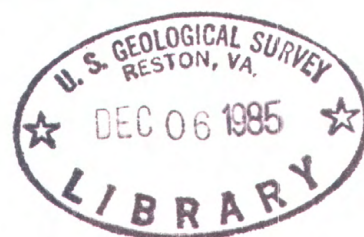


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Water Resources Data North Dakota Water Year 1984



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT ND-84-1
Prepared in cooperation with the State of North Dakota
and with other agencies

CALENDAR FOR WATER YEAR 1984

1983

OCTOBER

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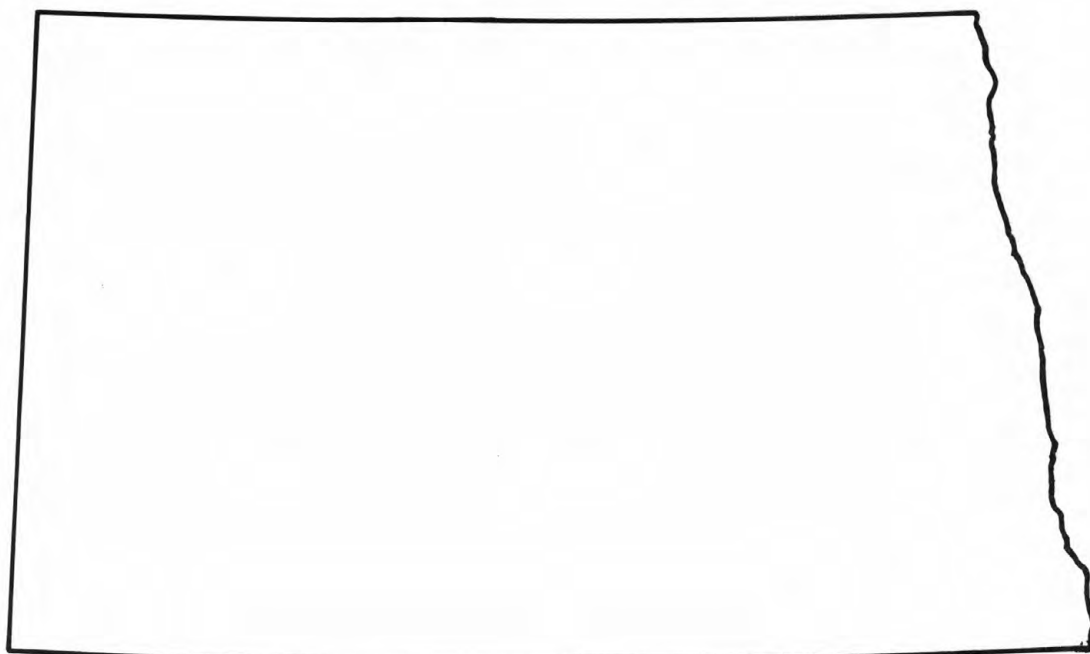
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Water Resources Data North Dakota Water Year 1984

by N.D. Haffield, and G.L. Ryan



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT ND-84-1
Prepared in cooperation with the State of North Dakota
and with other agencies

UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, SECRETARY

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For information on the water program in North Dakota write to
District Chief, Water Resources Division
U.S. Geological Survey
821 East Interstate Avenue
Bismarck, North Dakota 58501-1199

PREFACE

This volume of the annual hydrologic data report of North Dakota is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface- and ground-water data-collection networks in each State, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local, and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

This report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who typed, edited, and assembled the report. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the collection, processing, and tabulation of the data:

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[Letter after station name designates type of data:
(d) discharge, (c) chemical,
(m) microbiological, (t) water temperature, (s) sediment]

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WATER RESOURCES DATA FOR NORTH DAKOTA, 1984

INTRODUCTION

Water-resources data for the 1984 water year for North Dakota consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality of ground-water wells. This report contains discharge records for 108 gaging stations; stage only records for 21 gaging stations; stage and contents for 13 lakes and reservoirs; water quality for 108 gaging stations, 8 lakes, 33 wells, 2 precipitation stations; and water levels for 31 observation wells. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State, Federal, and local agencies in North Dakota.

Records of discharge and stage of streams, and contents or stage of lakes and reservoirs were first published in a series of U.S. Geological Survey water-supply papers entitled, "Surface Water Supply of the United States." Through September 30, 1960, these water-supply papers were in an annual series and then in a 5-year series for 1961-65 and 1966-70. Records of chemical quality, water temperatures, and suspended sediment were published from 1941 to 1970 in an annual series of water-supply papers entitled, "Quality of Surface Waters of the United States." Records of ground-water levels were published from 1935 to 1974 in a series of water-supply papers entitled, "Ground-Water Levels in the United States." Water-supply papers may be consulted in the libraries of the principal cities in the United States or may be purchased from the Branch of Distribution, U.S. Geological Survey, 604 South Pickett Street, Alexandria, VA 22304.

For the 1961 through 1970 water years, streamflow data were released by the Geological Survey in annual reports on a State-boundary basis. Water-quality records for water years 1964 through 1970 similarly were released either in separate reports or in conjunction with streamflow records.

Beginning with the 1971 water year, water data for streamflow, water quality, and ground water are published in official Survey reports on a State-boundary basis. These official Survey reports carry an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this volume is identified as "U.S. Geological Survey Water-Data Report ND-84-1". These water-data reports are for sale, in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephoning (701) 255-4011, ext. 601.

COOPERATION

The U.S. Geological Survey and organizations of the State of North Dakota have had cooperative agreements for the systematic collection of streamflow records since 1903, for ground-water levels since 1937, and for water-quality records since 1946. Organizations that assisted in collecting data through cooperative agreement with the Survey are:

Burleigh County Water Resource District, Alferd Thompson, Chairman

City of Dickinson, Arthur Baumgartner, Mayor

North Dakota Public Service Commission, Bruce Hagen, President

North Dakota State Water Commission, Vernon Fahy, Chief Engineer

Oliver County Board of Commissioners, Emil Hintz, Chairman

Assistance in the form of funds or services was given by other Federal agencies:

Corps of Engineers, U.S. Army

International Joint Commission, U.S. Department of State

Fish and Wildlife Service, U.S. Department of the Interior

Soil Conservation Service, U.S. Department of Agriculture

Bureau of Reclamation, U.S. Department of the Interior

Other Federal agencies of the U.S. Department of Interior for the development of the Missouri River basin.

Certain stations are maintained under agreement with Canada and the records are obtained and compiled in a manner equally acceptable in both countries. Most of these stations are designated as "International gaging stations."

HYDROLOGIC CONDITIONS

Precipitation in North Dakota during the 1984 water year was considerably less than normal in all but the southeastern corner of the state. Normally total yearly precipitation ranges from slightly under 16 inches in the western part of the State to about 19.5 inches in the southeastern corner of the State. Departures from normal for this year ranged from a -4.5 inches in the East-Central Division, to a +0.2 inches in the Southeastern Division. The average departure for the nine weather service divisions was a -2.6 inches.

A comparison of monthly precipitation for the 1984 water year with the average precipitation during the 1951-80 reference period for the nine National Weather Service Divisions in North Dakota is shown in figure 1. These data are from published reports of the National Weather Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce.

Monthly precipitation amounts for the period October to February were from near to slightly less than normal in the western and northern sections to slightly above normal in the eastern section. Because no large accumulations of snow occurred and because the temperature was generally mild, 10 to 15 degrees above normal during January and February, much of the State was free of snow cover by the end of February. Streamflow conditions during this period were near normal with typical low-flow winter conditions prevailing. Some streams, especially those in the Missouri River drainage basin did show an increase toward the end of January and again in February as some early snowmelt runoff occurred; however runoff volumes during the period were relatively small.

Precipitation increased during March and April as several spring storms moved across the State. On April 26-28 a record breaking blizzard covered the southwestern to north-central sections of the State with 10 to 25 inches of snow. The precipitation from this storm and that from smaller storms which occurred during late March to mid-April, resulted in the total precipitation for the two months being above normal throughout the State. Some runoff occurred from each of the individual storms, but the rivers were relatively free of any ice that would restrict their capacity and the precipitation occurred when the ground was unfrozen. No widespread or notable flooding occurred.

The remainder of the water year was dry throughout the entire State. Although the precipitation amounts for the month of June were near normal at many locations, the total amount of precipitation received during the period May to September departed from normal from as much as -6.1 inches in the north-central division to a -2.7 inches in the southeastern division. Mild to severe drought conditions existed throughout much of the eastern and northern section of the State.

Hydrographs that compare the historic mean monthly discharges with the 1984 monthly mean discharges for selected streams located within each of the weather service divisions are shown in fig. 2. Generally the hydrographs reflect the dry conditions that existed during the year. Streamflow at most of the stations was well below average. During the period March to May several of the streams had above average discharges due to the runoff from the spring storms, especially the late April blizzard. Peak flows occurred at several gaging stations in early May because of the runoff from this storm. A notable rise in discharge also occurred at some locations in the southwestern and south-central sections of the State during June because several summer rainstorms occurred in the area.

Because the water quality at any particular site is dependent upon the source of streamflow, water quality varies considerably across the State. During periods of low flow, when the major part of flow is derived from ground-water inflow, the dissolved-solids concentrations are quite large, reflecting the mineralized characteristics of the inflow. Maximum values of specific conductance are observed during the fall and winter months when the flow is primarily from ground-water sources. As streamflow increases from increased runoff, the concentration of constituents in solution will decrease while other materials that tend to be carried in suspension, such as sediment, will increase. The variability in water quality is the greatest during the spring, when there is a considerable quantity of overland runoff from snowmelt. Minimum values are observed during this period with the minimum value being dependent on the quantity of runoff that is available for dilution.

This years measurements of specific conductance all plot within the range that have historically been observed at each of the selected stations.

Ground-water level measurements made in a well completed in the Sheyenne Delta aquifer in the east-central part of the State are shown in figure 3. The water levels, which were slightly below average most of the time, show the typical annual fluctuation with recovery during wet periods in the spring and depletions during the dry spells of the summer and fall.

The ground-water level measurements that were made in a well completed in the Sentinel Butte aquifer in the southwestern part of the State are shown in figure 4. These water levels were above the historic mean for the entire year, but were generally lower than those for the previous year.

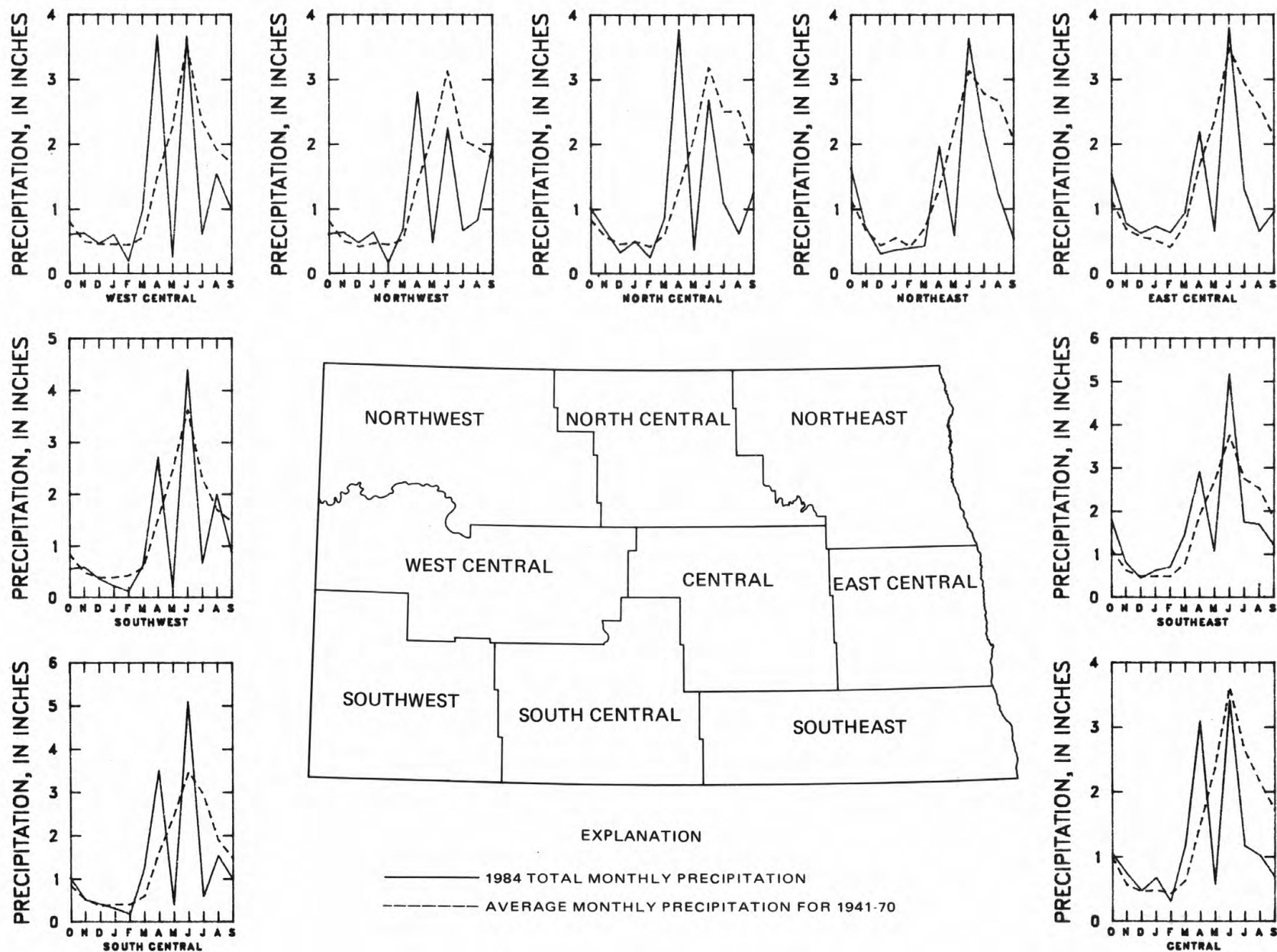


Figure 1.—Comparison of 1984 water year precipitation to 1941-70 average.

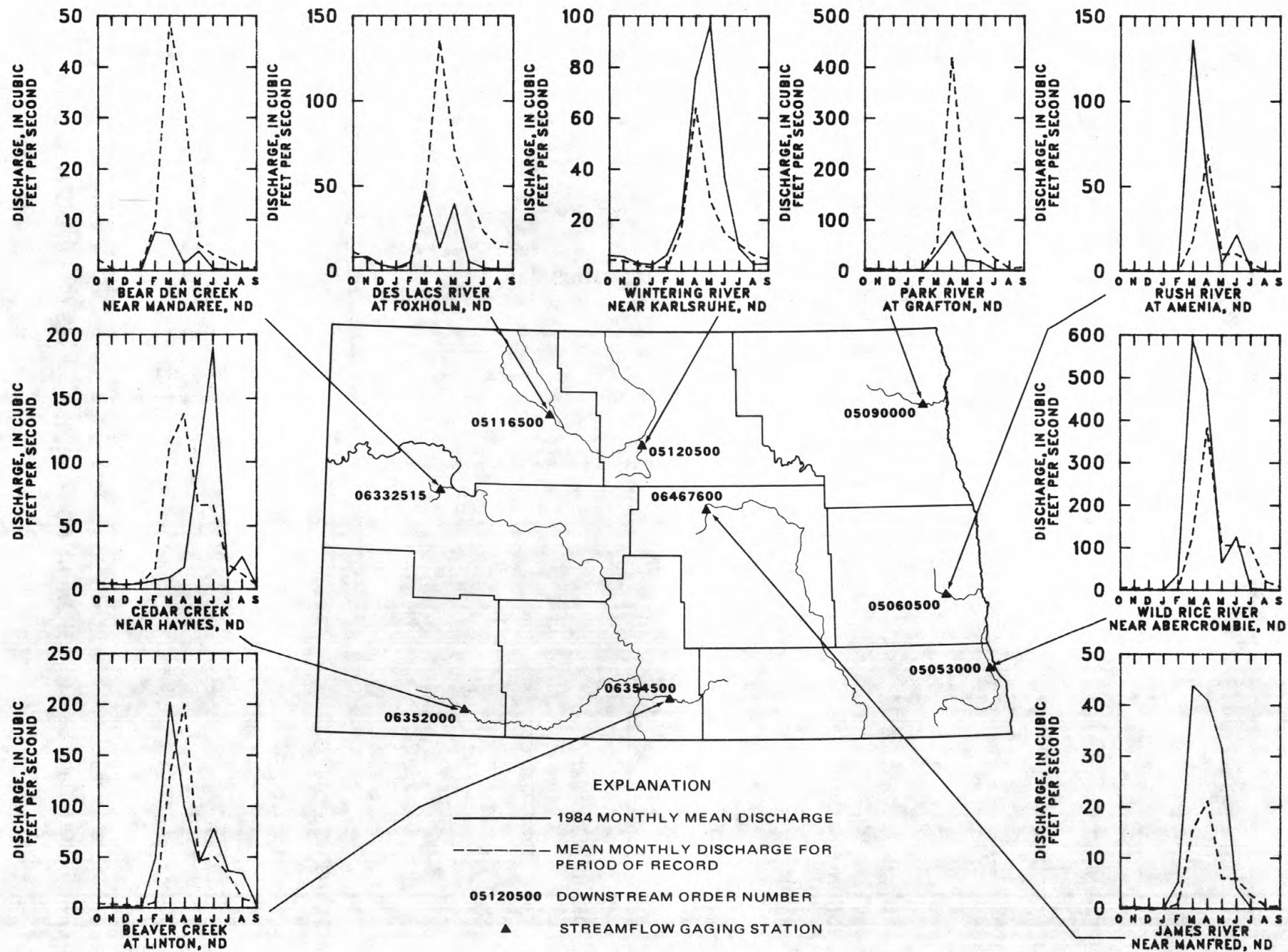


Figure 2.—Comparison of 1984 streamflow to mean streamflow for period of record.

Table 1.--Comparison of 1984 specific-conductance measurements with monthly and annual means, maximums, and minimums for period of record

| | Oct. | Nov. | Dec. | Jan. | Feb | Mar. | Apr. | May | June | July | Aug. | Sept. | Period of Record | 1984 |
|---|------|------|--------------|------|------|--------------------|--|------|---------------------------------|------|------|-------|---------------------|------|
| <u>05082500 Red River at Grand Forks, ND</u> | | | | | | | | | | | | | | |
| Mean | 504 | 580 | 606 | 579 | 563 | 505 | 447 | 560 | 548 | 495 | 499 | 482 | 518 | 499 |
| Maximum | 660 | 750 | 976 | 870 | 830 | 746 | 747 | 702 | 699 | 640 | 621 | 674 | 976 | 660 |
| Minimum | 399 | 440 | 468 | 445 | 450 | 306 | 200 | 370 | 348 | 280 | 360 | 340 | 200 | 305 |
| 1984 Values | 585 | -- | 555 | 550 | 462 | 305 325 | 345 430 450 530 620 660 | 655 | 465 385 520 595 615 | 504 | 420 | 500 | -- | -- |
| <u>05114000 Souris River near Sherwood, ND</u> | | | | | | | | | | | | | | |
| Mean | 1080 | 1250 | 1640 | 1750 | 1700 | 1350 | 597 | 751 | 998 | 1020 | 975 | 1080 | 1140 | 1110 |
| Maximum | 1470 | 1880 | 2230 | 2770 | 2200 | 2180 | 1280 | 1160 | 1340 | 1420 | 1300 | 1240 | 2770 | 2030 |
| Minimum | 710 | 925 | 1250 | 1280 | 640 | 200 | 277 | 345 | 520 | 540 | 128 | 775 | 128 | 515 |
| 1984 Values | 1000 | 1270 | -- | 1470 | 1430 | 2030 515 | 590 865 | -- | 1170 | 1160 | 690 | -- | -- | -- |
| <u>06337000 Little Missouri River near Watford City, ND</u> | | | | | | | | | | | | | | |
| Mean | 1420 | 1900 | 2960 | 2380 | 1220 | 981 | 1430 | 2000 | 1640 | 1880 | 1420 | 1800 | 1670 | 1580 |
| Maximum | 3100 | 2610 | 5000 | 3350 | 2030 | 1750 | 2700 | 3100 | 2710 | 3000 | 2400 | 2390 | 5000 | 2440 |
| Minimum | 720 | 740 | 1720 | 1500 | 640 | 400 | 515 | 1410 | 800 | 1080 | 1000 | 900 | 400 | 1030 |
| 1984 Values | 2270 | 2240 | -- | -- | -- | 1030 | -- | -- | 1080 1070 | -- | 1600 | -- | -- | -- |
| <u>06354000 Cannonball River at Breien, ND</u> | | | | | | | | | | | | | | |
| Mean | 1600 | 2180 | 2470 | 2340 | 1850 | 865 | 1060 | 1760 | 2140 | 1550 | 1480 | 1590 | 1710 | 1860 |
| Maximum | 2130 | 3070 | 3290 | 3800 | 3710 | 3100 | 2260 | 2930 | 3020 | 3000 | 2800 | 2300 | 3800 | 3150 |
| Minimum | 903 | 1600 | 2100 | 680 | 280 | 190 | 300 | 481 | 610 | 570 | 575 | 730 | 190 | 530 |
| 1984 Values | 1850 | 2040 | 2900 3000 | 3150 | 1300 | 1940 530 910 | 1250 | 2450 | -- | 1720 | 1430 | 1530 | -- | -- |

WATER RESOURCES DATA FOR NORTH DAKOTA, 1984

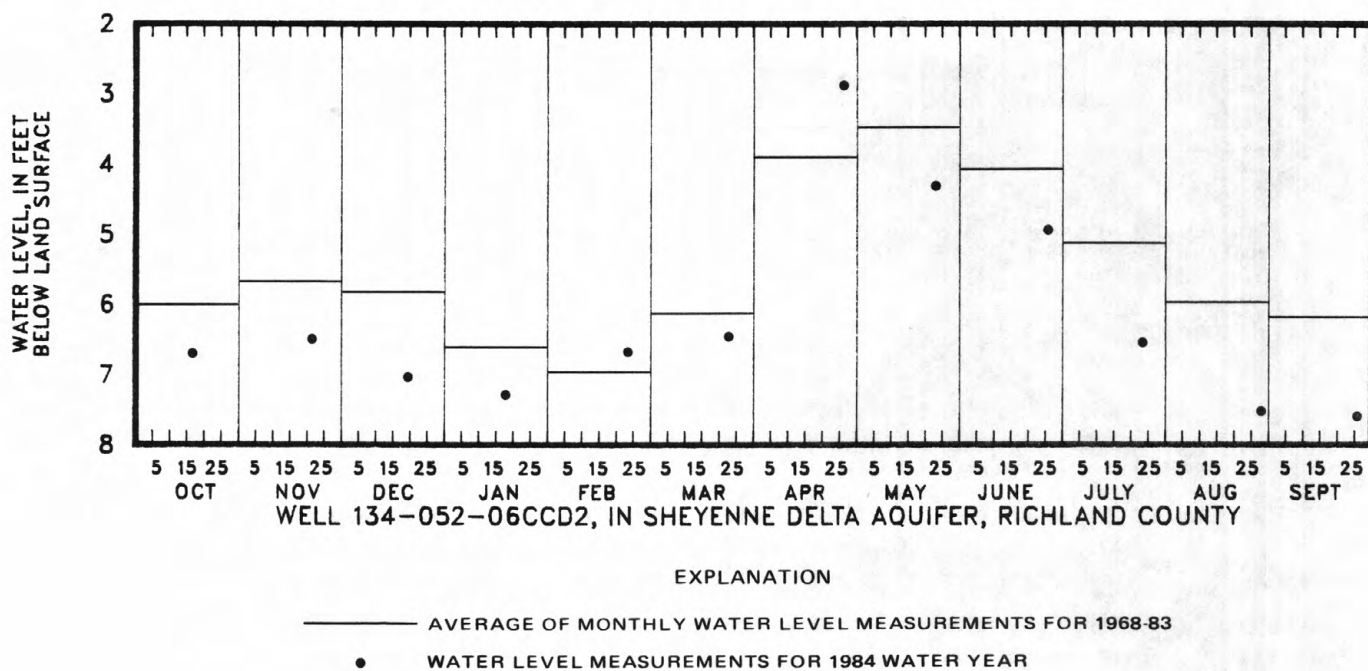


Figure 3.—Ground-water levels for 1984 compared with mean of monthly water level measurements for 1963-83 for a representative well.

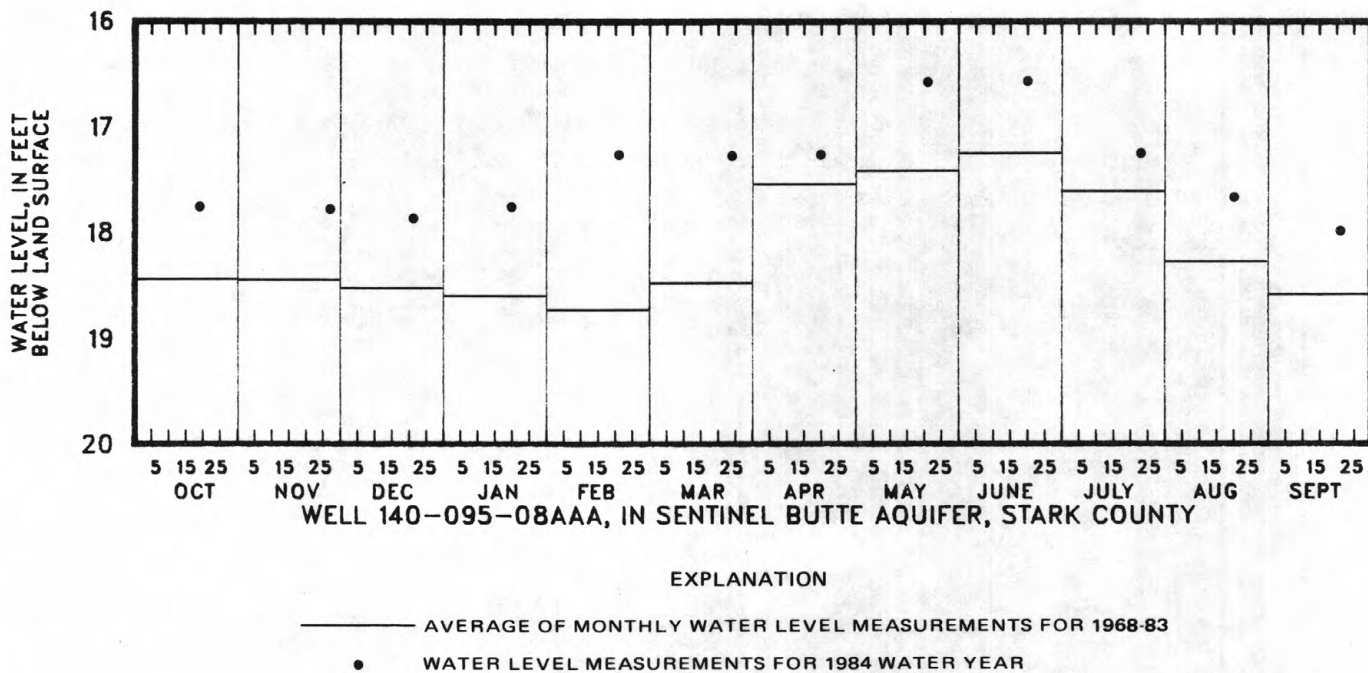


Figure 4.—Ground-water levels for 1984 compared with mean of monthly water level measurements for 1968-83 for a representative well.

DEFINITION OF TERMS

Terms related to streamflow, water quality, and other hydrologic data, as used in this report, are defined below. See also the table for converting inch-pound units to International System Units (SI) on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equivalent to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer penetrated by the well. A flowing artesian well is one in which the water level flows at the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warm-blooded animals. They commonly are used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies within 24 hours when incubated at $44.5^{\circ}\text{C} \pm 0.2^{\circ}\text{C}$ on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample.

Fecal streptococcal bacteria are bacteria also found in intestines of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at $35^{\circ}\text{C} \pm 1.0^{\circ}\text{C}$ on M-enterococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters of sample.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria.

Cells/volume refers to the number of cells of any organism that is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters or liters.

Cfs-day is the volume of water represented by flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons or 2,447 cubic meters.

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and provides an approximation of the quantity of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Coliform organisms are a group of bacteria used as an indicator of the sanitary quality of the water. The number of coliform colonies per 100 milliliters is determined by the immediate-incubation, membrane-filter method.

Color unit is produced by 1 milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir, lake, stream or aquifer. Contents herein is that of a reservoir and unless otherwise indicated, is computed on the basis of a level pool and does not include bank storage.

Continuing-record station is a specified site which meets one or more conditions as listed:

1. When gage-height record for a river or canal is recorded or collected by an observer on a regular basis during periods of flow. Daily discharge and/or gage-height record may be published.
2. When ground-water level below land-surface datum is recorded or measured 10 or more months during the water year.
3. When chemical samples are collected daily or monthly for 10 or more months during the water year.
4. When water-temperature records include measurements made once or more times daily.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section in a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Crest-stage gage is a device for obtaining the elevation of the flood crest of a stream.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Cubic foot per second (FT³/S, ft³/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to approximately 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment), that passes a given point within a given period of time.

Instantaneous discharge is the discharge at a particular instant of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Dissolved refers to the quantity of substance present in the true chemical solution. In practice, however, the term includes all forms of substance that will pass through a 0.45 micrometer membrane filter, and thus may include some very small (colloidal) suspended particles. Analyses for "dissolved" constituents are performed on subsamples of the filtrate.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the river upstream from the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the Earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height commonly is used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is attributable to the presence of alkaline earths (principally calcium and magnesium) and is expressed as equivalent calcium carbonate (CaCO₃).

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an 8-digit number.

Micrograms per gram (UG/G, µg/g) is a unit expressing the concentration of a chemical element as the mass (micrograms) of the element sorbed per unit mass (gram) of sediment.

Micrograms per liter (UG/L, µg/L) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to 1 milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represent the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in milligrams per liter, and is based on the mass of sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

Partial-record station is a particular site where limited streamflow and/or water-quality data are collected systematically for a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters, of suspended sediment or bed material determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size distributions used in this report are based on recommended classifications made by the American Geophysical Union Subcommittee on Sediment Terminology.

The classifications are as follows:

| Classification | Size (millimeters) | Method of analysis |
|----------------|--------------------|------------------------|
| Clay..... | 0.00024 - 0.004 | Sedimentation |
| Silt..... | .004 - .062 | Sedimentation |
| Sand..... | .062 - 2.0 | Sedimentation or sieve |
| Gravel..... | 2.0 - 64.0 | Sieve |

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic material is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, mass, or volume.

Percent saturation is a comparison of the actual oxygen content of water to the saturation content of oxygen, expressed in terms of percent.

Pesticides are chemical compounds used to control undesirable plants and animals. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides. Insecticides and herbicides, which control insects and plants respectively, are the two categories reported.

pH indicates the degree of acidity or alkalinity of water and is expressed in terms of pH units. The pH value of a solution is the negative logarithm of the concentration of hydrogen ions, in moles per liter. A pH of 7.0 indicates that the water is neither acid nor alkaline. pH readings progressively less than 7.0 denote increasing acidity and those progressively greater than 7.0 denote increasing alkalinity. The pH of most natural surface waters ranges between 6 and 8.

Picocurie (PC, pCi) is one trillionth (1×10^{-12}) of the quantity of radioactivity represented by a curie. A curie is the quantity of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 disintegrations per minute.

Polychlorinated biphenyls (PCB) are industrial chemicals that are mixtures of chlorinated biphenyl compounds having various percentages of chlorine. They are similar in structure to organochlorine insecticides.

Recoverable from bottom material is the quantity of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of only readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total quantity (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Runoff in inches (IN, in) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are affected by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land use, and quantity and intensity of precipitation.

Bedload is that sediment transported by a river in rolling and saltation on or near the streambed.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 foot above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture.

Suspended-sediment discharge (tons/day) is the rate at which dry weight of sediment passes a section of a stream or is the quantity of sediment, as measured by dry weight or volume, that passes a section in a given time. It is computed by multiplying discharge times milligrams per liter times 0.0027.

Suspended-sediment load is quantity of suspended sediment passing a section in a specified period.

Total sediment discharge (tons/day) is the sum of the suspended sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry weight or volume, that passes a section during a given time.

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions with soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance derived from the atmosphere, vegetation, soil, or rocks that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in micromhos per centimeter at 25° Celsius. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids concentration of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in micromhos). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage is the height of a water surface above an established datum plane; also gage height.

Stage-discharge relation is the relation between gage height (stage) and volume of water per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Surface area of a lake is that area outlined on the latest U.S. Geological Survey topographic map as the boundary of the lake and measured by a planimeter, in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimeted. All areas shown are those for the stage when the planimeted map was made.

Suspended (as used in tables of chemical analyses) refers to the quantity (concentration) of the total concentration in a water-sediment mixture. The water-sediment mixture is associated with (or sorbed on) that material retained on a 0.45-micrometer filter.

Suspended, recoverable is the quantity of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45-micrometer membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" quantity (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total quantity of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45-micrometer membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical method used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total constituents" are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Thermograph is a thermometer that continuously and automatically records, on a chart, the water temperature of a stream. "Temperature recorder" is the term used to indicate the presence of a thermograph or a digital mechanism that automatically records water temperatures on paper tape.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration in milligrams per liter by 0.00136.

Tons per day is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour day.

Total is the total quantity of a given constituent in a representative water-suspended sediment sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical method used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determines all of the constituent in the sample.)

Total in bottom material is the total quantity of a given constituent in a representative sample of bottom material. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical method used, is required to judge when the results should be reported as "total in bottom material."

Total, recoverable is the quantity of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" quantity (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Water year in Geological Survey reports dealing with surface-water supply is the 12 months October 1 through September 30. The water year is designated by the calendar year in which it ends and includes 9 of the 12 months of that calendar year plus the last 3 months of the previous calendar year. Thus, the year ending September 30, 1981, is called the "1981 water year."

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharge. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WRD is used as an abbreviation for "Water-Resources Data" in REVISED RECORDS paragraph to refer to State annual basic-data reports published before 1975.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports.

DOWNSTREAM ORDER AND STATION NUMBER

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a main-stream station are listed before that station. A station on a tributary that enters between two main-stream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary on which a station is situated with respect to the stream to which it is immediately tributary is indicated by an indentation in a list of stations in the front of the report. Each indentation represents one rank. This downstream order and system of indentation show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

As an added means of identification, each hydrologic station and partial-record station has been assigned a station number. These are in the same downstream order used in this report. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete 8-digit number for each station such as 05051700, which appears just to the left of the station name, includes the 2-digit part number "05" plus the 6-digit downstream order number "051700".

NUMBERING SYSTEM FOR WELLS AND MISCELLANEOUS SITES

The 8-digit downstream order station numbers are not assigned to wells and miscellaneous sites where only random water-quality samples or discharge measurements are obtained.

The well and miscellaneous-site numbering system of the U.S. Geological Survey is based on the grid system of latitude and longitude. The system provides the geographic location of the well or miscellaneous site and a unique number for each site. The number consists of 15 digits; the first 6 digits denote the degrees, minutes, and seconds of latitude; the next 7 digits denote degrees, minutes, and seconds of longitude; and the last 2 digits (assigned sequentially) identify the wells or other sites within a 1-second grid. See figure 5.

In order to compare data for wells in other publications, such as the county ground-water studies, the wells in this report also are numbered according to a system based on the location in the public land classification of the U.S. Bureau of Land Management. The system is illustrated in figure 6. The first numeral denotes the township north of a base line, the second numeral denotes the range west of the fifth principal meridian, and the third numeral denotes the section in which the well is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter section (10-acre tract). For example, well 139-049-15ADC is in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec. 15, T. 139 N., R. 049 W. Consecutive terminal numerals are added if more than one well is recorded within a 10-acre tract.

SPECIAL NETWORKS AND PROGRAMS

Hydrologic bench-mark station is one that provides hydrologic data for a basin in which the hydrologic regimen will likely be governed solely by natural conditions. Data collected at a bench-mark station may be used to separate effects of natural from man-made changes in other basins which have been developed and in which the physiography, climate, and geology are similar to those in the undeveloped bench-mark basin.

National stream-quality accounting network (NASQAN) is a data-collection network designed by the U.S. Geological Survey to meet many of the information demands of agencies or groups involved in national or regional water-quality planning and management. Both accounting and broad-scale monitoring objectives have been incorporated into the network design. Areal configuration of the network is based on river-basin accounting units (identified by 8-digit hydrologic-unit numbers) designated by the Office of Water Data Coordination of the U.S. Geological Survey. Primary objectives of the network are (1) to depict areal variability of streamflow and water-quality conditions nationwide on a year-by-year basis and (2) to detect and assess long-term changes in streamflow and stream quality.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

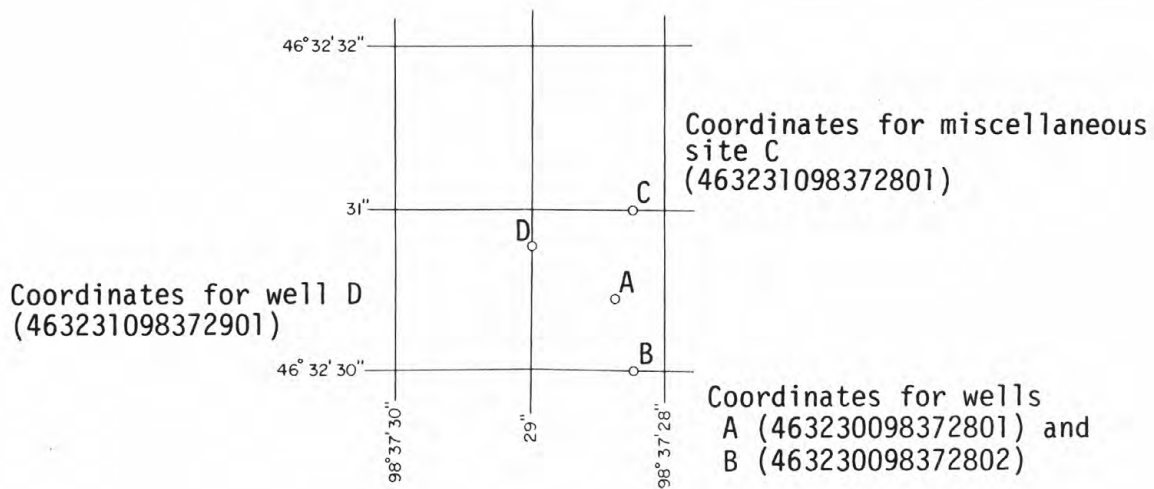


FIGURE 5.—System for numbering wells and miscellaneous sites (latitude and longitude).

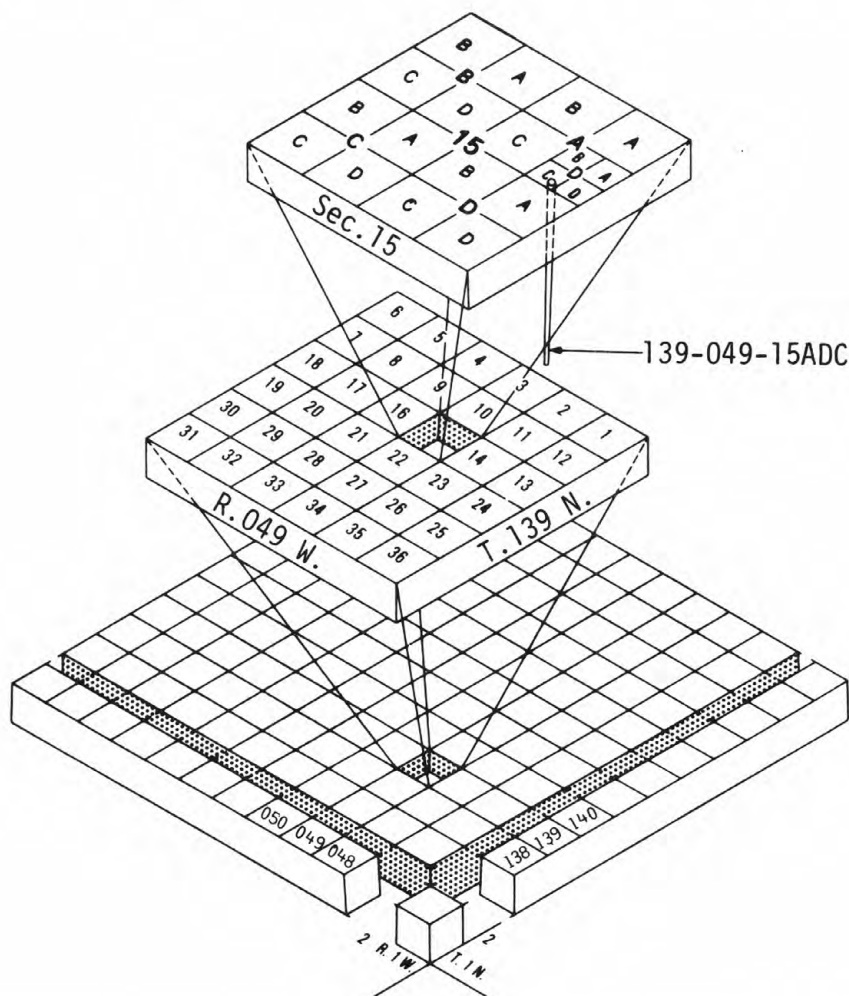


FIGURE 6.—System for numbering wells and miscellaneous sites (township and range).

EXPLANATION OF STAGE AND WATER-DISCHARGE RECORDS

Collection and computation of data

The hydrologic data collected at gaging stations consist of records of stage and measurements of discharge of streams or canals, and stage, surface area, and contents of lakes or reservoirs. In addition, measurements and observations of factors affecting the stage-discharge relation or the stage-capacity relation, weather records, and other information are used to supplement hydrologic data in determining the daily flow or volume of water in storage. Records of stage are obtained from either direct readings on a nonrecording gage or from a water-stage recorder that gives either a continuous graph of the fluctuations or a tape punched at selected time intervals. Measurements of discharge are made with a current meter, using the general methods adopted by the Geological Survey. These methods are described in standard textbooks, in Water-Supply Paper 888, and in U.S. Geological Survey Techniques of Water Resources Investigations, Book 3, Chapter A6.

For stream-gaging stations, rating tables giving the discharge for any stage are prepared from stage-discharge relation curves. If extensions to the rating curves are necessary to express discharge greater than measured, they are made on the basis of indirect measurements of peak discharge (such as slope-area or contracted-opening measurements, computation of flow over dams or weirs), step-backwater techniques, velocity-area studies, and logarithmic plotting. The daily mean discharge is computed from gage heights and rating tables, then the monthly and yearly mean discharge are computed from the daily figures. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is computed by the shifting-control method, in which correction factors based on individual discharge measurements and notes by engineers and observers are used in applying the gage heights to the rating tables. If the stage-discharge relation for a station is temporarily changed by the presence of aquatic growth or debris on the control, the daily mean discharge is computed by what is virtually the shifting-control method.

At some stream-gaging stations the stage-discharge relation is affected by ice in the winter, and it becomes impossible to compute the discharge in the usual manner. Discharge for periods of ice effect is computed on the basis of gage-height record and occasional winter discharge measurements. Consideration is given to the available information on temperature and precipitation, notes by gage observers and hydrologists, and hydrographic comparison with other stations in the same or nearby basins.

For a lake or reservoir station, capacity tables giving the contents for any stage are prepared from stage-area relation curves defined by surveys. The application of the stage to the capacity table gives the contents, from which the daily, monthly, or yearly change in contents is computed.

If the stage-capacity curve is subject to changes because of deposition of sediment in the reservoir, periodic resurveys of the reservoir are necessary to define new stage-capacity curves. During the period between reservoir surveys, the computed contents may be increasingly in error due to the gradual accumulation of sediment.

For some gaging stations there are periods when no gage-height record is obtained or the recorded gage height is so faulty that it cannot be used to compute daily discharge or contents. This happens when the recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods the daily discharges are estimated on the basis of recorded range in stage, prior and subsequent records, discharge measurements, weather records, and comparison with records for other stations in the same or nearby basins. Similarly, daily contents may be estimated on the basis of operator's log, prior and subsequent records, inflow-outflow studies, and other information.

The data in this report generally comprise a description of the station and tabulations of daily and monthly figures. For gaging stations on streams, a table showing the daily discharge and monthly and yearly discharge is given. For gaging stations on lakes and reservoirs, a monthly summary table of stage and contents or a table showing the daily contents is given. Tables of daily mean gage heights are included for some streamflow stations and for some reservoir stations. Records are published for the water year, which begins on October 1 and ends on September 30.

The description of the gaging station gives the location, drainage area, period of record, notations of revisions of previously published records, type and history of gages, general remarks, average discharge, and extremes of discharge or contents. The location of the gaging station and the drainage area are obtained from the most accurate maps available. River mileage, given under "LOCATION" for some stations, is that determined and used by the U.S. Army Corps of Engineers or other agencies. Periods for which there are published records for the present station or for stations generally equivalent to the present one are given under "PERIOD OF RECORD."

Previously published streamflow records of some stations have been found to be in error on the basis of data or information later obtained. Revisions of such records usually are published along with the current records in one of the annual or compilation reports. In order to make it easier to find such revised records, a paragraph headed "REVISED RECORDS" has been added to the description of all stations for which revised records have been published. Listed therein are all the reports in which revisions have been published, each followed by the water years for which figures are revised in that report. In listing the water years, only one number is given; for instance, 1981 stands for the water year October 1, 1980, to September 30, 1981. If no daily, monthly, or annual figures of discharge are affected by the revision, the fact is brought out by notations after the year dates as follows: "(M)" means that only the instantaneous maximum discharge was revised; "(m)" that only the instantaneous minimum was revised; and "(P)" that only peak discharges were revised. If the drainage area has been revised, the report in which the revised figure was first published is given. It should be noted that for all stations for which runoff in cubic feet per second per square mile, and runoff, in inches, are published, a revision of the drainage area necessitates corresponding revision of all values based on the drainage area. Revised values of runoff in cubic feet per second per square mile, and runoff, in inches, resulting from a revision of the drainage area only usually are not published in the annual series of reports.

The type of gage currently in use; the datum of the present gage referred to National Geodetic Vertical Datum of 1929; and a condensed history of the type, location, and datum of previous gages used during the period of record are given under "GAGE." National Geodetic Vertical Datum of 1929 is explained in "DEFINITION OF TERMS."

Information pertaining to the accuracy of the discharge records and to conditions that affect the natural flow of the gaging station is given under "REMARKS." For reservoir stations, information on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir is given under "REMARKS."

The average discharge for the number of years indicated is given under "AVERAGE DISCHARGE"; it is not given for stations having fewer than 5 complete water years of record or for stations where changes in water development during the period of record cause the value to have little significance. In addition, the median of yearly mean discharges is given for stations that have 10 or more complete water years of record, if the median differs from the average by more than 10 percent.

Under "EXTREMES" the extremes for the period of record are given first, second, information available outside the period of record, and last, those for the current year. Unless otherwise qualified, the maximum discharge (or contents) is the instantaneous maximum corresponding to the crest stage obtained by use of a water-stage recorder (graphic or digital), a crest-stage gage, or a nonrecording gage read at the time of the crest. If the maximum gage height did not occur on the same day as the maximum discharge (or contents), it is given separately. Similarly, the minimum is the instantaneous minimum unless otherwise qualified. For some stations peak discharges are listed with "EXTREMES FOR THE CURRENT YEAR"; if they are, all independent peaks, including the maximum for the year, above the selected base with the time of occurrence and corresponding gage heights are published in tabular format. The base discharge, which is given in the table heading, is selected so that an average of about three peaks a year will be presented. Peak discharges are not published for any canals, ditches, drains, or for any stream for which the peaks are subject to substantial control by man. Time of day is expressed in 24-hour local standard time; for example, 12:30 a.m. is 0030, 1:30 p.m. is 1330. The minimums for these stations are published in a separate paragraph following the table of peaks.

The daily table for stream-gaging stations gives the mean discharge for each day and is followed by monthly and yearly summaries. In the monthly summary below the daily table, the line headed "TOTAL" gives the sum of the daily figures. The line headed "MEAN" gives the average flow, in cubic feet per second, during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily discharges, respectively, for the month. Discharge for the month also may be expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN"), or in acre-feet (line headed "AC-FT"). Values for runoff in cubic feet per second per square mile, and runoff, in inches, are omitted if there is extensive regulation or diversion, if the drainage area includes large noncontributing areas, or if the average annual rainfall throughout the drainage basin usually is less than 20 inches. In the yearly summary below the monthly summary, the values shown are the appropriate daily discharges for the calendar and water years.

Footnotes to the table of daily discharge are introduced by the word "NOTE." Footnotes are used to indicate periods for which the discharge is computed or estimated by special methods because of no gage-height record, backwater from various sources, or other unusual conditions. Periods of no gage-height record are indicated if the period is continuous for a month or more or includes the maximum discharge for the year. Periods of backwater from an unusual source, of indefinite stage-discharge relation, or of any other unusual condition at the gage site are indicated only if they are a month or more in length and the accuracy of the records is affected. Days on which the stage-discharge relation is affected by ice are not indicated. The methods used in computing discharge for various unusual conditions have been explained in preceding paragraphs.

For most gaging stations on lakes and reservoirs the data presented comprise a description of the station and a monthly summary table of stage and contents. For some reservoirs a table showing daily contents or stage is given. A table of capacity at given stages is published for all reservoirs for which records are published on a daily basis, but is not published for reservoirs for which only monthly data are given.

Data collected at partial-record stations follow the information for continuous record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of annual maximum stage and discharge at crest-stage stations and the second is a table of both low flow and high-flow measurements. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. Occasionally, a series of discharge measurements are made within a short time to investigate the seepage gains or losses along a reach of a stream or to determine the low-flow characteristics of an area. Such measurements also are given in special tables following the tables of partial-record stations.

Accuracy of field data and computed results

The accuracy of streamflow data depends primarily on (1) the stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of observations of stage, measurements of discharge, and interpretations of records.

The station description under "REMARKS" states the degree of accuracy of the records. "Excellent" means that about 95 percent of the daily discharges are within 5 percent; "good", within 10 percent; and "fair" within 15 percent. "Poor" means that daily discharges have less than "fair" accuracy.

Values of daily mean discharge in this report are shown to the nearest hundredth of a cubic foot per second for discharges of less than 1 ft³/s; to tenths between 1.0 and 10 ft³/s; to whole numbers between 10 and 1,000 ft³/s; and to 3 significant figures for values greater than 1,000 ft³/s. The number of significant figures used is based solely on the magnitude of the value. The same rounding rules apply to discharge values listed for partial-record stations.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff due to the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation due to artificial causes, or to other factors. For such stations, values of runoff in cubic feet per second per square mile, and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, for changes in contents of reservoirs, or for other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the measured discharge.

Other data available

Information of a more detailed nature than that published for most of the gaging stations, such as water temperatures, discharge measurements, gage-height records, and rating tables is on file in the district office. Also, most gaging-station records are available in computer-usable form and many statistical analyses have been made. For example, the computer listing of annual maximum discharges for the period of record at the Knife River near Hazen station (06340500) is shown in table 2. The Log-Pearson Type III annual peak-flow frequency analysis for these data following the U.S. Water Resources Council guidelines in Bulletin 17B is shown in table 3. The frequency analysis may also be shown graphically (fig. 7).

Usually data users are interested in comparing current streamflow to long-term averages. Examples of the statistics computed for the monthly and annual mean discharges, respectively, for the Knife River near Hazen are shown in tables 4 and 5. Current flow data at U.S. Geological Survey gaging stations are available upon request, but all data are provisional and subject to revision until published.

Many other statistics and data formats are available upon request. The information generally is available on a timely basis and can be specifically tailored to the individual data-users needs.

Records of discharge collected by agencies other than the U.S. Geological Survey

The National Water Data Exchange, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA 22092, maintains an index of all discharge measurement sites in the State. Information on records available at specific sites can be obtained upon request.

| PAGE 1 | | PKTBL/TXT | | | |
|---------------|----------|----------------------------|------------------------|----------------------------|----------|
| WATER YEAR | DATE | PEAK DISCHARGE (CFS) | GAGE HEIGHT (FT) | MAX GAGE HEIGHT (FT) | DATE |
| 1930 | 02/21/30 | 3070.00 | 23.20 | | |
| 1931 | 09/22/31 | 1450.00 | 11.60 | | |
| 1932 | 06/14/32 | 1300.00 | 11.10 | | |
| 1933 | 03/17/33 | 2200.00 | 14.50 | | |
| 1938 | 07/05/38 | 7540.00 | 23.00 | | |
| 1939 | 03/24/39 | 9300.00 | 24.47 | | |
| 1940 | 07/29/40 | 1150.00 | 10.92 | | |
| 1941 | 06/09/41 | 4110.00 | 20.23 | | |
| 1942 | 06/07/42 | 3120.00 | 17.10 | | |
| 1943 | 03/26/43 | 26500.00 | 26.30 | | |
| 1944 | 04/03/44 | 8010.00 | 23.39 | | |
| 1945 | 03/15/45 | 8690.00 | 23.99 | | |
| 1946 | 03/03/46 | 3500.00 | 19.30 | | |
| 1947 | 06/25/47 | 6000.00 | 21.70 | 21.95 | 03/25/47 |
| 1948 | 03/24/48 | 7070.00 | 23.62 | | |
| | 03/30/48 | 4320.00 | | | |
| | 04/04/48 | 4760.00 | | | |
| 1949 | 04/06/49 | 7760.00 | 23.30 | 24.10 | 04/03/49 |
| 1950 | 04/17/50 | 22700.00 | 25.93 | | |
| 1951 | 03/30/51 | 9000.00 | 25.36 | | |
| | 04/05/51 | 7600.00 | 23.67 | | |
| 1952 | 04/07/52 | 20200.00 | 25.83 | | |
| 1953 | 06/14/53 | 3440.00 | 17.31 | | |
| 1954 | 04/08/54 | 3880.00 | 18.06 | | |
| 1955 | 03/13/55 | 1400.00 | 11.35 | | |
| 1956 | 03/21/56 | 6630.00 | 23.76 | | |
| 1957 | 03/01/57 | 1590.00 | 12.49 | | |
| 1958 | 03/28/58 | 3500.00 | 19.82 | | |
| 1959 | 03/24/59 | 4930.00 | 20.14 | | |
| 1960 | 03/27/60 | 7230.00 | 23.13 | | |
| 1961 | 03/03/61 | 488.00 | 9.62 | 9.72 | 03/02/61 |
| 1962 | 05/31/62 | 3860.00 | 17.48 | | |
| | 06/16/62 | 2230.00 | 13.40 | | |
| | 06/22/62 | 2060.00 | 12.91 | | |
| | 07/06/62 | 1530.00 | 11.36 | | |
| | 07/19/62 | 2340.00 | 13.72 | | |
| 1963 | 06/10/63 | 1050.00 | 9.63 | | |
| 1964 | 06/18/64 | 5170.00 | 20.17 | | |
| | 07/05/64 | 1910.00 | 12.46 | | |
| 1965 | 04/15/65 | 3330.00 | 15.99 | | |
| | 05/05/65 | 2030.00 | 12.64 | | |
| | 05/27/65 | 1950.00 | 12.34 | | |
| 1966 | 06/24/66 | 35300.00 | 27.01 | | |
| | 03/14/66 | 4230.00 | 17.82 | | |
| | 08/01/66 | 1500.00 | 10.75 | | |
| 1967 | 03/25/67 | 7980.00 | 23.88 | | |
| | 03/04/67 | 2500.00 | | | |
| | 04/18/67 | 2430.00 | 12.72 | | |
| | 05/08/67 | 3740.00 | 15.76 | | |
| 1968 | 03/06/68 | 1800.00 | 18.37 | | |
| 1969 | 04/07/69 | 11800.00 | 24.75 | | |
| | 07/11/69 | 1710.00 | 11.51 | | |
| | 07/18/69 | 4480.00 | 19.25 | | |
| 1970 | 05/11/70 | 8180.00 | 23.83 | | |
| | 04/30/70 | 3090.00 | 15.12 | | |
| | 06/19/70 | 1860.00 | 11.95 | | |
| 1971 | 03/17/71 | 4320.00 | 18.79 | | |
| | 03/31/71 | 2790.00 | 15.09 | | |
| | 06/06/71 | 3760.00 | 16.57 | | |
| | 06/09/71 | 2610.00 | 13.97 | | |
| 1972 | 03/15/72 | 19000.00 | 26.17 | | |
| | 06/13/72 | 1580.00 | 11.05 | | |
| | 06/20/72 | 2960.00 | 14.98 | | |
| 1973 | 03/02/73 | 3900.00 | 21.44 | | |
| 1974 | 03/03/74 | 1350.00 | 14.28 | | |
| 1975 | 05/01/75 | 6600.00 | 22.60 | 23.37 | 04/24/75 |
| | 04/24/75 | 6500.00 | 23.37 | | |
| 1976 | 03/19/76 | 3000.00 | 18.00 | | |
| 1977 | 06/19/77 | 1200.00 | 9.75 | 11.69 | 03/11/77 |
| 1978 | 03/27/78 | 11000.00 | 25.10 | | |
| 1979 | 04/18/79 | 5440.00 | 20.26 | | |
| | 03/20/79 | 1700.00 | | | |
| | 04/13/79 | 2000.00 | | | |
| | 06/25/79 | 2000.00 | | | |
| 1980 | 06/15/80 | 1620.00 | 10.58 | | |
| 1981 | 02/18/81 | 900.00 | 9.92 | | |
| 1982 | 03/31/82 | 10500.00 | 25.14 | | |
| | 02/23/82 | 2000.00 | | | |
| | 03/15/82 | 4400.00 | | | |
| | 04/13/82 | 6900.00 | 22.64 | | |
| | 06/11/82 | 4000.00 | 17.20 | | |
| 1983 | 03/13/83 | 5300.00 | | 23.00 | 03/13/83 |
| | 10/31/82 | 2210.00 | 12.46 | | |
| | 03/07/83 | 3100.00 | | | |
| 1984 | 03/21/84 | 2500.00 | 14.50 | | |
| | 05/06/84 | 2160.00 | 12.33 | | |
| | 06/16/84 | 1710.00 | | | |

Table 2.--Computer printout of annual maximum discharge for period of record for Knife River near Hazen, ND (06340500).

PGM J407 VER 3.7
(REV 11/5/81)

U. S. GEOLOGICAL SURVEY
ANNUAL PEAK FLOW FREQUENCY ANALYSIS
FOLLOWING WRC GUIDELINES BULL. 17-B.

RUN-DATE 8/13/85 AT 1752 SEQ 1.0001

OPTIONS IN EFFECT -- PLOT BCPU LGPT NODB PPOS NORS EXPR CLIM

STATION - 06340500 /USGS KNIFE RIVER AT HAZEN, ND 1930-1984 06340500 /USGS

I N P U T D A T A S U M M A R Y

| -- YEARS OF RECORD -- SYSTEMATIC | HISTORIC | HISTORIC PEAKS | GENERALIZED SKEW | STD. ERROR OF GENERAL. SKEW | SKEW OPTION | GAGE BASE DISCHARGE | USER-SET OUTLIER CRITERIA HIGH OUTLIER LOW OUTLIER |
|-------------------------------------|----------|-------------------|---------------------|--------------------------------|----------------|------------------------|---|
| 51 | 0 | 0 | -0.400 | -- | WRC WEIGHTED | 0.0 | -- -- |

***** NOTICE -- PRELIMINARY MACHINE COMPUTATIONS. *****
***** USER RESPONSIBLE FOR ASSESSMENT AND INTERPRETATION. *****

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF195I-NO LOW OUTLIERS WERE DETECTED BELOW CRITERION. 323.2
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 59645.4

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

| | FLOOD BASE DISCHARGE | FLOOD BASE EXCEEDANCE PROBABILITY | LOGARITHMIC MEAN | LOGARITHMIC STANDARD DEVIATION | LOGARITHMIC SKEW |
|-------------------|-------------------------|---|---------------------|--------------------------------------|---------------------|
| SYSTEMATIC RECORD | 0.0 | 1.0000 | 3.6426 | 0.4083 | -0.023 |
| W R C ESTIMATE | 0.0 | 1.0000 | 3.6426 | 0.4083 | -0.118 |

ANNUAL FREQUENCY CURVE ORDINATES -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

| ANNUAL EXCEEDANCE PROBABILITY | W R C ESTIMATE | SYSTEMATIC RECORD | 'EXPECTED PROBABILITY' ESTIMATE | 95-PCT CONFIDENCE LIMITS FOR W R C ESTIMATES | |
|-------------------------------------|-------------------|----------------------|---------------------------------------|---|----------|
| | | | | LOWER | UPPER |
| 0.9950 | 351.2 | 382.0 | 297.5 | 202.5 | 529.1 |
| 0.9900 | 454.3 | 485.1 | 401.6 | 274.1 | 663.5 |
| 0.9500 | 906.8 | 929.6 | 862.3 | 614.3 | 1226.0 |
| 0.9000 | 1301.4 | 1313.1 | 1253.7 | 931.2 | 1699.6 |
| 0.8000 | 2002.1 | 1992.5 | 1965.6 | 1515.5 | 2531.9 |
| 0.5000 | 4472.9 | 4406.7 | 4472.9 | 3592.9 | 5574.2 |
| 0.2000 | 9734.7 | 9696.9 | 9901.0 | 7692.8 | 12876.6 |
| 0.1000 | 14466.3 | 14614.8 | 14955.6 | 11099.4 | 20147.7 |
| 0.0400 | 21900.0 | 22600.5 | 23118.1 | 16148.6 | 32477.5 |
| 0.0200 | 28506.2 | 29926.4 | 30873.8 | 20432.1 | 44133.3 |
| 0.0100 | 36033.5 | 38502.9 | 39882.3 | 25148.3 | 58045.2 |
| 0.0050 | 44547.7 | 48467.4 | 50919.1 | 30322.2 | 74452.2 |
| 0.0020 | 57434.7 | 64020.8 | 66677.2 | 37905.8 | 100408.3 |

Table 3.--Computer prinout of peak flow frequency analysis for the Knife River near Hazen, ND (06340500).

RUN-DATE 8/13/85 AT 1752 SEQ 1.0001

STATION - 06340500 /USGS KNIFE RIVER AT HAZEN, ND 1930-1984 06340500 /USGS

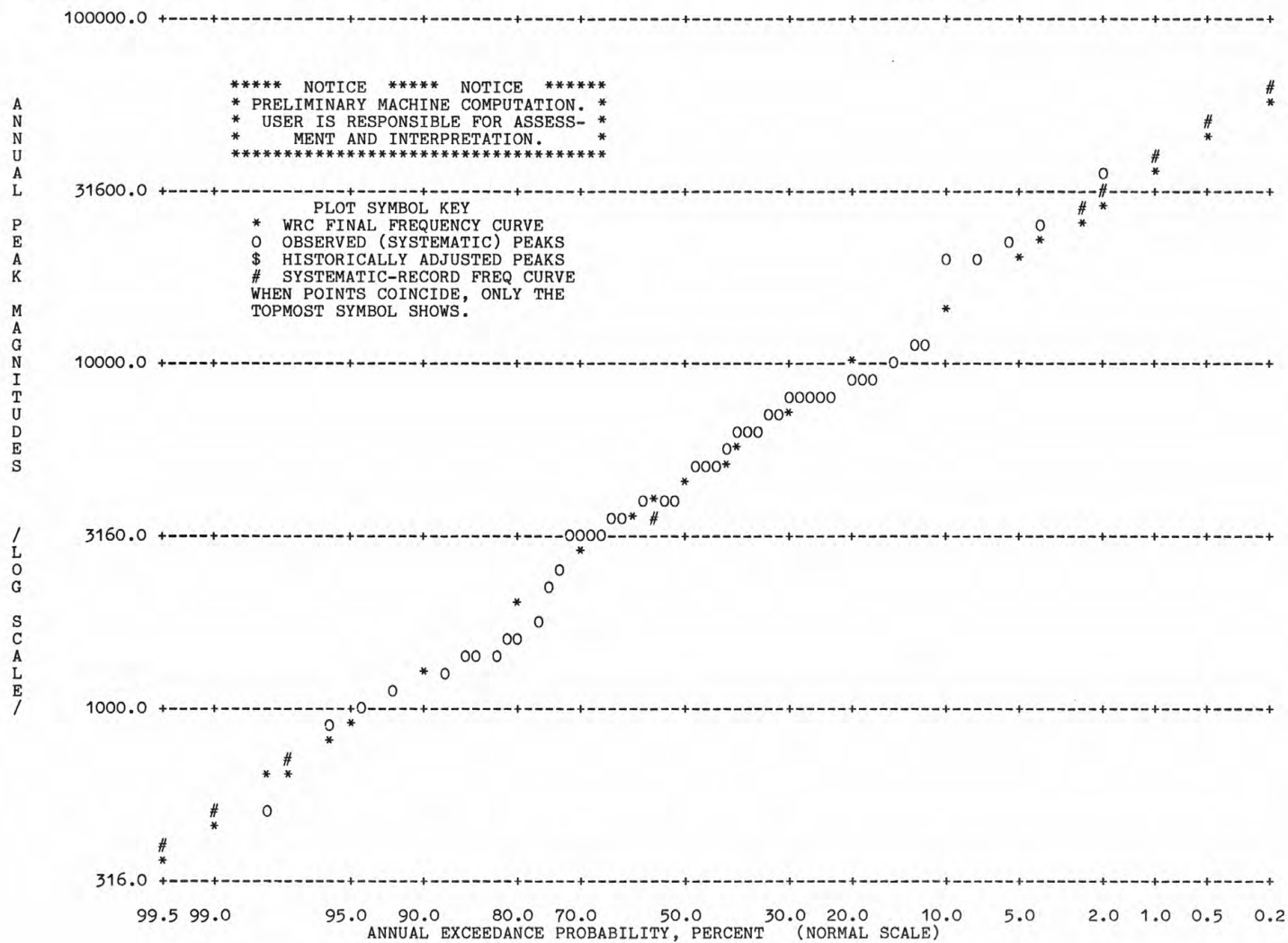


Figure 7.--Computer printout of peak flow frequency curve for the Knife River near Hazen, ND (06340500).

STATION 06340500 KNIFE RIVER AT HAZEN, ND

DISCHARGE-(CFS)

STATISTICS ON NORMAL MONTHLY MEANS (ALL DAYS)

| OCT | NOV | DEC | JAN | FEB | MARCH | APRIL | MAY | JUNE | JULY | AUG | SEPT |
|--|--------|--------|--------|----------|-----------|-----------|----------|----------|----------|---------|--------|
| BY ROWS (MEAN,VARIANCE,STANDARD DEVIATION, SKEWNESS, COEFF. OF VARIATION, PERCENTAGE OF AVERAGE VALUE) | | | | | | | | | | | |
| 35.70 | 31.00 | 20.50 | 19.80 | 92.20 | 713.00 | 618.00 | 170.00 | 266.00 | 118.00 | 48.80 | 35.70 |
| 2477.00 | 907.00 | 155.00 | 669.00 | 27000.00 | 581700.00 | 800600.00 | 65050.00 | 66630.00 | 24340.00 | 1887.00 | 907.00 |
| 49.80 | 30.10 | 12.50 | 25.90 | 164.00 | 763.00 | 895.00 | 255.00 | 258.00 | 156.00 | 43.40 | 30.10 |
| 6.03 | 5.38 | 2.63 | 3.42 | 3.18 | 1.65 | 2.36 | 3.75 | 1.38 | 3.87 | 1.91 | 2.11 |
| 1.39 | 0.97 | 0.61 | 1.31 | 1.78 | 1.07 | 1.45 | 1.50 | 0.97 | 1.32 | 0.89 | 0.84 |
| 1.65 | 1.43 | 0.95 | 0.91 | 4.25 | 32.90 | 28.50 | 7.82 | 12.30 | 5.45 | 2.25 | 1.65 |

***** INDICATES NO-VALUE MONTH(S) FOUND OR NOT ENOUGH DATA, THEREFORE STATISTIC IS NOT COMPUTED

Table 4.--Computer prinout of statistics computed on monthly mean discharges for the period of record on the Knife River near Hazen, ND 066350500).

..... 20

STATION 06340500 KNIFE RIVER AT HAZEN, ND

DISCHARGE-(CFS)

STATISTICS ON NORMAL ANNUAL MEANS(ALL DAYS)

| MEAN | VARIANCE | STANDARD DEVIATION | SKEWNESS | COEFF. OF VARIATION | SERIAL CORR |
|--------|----------|--------------------|----------|---------------------|-------------|
| 181.00 | 12030.00 | 110.00 | 0.66 | 0.60 | 0.192 |

* INDICATES NO-VALUE YEAR(S), LOG OF ZERO, OR NOT ENOUGH DATA FOUND

Table 5.--Computer prinout of statistics computed on annual mean discharges for the period of record on the Knife River near Hazen, ND (06340500).

EXPLANATION OF WATER-QUALITY RECORDS

Collection and examination of data

Surface-water samples for analyses usually are collected at or near gaging stations. The quality-of-water records are given immediately following the discharge records at these stations.

The descriptive heading for water-quality records gives the period of record for all water-quality data; the period of daily record for data that are measured on a daily basis (specific conductance, water temperature or sediment discharge) extremes for the period of daily record; extremes for the current year; and general remarks.

For ground-water records, no descriptive statements are given; however, the well number, depth of well, date of sampling and/or other pertinent data are given in the table containing the chemical analyses of the ground water.

Water analysis

Most methods for collecting and analyzing water samples are described in the U.S. Geological Survey Techniques of Water-Resources Investigations listed on a following page.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary significantly with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams need to be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight adsorption of carbon dioxide from the air by the sample between measurement of pH at the sampling site and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum and minimum values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the district office.

Water temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are measured at time of discharge measurements for water-discharge stations. For stations where water temperatures are measured manually once or twice daily, the water temperatures are measured at about the same time each day. Large streams have a small diel temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, either mean temperatures or maximum and minimum temperatures for each day are published.

Sediment

Suspended-sediment concentrations are determined from samples collected by using depth-integrating samplers. Samples usually are obtained at several verticals in the cross section, or a single sample may be obtained at a fixed point and a coefficient applied to determine the mean concentration in the cross sections.

During periods of rapidly changing flow or rapidly changing concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily loads of suspended sediment were estimated on the basis of water discharge, sediment concentrations measured immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge.

At other stations, suspended-sediment samples were collected periodically at many verticals in the stream cross section. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of the quantities of suspended sediment, records of the periodic measurements of the particle-size distribution of the suspended sediment and bed material are included.

Parameter codes

In most of the column headings of this report the names of the constituents or properties for which data are given are followed by five-digit codes which appear in parentheses. These codes, called parameter codes, are identical to those introduced or approved by the U.S. Environmental Protection Agency and are widely used by Federal and State agencies. The codes indicate, to one having a key, more precisely than the narrative column headings can the constituents or properties being reported. Data listed under a given code in this report generally are comparable to those listed under the same code by other agencies.

EXPLANATION OF GROUND-WATER LEVEL RECORDS

Collection of data

Only ground-water level data from a basic network of selected observation wells are published herein. This network contains observation wells so located that the most significant data are obtained from the fewest wells in the most important aquifers. The complete statewide network included more than 800 wells during 1984. One-half of these wells are measured annually and the others at a variety of frequencies. Forty-three wells were equipped with continuous water-level recorders.

Each well is identified by means of (1) a 15-digit number that is based on latitude and longitude and (2) a local number that is provided for local needs. See figures 5 and 6.

Measurements are made in many types of wells, under varying conditions of access and at different temperatures; hence, neither the method of measurement nor the equipment can be standardized. At each observation well, however, the equipment and techniques used are those that will ensure that measurements at each well are consistent.

Water-level measurements in this report are given in feet with reference to land surface. National Geodetic Vertical Datum of 1929 is the datum plane on which the national network of precise levels is based; land surface is a datum plane that is approximately at land surface of each well. If known, the altitude of the land surface related to the National Geodetic Vertical Datum of 1929 is given in the well description. The height of the measuring point above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month.

Water levels are reported to as many significant figures as can be justified by the local conditions. For example, in a measurement of a depth to water of several hundred feet, the error in determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given only to a tenth of a foot or a larger unit.

Availability of data

All water-level measurements and recorder data are stored in computer as well as manual files and are available in a tabular listing similar to those published in this report. However, ground-water data usually are more easily analyzed when displayed graphically. Examples of computer-generated hydrographs for four wells published in this report are presented in figures 8-10.

The hydrograph for a well in Burleigh County completed in the McKenzie aquifer is shown in two 10-year segments by figures 13a and b. The first period from 1963 through 1974 shows very little fluctuation in water level. However, the second period from 1973 through 1984 shows large declines in the water level during mid-year periods.

The irrigation water-use data for the McKenzie aquifer (table 6) show that irrigation was insignificant until about 1972. From 1972 through 1974, only annual water-level measurements at the end of the year were made and the effect of irrigation withdrawals on the aquifer can not be detected on the hydrograph.

WELL NO: 139-078-27CBB

COUNTY: BURLEIGH

STATE: NORTH DAKOTA

AQUIFER: 112MCKZ

DEPTH: 220 FT

LSD: 1713 FT

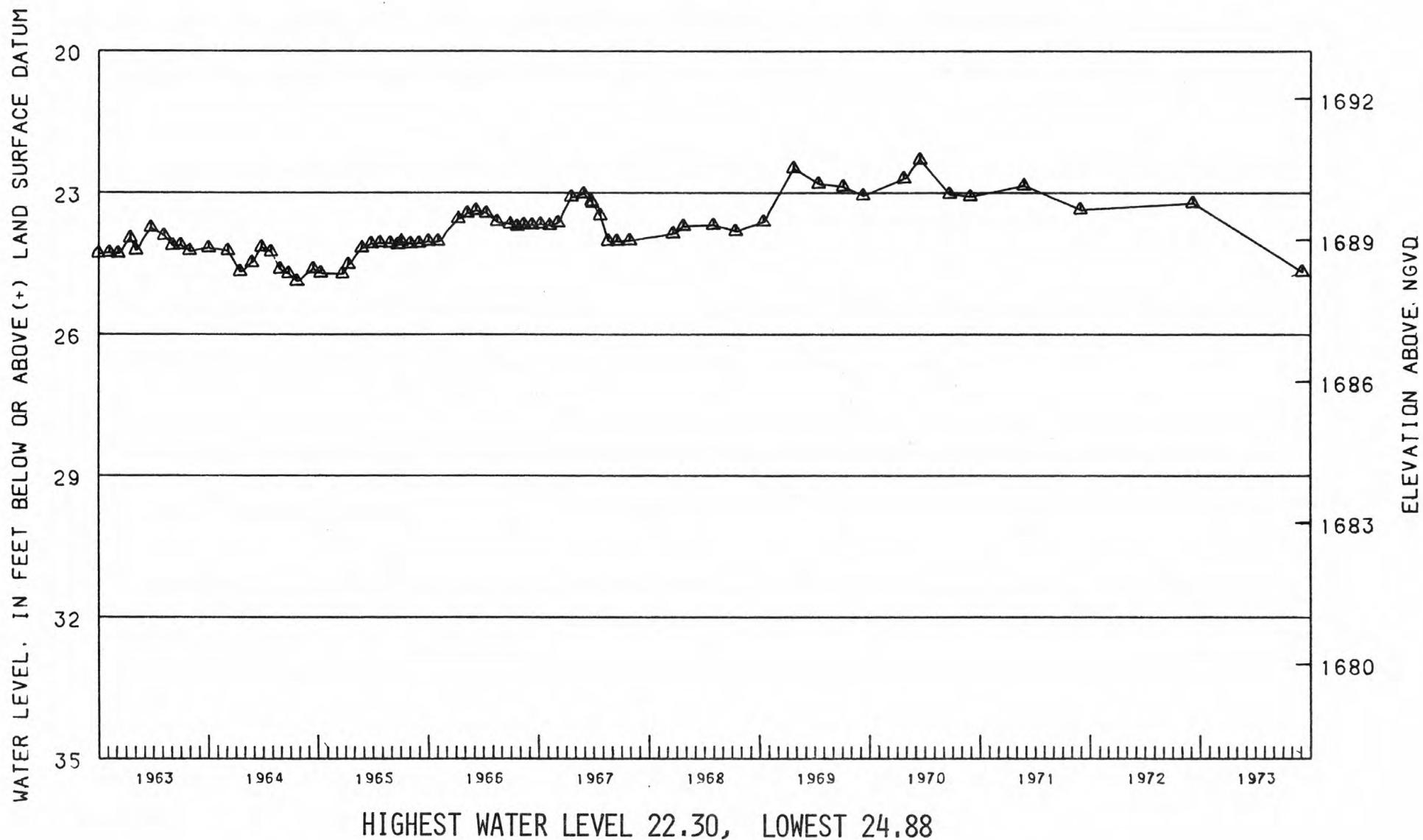


Figure 8a.—Ground-water level hydrograph for a McKenzie aquifer well, Burleigh County, 1963-73.

WELL NO: 139-078-27CBB

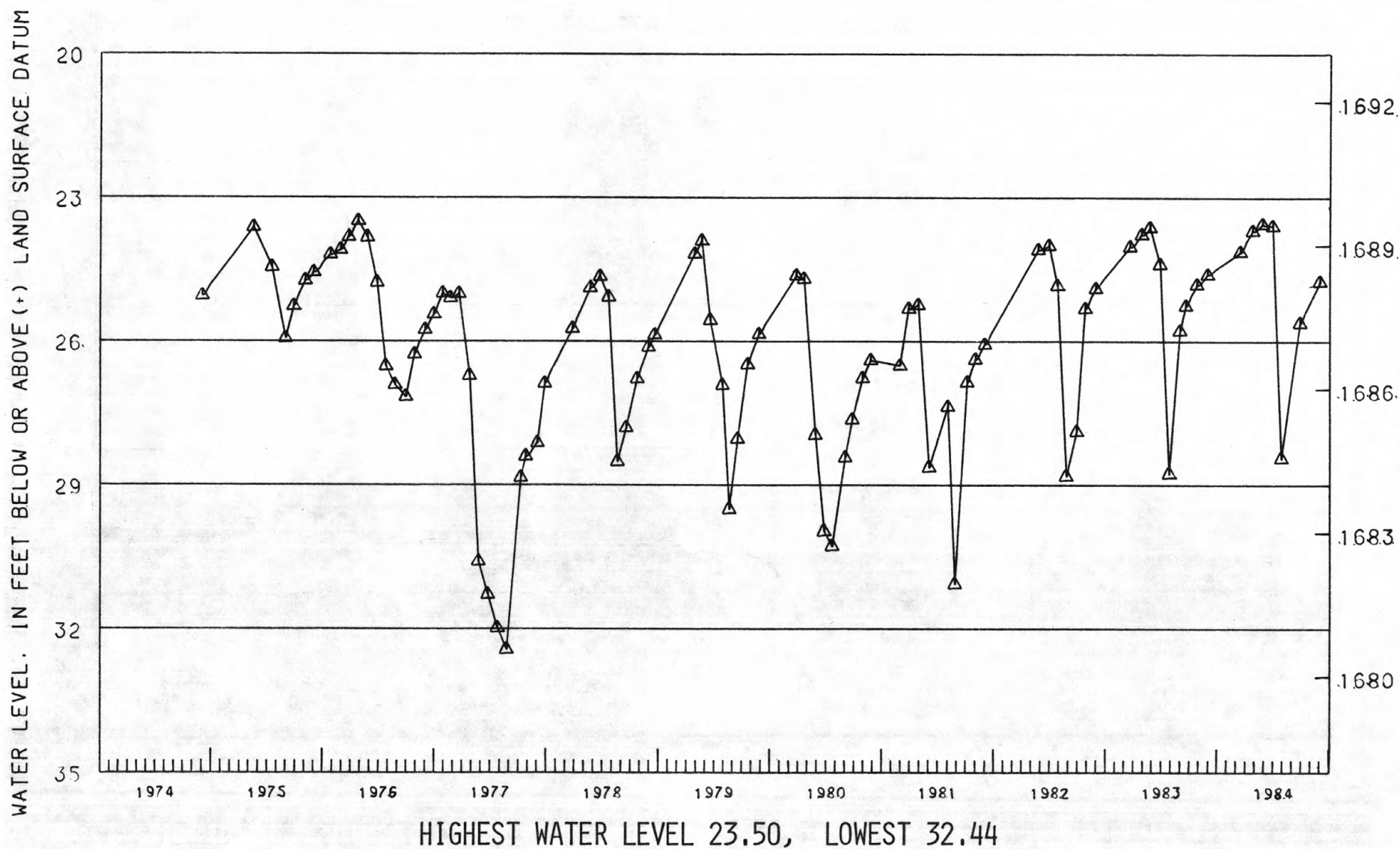
COUNTY: BURLEIGH

STATE: NORTH DAKOTA

AQUIFER: 112MCKZ

DEPTH: 220 FT

LSD: 1713 FT



WATER RESOURCES DATA FOR NORTH DAKOTA, 1984

Figure 8b.—Ground-water level hydrograph for a McKenzie aquifer well, Burleigh County, 1974-84.

Table 6.--Reported water use for irrigation
from the McKenzie aquifer, in acre-feet

| Year | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 |
|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Reported use (ac-ft) | 0 | 75 | 150 | 436 | 416 | 400 | 182 | 338 | 781 | 183 | 314 | 475 | 230 | 348 | 486 | 546 |

Beginning in 1975, the frequency of water-level measurements was increased. This provided the definition necessary to show the annual declines in water level during the irrigation season and the recovery during the winter and spring. The largest total reported use was during 1977. This corresponds to the largest annual decline in the water level, more than 7 feet, during the period of record for this well.

The 1984 hydrograph for a well equipped with a continuous recorder that is completed in the Sheyenne Delta aquifer in Richland County is shown in figure 9. The double lines indicate the maximum and minimum recorded daily water levels. The dashed line was drawn between the taped measurements to compare the definition of changes in water level that is provided when continuous-recorder data are available to that of periodic measurements with a steel tape.

The ground-water data are recorded and stored as water level in feet below land surface. Since the elevation of land surface is determined for all well sites, it is possible to relate water level below land surface to elevation above National Geodetic Vertical Datum of 1929. Both vertical scales are used on the ground-water hydrographs, water level below land surface on the left margin and water-level elevation above National Geodetic Vertical Datum of 1929 on the right margin. This feature is convenient for showing the relationship that exists between the ground-water level and the level of water in nearby lakes and reservoirs. The hydrographs for Devils Lake and well 153-063-30CBC in Benson County are shown in figure 10. Such comparison hydrographs are useful tools for analysis of surface-water/ground-water relationships.

WELL NO. 134-052-06CCD2 COUNTY: RICHLAND

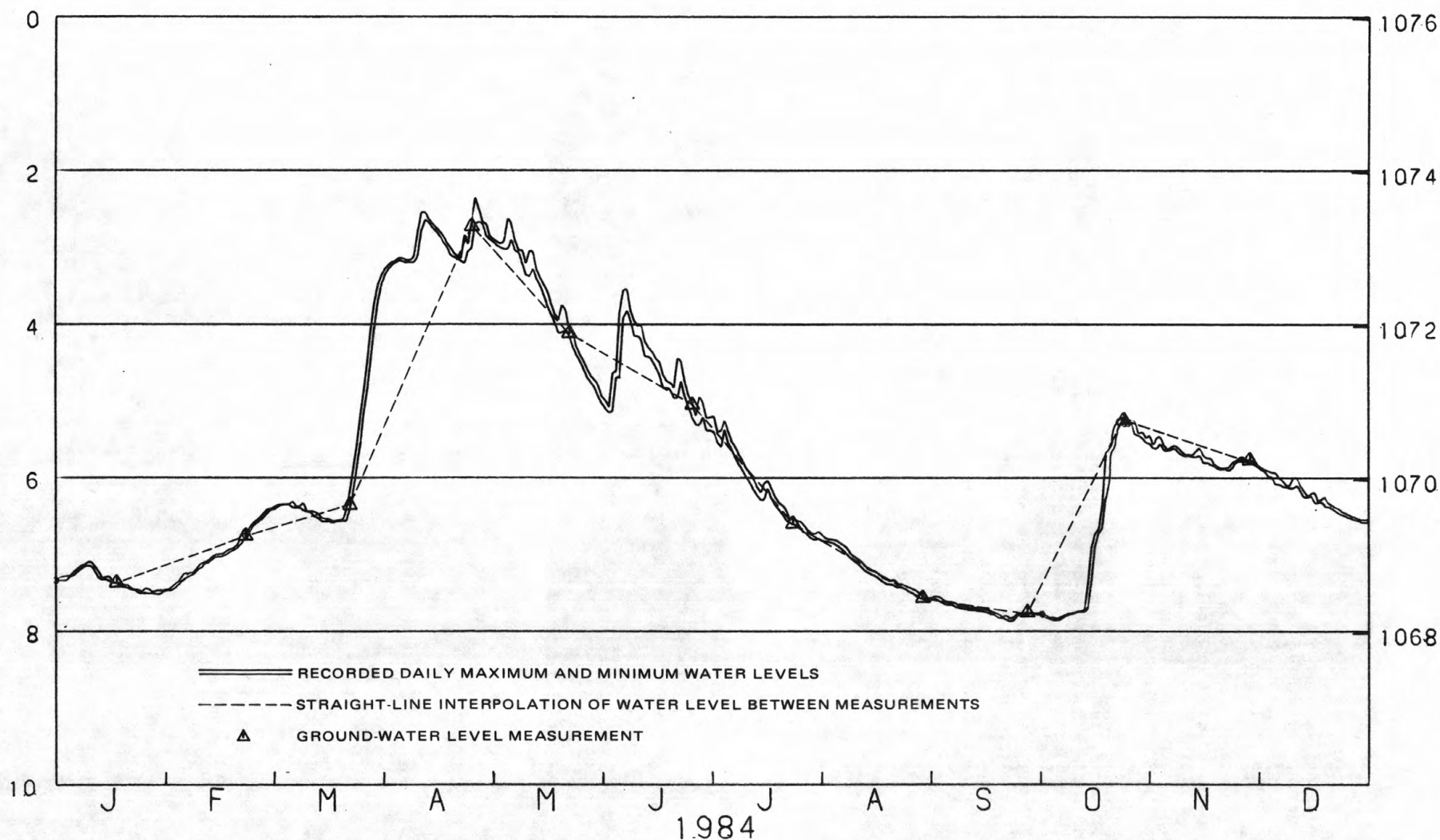
STATE: NORTH DAKOTA

AQUIFER: 112SNDL

DEPTH: 40 FT

LSD: 1076 FT

WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND SURFACE DATUM



HIGHEST WATER LEVEL 1.37, LOWEST 8.73

ELEVATION ABOVE NGVD

WATER RESOURCES DATA FOR NORTH DAKOTA, 1984

Figure 9.—Ground-water level hydrograph for recorder well in Sheyenne Delta aquifer, Richland County, 1984 water year.

WELL NO: 153-063-30CBC

COUNTY: BENSON

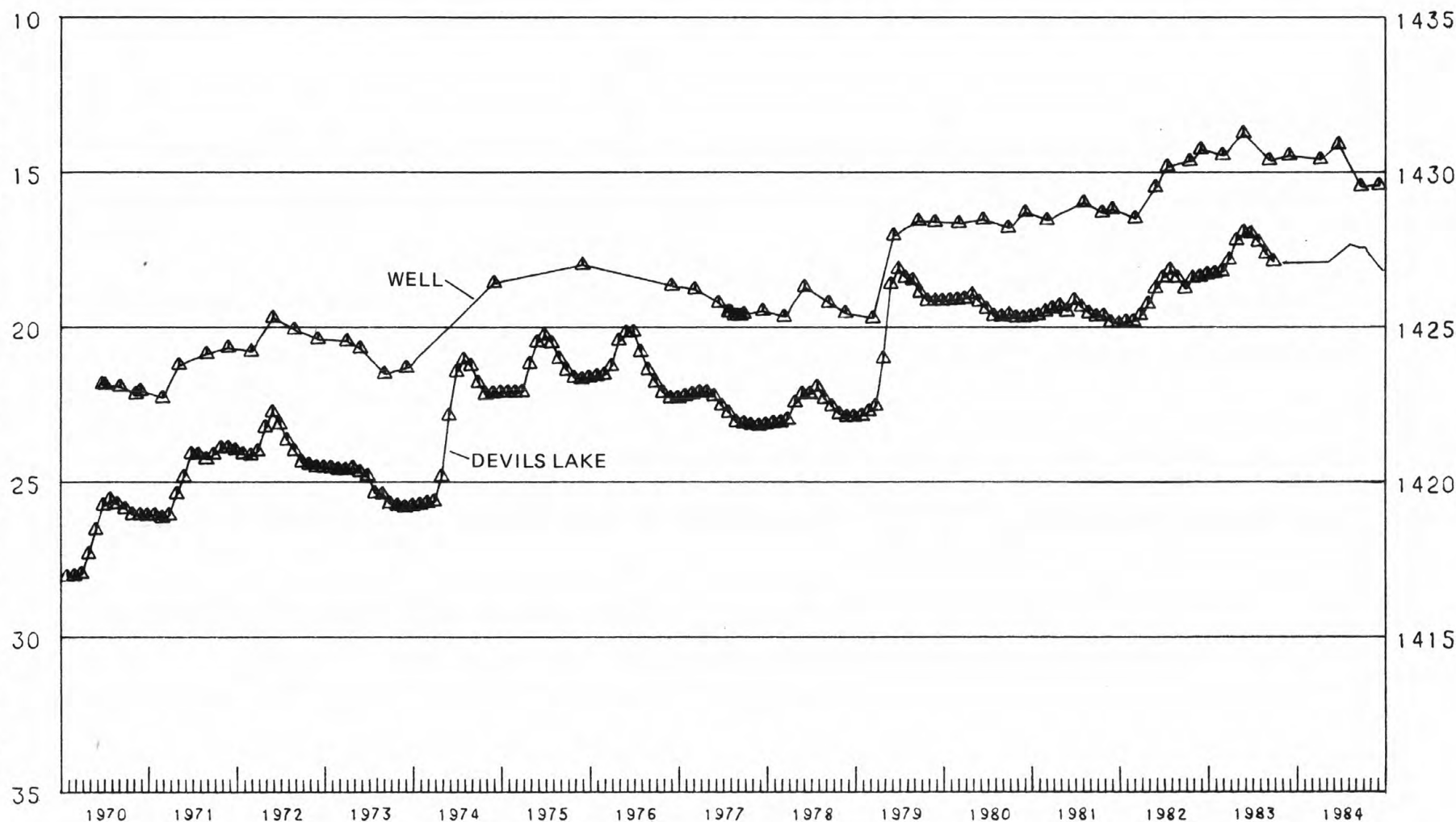
STATE: NORTH DAKOTA

AQUIFER: 112SPRD

DEPTH: 143 FT

LSD: 1445 FT.

WATER LEVEL, IN FEET BELOW OR ABOVE (+) LAND SURFACE DATUM



HIGHEST WATER LEVEL 13.75, LOWEST 22.30
HIGHEST LAKE LEVEL 16.93, LOWEST 28.04

Figure 10.—Ground-water level hydrograph for a Spritwood aquifer well, Benson County, showing comparison with Devils Lake monthend water-level elevations, 1970-84.

WATER RESOURCES DATA FOR NORTH DAKOTA, 1984

Thirty-seven manuals by the U.S. Geological Survey have been published to date in the series on techniques describing procedures for planning and executing specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) is on surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises. The reports listed below are for sale by the U.S. Geological Survey, Branch of Distribution, 604 South Pickett St., Alexandria, VA 22304 (authorized agent of the Superintendent of Documents, Government Printing Office).

NOTE: When ordering any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations".

- 1-D1. *Water temperature--influential factors, field measurement, and data presentation*, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.
- 1-D2. *Guidelines for collection and field analysis of ground-water samples for selected unstable constituents*, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.
- 2-D1. *Application of surface geophysics to ground-water investigations*, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.
- 2-E1. *Application of borehole geophysics to water-resources investigations*, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 3-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. *Measurement of peak discharge at culverts by indirect methods*, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.
- 3-A4. *Measurement of peak discharge at width contractions by indirect methods*, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.
- 3-A5. *Measurement of peak discharge at dams by indirect methods*, by Harry Huising: USGS--TWRI Book 3, Chapter A5. 1967. 29 pages.
- 3-A6. *General procedure for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. *Stage measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. *Discharge measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. *Measurement of time of travel and dispersion in streams by dye tracing*, by E. F. Hubbard, F. A. Kilpatrick, L. A. Martens, and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1982. 44 pages.
- 3-A11. *Measurement of discharge by moving-boat method*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.
- 3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 3-B2. *Introduction to ground-water hydraulics, a programed text for self-instruction*, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.
- 3-B3. *Type curves for selected problems of flow to wells in confined aquifers*, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.
- 3-C1. *Fluvial sediment concepts*, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. *Field methods for measurement of fluvial sediment*, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. *Computation of fluvial-sediment discharge*, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. *Some statistical tools in hydrology*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. *Low-flow investigations*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. *Regional analyses of streamflow characteristics*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. *Computation of rate and volume of stream depletion by wells*, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M. W. Skougstad and others, editors: USGS--TWRI Book 5, Chapter A1. 1979. 626 pages.
- 5-A2. *Determination of minor elements in water by emission spectroscopy*, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. *Methods for analysis of organic substances in water*, by D. F. Goerlitz and Eugene Brown: USGS--TWRI Book 5, Chapter A3. 1972. 40 pages.
- 5-A4. *Methods for collection and analysis of aquatic biological and microbiological samples*, edited by P. E. Greeson, T. A. Ehlke, G. A. Irwin, B. W. Lium, and K. V. Slack: USGS--TWRI Book 5, Chapter A4. 1977. 332 pages.
- 5-A5. *Methods for determination of radioactive substances in water and fluvial sediments*, by L. L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. *A model for simulation of flow in singular and interconnected channels*, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. *Methods of measuring water levels in deep wells*, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-B2. *Calibration and maintenance of vertical-axis type current meters*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.

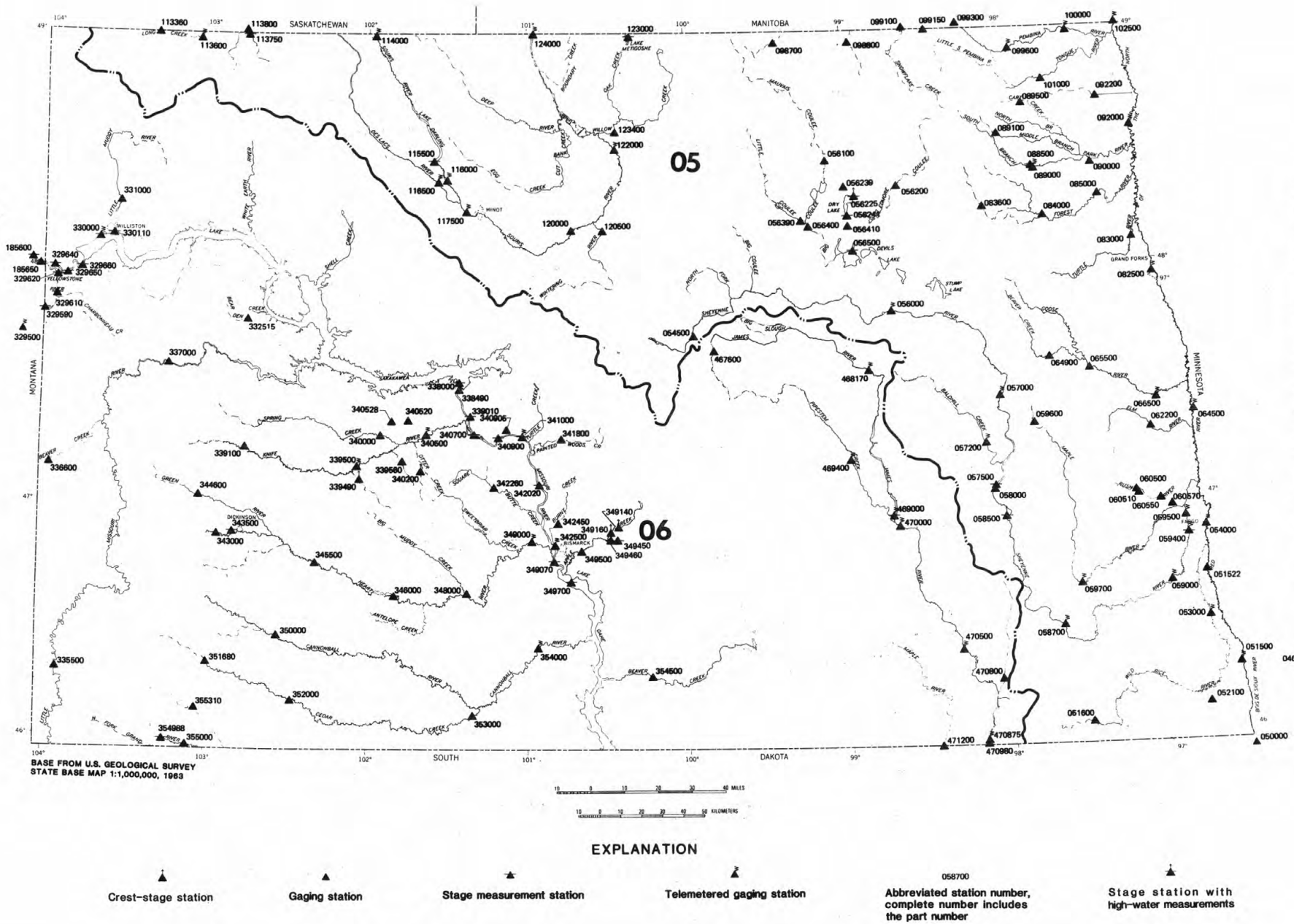


Figure 11.--Location of lake, crest-stage and stream-gaging stations.

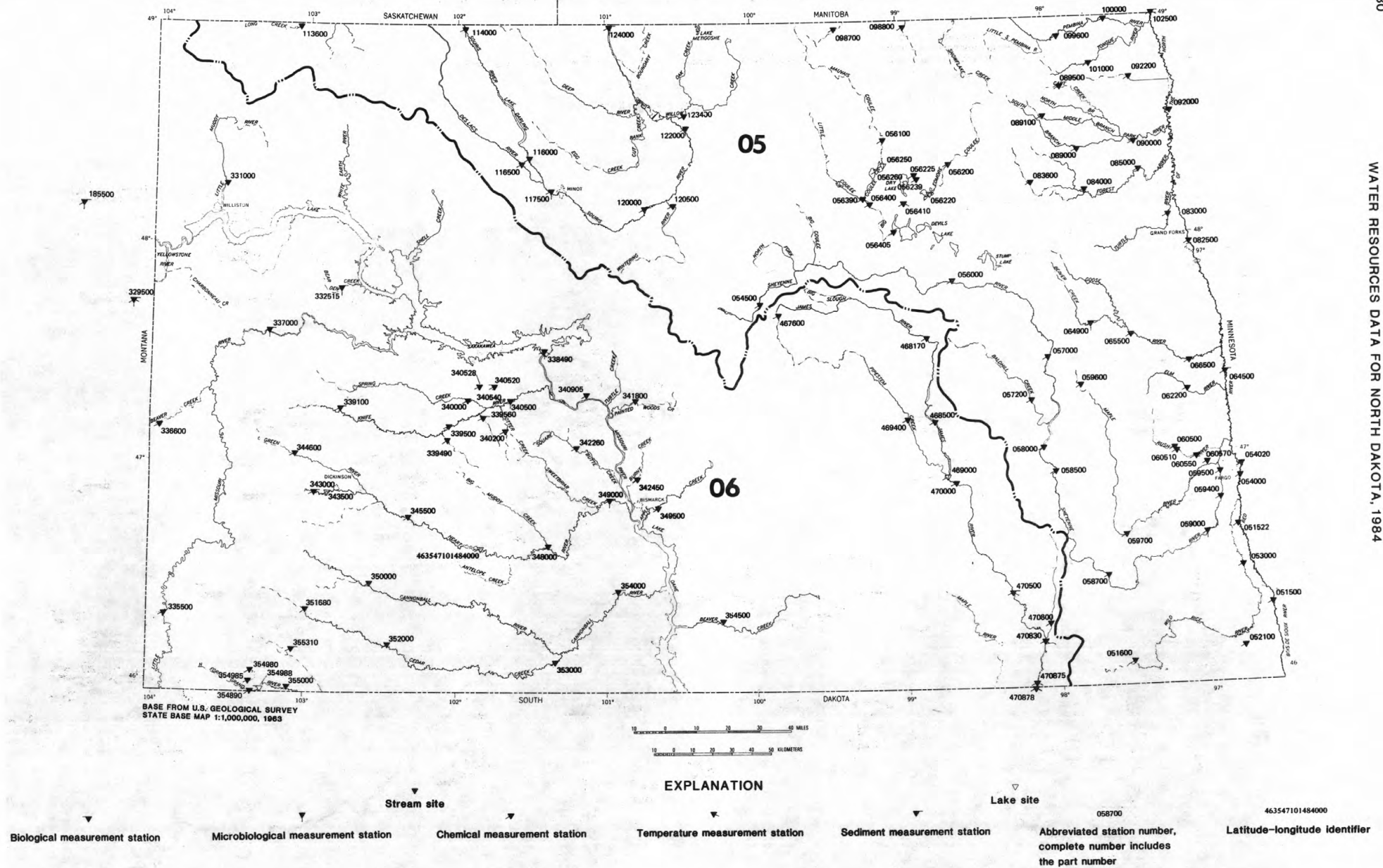


Figure 12.--Location of water-quality stations.

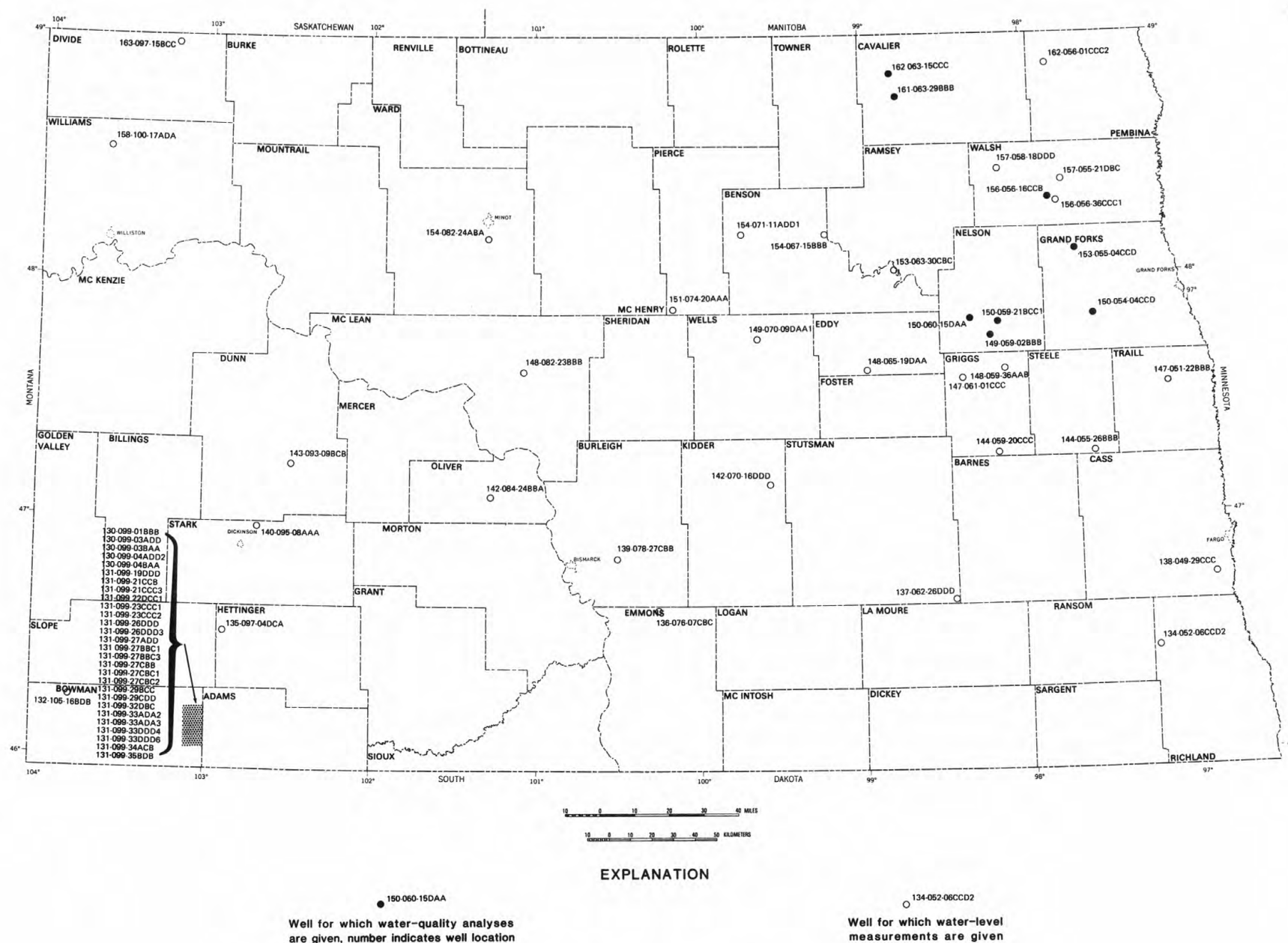


Figure 13.—Location of ground-water observation wells.

RED RIVER OF THE NORTH BASIN

05046000 OTTER TAIL RIVER BELOW ORWELL DAM, NEAR FERGUS FALLS, MN

LOCATION.--Lat 46°12'35", long 96°11'05", in NE¼ sec.34, T.132 N., R.44 W., Otter Tail County, Hydrologic Unit 09020103, on left bank 0.7 mi downstream from Orwell Dam, 6.1 mi downstream from Dayton Hollow Dam, 8 mi southwest of Fergus Falls, and 11.1 downstream from Pelican River.

DRAINAGE AREA.--1,830 mi², approximately.

PERIOD OF RECORD.--October 1930 to current year. Prior to October 1952, published as Otter Tail River below Pelican River, near Fergus Falls. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 785: 1934(M). WSP 1208: 1947(M). WSP 1308: 1931(M).

GAGE.--Water-stage recorder. Datum of gage is 1,029.65 ft, adjustment of 1912 (levels by Corps of Engineers). Oct. 11, 1930, to Nov. 17, 1933, at same site at datum 2.00 ft higher; Nov. 18, 1933, to Mar. 21, 1953; at site 6.1 mi upstream at datum 40.30 ft higher.

REMARKS.--Records good. Flow regulated by Orwell Lake (station 05045950) beginning Mar. 21, 1953 and powerplants upstream.

AVERAGE DISCHARGE.--54 years, 305 ft³/s, 221,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,710 ft³/s, June 17, 1953, gage height, 5.60 ft backwater from aquatic vegetation; minimum, 0.70 ft³/s Aug. 5, 1970, gage height, 1.28 ft, result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 808 ft³/s June 15, gage height, 3.64 ft result of regulation; maximum gage height, 4.60 ft Feb. 5, (backwater from ice); minimum, 14 ft³/s Sept. 28, gage height, 1.78 ft result of regulation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 1 | 310 | 311 | 278 | 241 | 306 | 415 | 639 | 690 | 476 | 674 | 276 | 191 |
| 2 | 309 | 311 | 272 | 240 | 306 | 413 | 738 | 690 | 494 | 640 | 357 | 190 |
| 3 | 300 | 303 | 261 | 238 | 300 | 415 | 732 | 683 | 491 | 608 | 334 | 187 |
| 4 | 306 | 300 | 261 | 235 | 300 | 415 | 720 | 678 | 490 | 600 | 330 | 175 |
| 5 | 311 | 300 | 261 | 235 | 320 | 414 | 709 | 674 | 489 | 585 | 328 | 161 |
| 6 | 311 | 300 | 262 | 235 | 310 | 409 | 703 | 669 | 524 | 576 | 310 | 162 |
| 7 | 311 | 300 | 262 | 238 | 308 | 406 | 685 | 666 | 582 | 569 | 287 | 165 |
| 8 | 311 | 300 | 261 | 240 | 306 | 401 | 680 | 665 | 693 | 554 | 286 | 165 |
| 9 | 311 | 300 | 261 | 246 | 306 | 390 | 674 | 662 | 513 | 438 | 288 | 165 |
| 10 | 311 | 300 | 264 | 290 | 306 | 390 | 668 | 656 | 339 | 445 | 287 | 168 |
| 11 | 311 | 295 | 265 | 299 | 300 | 390 | 668 | 652 | 350 | 513 | 285 | 168 |
| 12 | 311 | 294 | 261 | 300 | 300 | 390 | 656 | 649 | 442 | 511 | 278 | 167 |
| 13 | 311 | 294 | 261 | 300 | 300 | 390 | 656 | 649 | 625 | 445 | 144 | 169 |
| 14 | 336 | 294 | 259 | 301 | 312 | 390 | 656 | 647 | 703 | 451 | 82 | 167 |
| 15 | 351 | 294 | 259 | 299 | 332 | 390 | 656 | 647 | 765 | 450 | 172 | 139 |
| 16 | 352 | 294 | 258 | 296 | 335 | 412 | 651 | 647 | 799 | 441 | 262 | 107 |
| 17 | 350 | 290 | 256 | 316 | 360 | 429 | 651 | 644 | 792 | 438 | 239 | 108 |
| 18 | 350 | 289 | 256 | 298 | 372 | 429 | 647 | 643 | 782 | 428 | 219 | 92 |
| 19 | 350 | 289 | 256 | 272 | 371 | 429 | 644 | 641 | 772 | 424 | 219 | 100 |
| 20 | 350 | 291 | 256 | 272 | 373 | 429 | 635 | 640 | 761 | 421 | 225 | 116 |
| 21 | 350 | 289 | 256 | 272 | 375 | 429 | 632 | 617 | 755 | 417 | 228 | 80 |
| 22 | 350 | 289 | 254 | 261 | 379 | 434 | 629 | 593 | 751 | 416 | 228 | 112 |
| 23 | 348 | 289 | 253 | 256 | 379 | 462 | 621 | 592 | 748 | 409 | 228 | 113 |
| 24 | 345 | 288 | 252 | 266 | 400 | 479 | 621 | 585 | 743 | 405 | 228 | 113 |
| 25 | 346 | 278 | 252 | 271 | 419 | 490 | 611 | 581 | 735 | 403 | 225 | 80 |
| 26 | 343 | 278 | 252 | 271 | 415 | 278 | 610 | 577 | 726 | 399 | 226 | 46 |
| 27 | 339 | 278 | 251 | 294 | 414 | 86 | 609 | 570 | 718 | 394 | 224 | 52 |
| 28 | 339 | 278 | 251 | 322 | 415 | 48 | 616 | 564 | 702 | 385 | 223 | 39 |
| 29 | 339 | 278 | 249 | 311 | 410 | 49 | 616 | 497 | 691 | 381 | 222 | 36 |
| 30 | 338 | 278 | 246 | 311 | --- | 130 | 653 | 449 | 683 | 356 | 224 | 42 |
| 31 | 325 | --- | 245 | 311 | --- | 412 | --- | 451 | --- | 339 | 204 | --- |
| TOTAL | 10225 | 8772 | 7991 | 8537 | 10029 | 11443 | 19686 | 19268 | 19134 | 14515 | 7668 | 3775 |
| MEAN | 330 | 292 | 258 | 275 | 346 | 369 | 656 | 622 | 638 | 468 | 247 | 126 |
| MAX | 352 | 311 | 278 | 322 | 419 | 490 | 738 | 690 | 799 | 674 | 357 | 191 |
| MIN | 300 | 278 | 245 | 235 | 300 | 48 | 609 | 449 | 339 | 339 | 82 | 36 |
| AC-FT | 20280 | 17400 | 15850 | 16930 | 19890 | 22700 | 39050 | 38220 | 37950 | 28790 | 15210 | 7490 |

CAL YR 1983 TOTAL 113417 MEAN 311 MAX 443 MIN 88 AC-FT 225000
WTR YR 1984 TOTAL 141043 MEAN 385 MAX 799 MIN 36 AC-FT 279800

RED RIVER OF THE NORTH BASIN

05050000 BOIS DE SIOUX RIVER NEAR WHITE ROCK, SD

LOCATION.--Lat 45°51'45", long 96°34'25", in SW1/4SW1/4 sec.27, T.128 N., R.47 W., Roberts County, Hydrologic Unit 09020101, on Sisseton Indian Reservation, on left bank just downstream from Big Slough Outlet, 300 ft downstream from White Rock Dam, 4 mi south of White Rock, and 5 mi northwest of Wheaton, MN.

DRAINAGE AREA.--1,160 mi², approximately.

PERIOD OF RECORD.--October 1941 to current year.

GAGE.--Water-stage recorder. Datum of gage is 960.00 ft, adjustment of 1912 (levels by Corps of Engineers). Prior to Jan. 14, 1943, nonrecording gage at same site at datum 0.11 ft lower. Jan. 15, 1943, to Sept. 30, 1963, water-stage recorder at same site at datum 0.11 ft lower.

REMARKS.--Records fair. Flow regulated by Lake Traverse-Bois de Sioux Flood Control and Water Conservation project, available capacity for flood control, 137,000 acre-ft.

AVERAGE DISCHARGE.--43 years, 76.8 ft³/s, 55,640 acre-ft/yr; median of yearly mean discharges, 50 ft³/s 36,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,770 ft³/s, occurred during period Apr. 19-21, 1969, gage height, 15.07 ft, from floodmark; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 978 ft³/s Apr. 14, gage height, 11.00 ft, maximum gage height, 11.03 ft June 25; no flow on many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|------|------|-------|--------|-------|-------|---------|---------|---------|-------|
| 1 | .00 | .00 | .00 | .00 | .00 | 1.6 | 18 | 345 | 272 | 584 | .14 | 1.2 |
| 2 | .00 | .00 | .00 | .00 | .00 | 1.1 | 355 | 341 | 191 | 568 | .21 | .96 |
| 3 | .00 | .00 | .00 | .00 | .00 | .75 | 784 | 340 | 44 | 558 | .03 | .80 |
| 4 | .00 | .00 | .00 | .00 | .00 | .72 | 793 | 340 | 6.9 | 540 | .04 | .72 |
| 5 | .00 | .00 | .00 | .00 | .00 | .75 | 788 | 342 | 129 | 439 | .00 | .72 |
| 6 | .00 | .00 | .00 | .00 | .00 | .70 | 774 | 342 | 249 | 374 | .08 | .78 |
| 7 | .00 | .00 | .00 | .00 | .00 | .70 | 753 | 356 | 270 | 363 | .19 | .68 |
| 8 | .00 | .00 | .00 | .00 | .00 | .68 | 738 | 354 | 352 | 354 | .194 | .75 |
| 9 | .00 | .00 | .00 | .00 | .00 | .60 | 719 | 342 | 384 | 308 | .264 | .58 |
| 10 | .00 | .00 | .00 | .00 | .00 | .60 | 807 | 340 | 408 | 270 | .258 | .58 |
| 11 | .00 | .00 | .00 | .00 | .00 | .58 | 805 | 345 | 323 | 273 | .246 | .58 |
| 12 | .00 | .00 | .00 | .00 | .00 | .58 | 818 | 339 | 157 | 278 | .237 | .62 |
| 13 | .00 | .00 | .00 | .00 | .00 | .60 | 894 | 344 | 87 | 282 | .188 | .68 |
| 14 | .00 | .00 | .00 | .00 | .00 | .65 | 972 | 338 | 252 | 291 | .138 | .75 |
| 15 | .00 | .00 | .00 | .00 | .00 | .70 | 965 | 334 | 502 | 291 | .155 | .75 |
| 16 | .00 | .00 | .00 | .00 | .00 | .75 | 952 | 330 | 540 | 197 | .162 | .75 |
| 17 | .00 | .00 | .00 | .00 | .00 | .80 | 950 | 340 | 526 | 147 | .152 | .70 |
| 18 | .00 | .00 | .00 | .00 | .00 | .90 | 948 | 344 | 562 | 240 | .144 | .78 |
| 19 | .00 | .02 | .00 | .00 | .00 | 1.0 | 941 | 344 | 602 | 291 | .132 | 1.1 |
| 20 | .00 | .03 | .00 | .00 | .00 | 1.5 | 932 | 338 | 618 | 296 | .131 | 1.0 |
| 21 | .00 | .02 | .00 | .00 | .00 | 2.0 | 914 | 297 | 629 | 300 | .132 | 1.3 |
| 22 | .00 | .00 | .00 | .00 | .00 | 2.5 | 892 | 242 | 644 | 310 | .95 | .96 |
| 23 | .00 | .00 | .00 | .00 | .00 | 4.0 | 746 | 240 | 671 | 316 | .48 | 1.1 |
| 24 | .00 | .00 | .00 | .00 | 5.4 | 6.0 | 580 | 244 | 669 | 316 | .40 | .58 |
| 25 | .00 | .00 | .00 | .00 | 12 | 10 | 567 | 252 | 648 | 351 | .74 | .65 |
| 26 | .00 | .00 | .00 | .00 | 10 | 15 | 563 | 252 | 631 | 175 | .72 | .50 |
| 27 | .00 | .00 | .00 | .00 | 10 | 25 | 466 | 254 | 611 | 4.2 | .69 | .35 |
| 28 | .00 | .00 | .00 | .00 | 13 | 34 | 358 | 258 | 609 | .48 | .75 | .21 |
| 29 | .00 | .00 | .00 | .00 | 6.0 | 30 | 354 | 262 | 606 | .27 | .79 | .19 |
| 30 | .00 | .00 | .00 | .00 | --- | 26 | 360 | 264 | 594 | .21 | .79 | .21 |
| 31 | .00 | --- | .00 | .00 | --- | 21 | --- | 264 | --- | .17 | .34 | --- |
| TOTAL | .00 | .07 | .00 | .00 | 56.40 | 191.76 | 21506 | 9667 | 12786.9 | 8717.33 | 3217.50 | 21.53 |
| MEAN | .000 | .002 | .000 | .000 | 1.94 | 6.19 | 717 | 312 | 426 | 281 | 104 | .72 |
| MAX | .00 | .03 | .00 | .00 | 13 | 34 | 972 | 356 | 671 | 584 | 264 | 1.3 |
| MIN | .00 | .00 | .00 | .00 | .00 | .58 | 18 | 240 | 6.9 | .17 | .00 | .19 |
| AC-FT | .00 | .1 | .00 | .00 | 112 | 380 | 42660 | 19170 | 25360 | 17290 | 6380 | 43 |

CAL YR 1983 TOTAL 292.74 MEAN .80 MAX 11 MIN .00 AC-FT 581
WTR YR 1984 TOTAL 56164.49 MEAN 153 MAX 972 MIN .00 AC-FT 111400

RED RIVER OF THE NORTH BASIN

05051500 RED RIVER OF THE NORTH AT WAHPETON, ND

LOCATION.--Lat 46°15'55", long 96°35'40", in NE¼ sec.8, T.132 N., R.47 W., Richland County, Hydrologic Unit 09020104, on left bank in Wahpeton, 800 ft downstream from confluence of Bois de Sioux and Otter Tail Rivers, and at mile 548.6.

DRAINAGE AREA.--4,010 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1942 to current year. Gage-height records collected in this vicinity since 1917 are contained in reports of the U.S. Weather Bureau.

GAGE.--Water-stage recorder and concrete and wooden dam. Datum of gage is 942.97 ft National Geodetic Vertical Datum of 1929. Prior to Aug. 6, 1943, U.S. Weather Bureau nonrecording gage 800 ft upstream, converted to present datum. Aug. 6, 1943, to Oct. 27, 1950, nonrecording gage at present site and datum.

REMARKS.--Records good except those for winter periods, which are fair. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at elevation 1,070 ft National Geodetic Vertical Datum of 1929, adjustment of 1912; Lake Traverse, capacity, 137,000 acre-ft, available for flood control; numerous other controlled lakes and ponds, and several powerplants.

AVERAGE DISCHARGE.--41 years (1944-84), 524 ft³/s, 379,600 acre-ft/yr; median of yearly mean discharges, 470 ft³/s, 341,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,200 ft³/s Apr. 10, 1969, gage height, 16.34 ft; minimum daily, 1.7 ft³/s Aug. 28 to Sept. 5, 9, 10, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--A stage of 17.0 ft, discharge, 10,500 ft³/s occurred in the spring of 1897 and has not been exceeded since.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,710 ft³/s Mar. 28, gage height, 13.43 ft, backwater from ice; minimum daily, 40 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-------|-------|-------|-------|--------|-------|--------|-------|--------|------|
| 1 | 291 | 331 | 205 | 250 | 310 | 500 | 2990 | 1110 | 639 | 1560 | 402 | 288 |
| 2 | 285 | 313 | 245 | 260 | 305 | 495 | 2540 | 1150 | 662 | 1520 | 333 | 244 |
| 3 | 281 | 309 | 245 | 265 | 298 | 485 | 2240 | 1160 | 687 | 1460 | 402 | 219 |
| 4 | 278 | 304 | 235 | 278 | 292 | 490 | 2140 | 1150 | 673 | 1390 | 418 | 202 |
| 5 | 276 | 296 | 250 | 288 | 210 | 510 | 2020 | 1130 | 644 | 1360 | 405 | 191 |
| 6 | 282 | 301 | 250 | 282 | 145 | 480 | 1890 | 1140 | 627 | 1260 | 391 | 168 |
| 7 | 285 | 300 | 250 | 280 | 242 | 440 | 1810 | 1120 | 696 | 1160 | 371 | 162 |
| 8 | 286 | 301 | 250 | 252 | 285 | 448 | 1750 | 1120 | 1940 | 1100 | 342 | 164 |
| 9 | 287 | 329 | 250 | 240 | 292 | 445 | 1690 | 1120 | 3580 | 1060 | 380 | 166 |
| 10 | 282 | 325 | 250 | 215 | 298 | 450 | 1620 | 1120 | 4090 | 904 | 488 | 166 |
| 11 | 288 | 281 | 250 | 205 | 302 | 442 | 1660 | 1090 | 3760 | 795 | 499 | 167 |
| 12 | 291 | 277 | 250 | 235 | 300 | 435 | 1810 | 1080 | 3230 | 844 | 491 | 176 |
| 13 | 293 | 277 | 250 | 265 | 310 | 430 | 2020 | 1070 | 2590 | 846 | 456 | 170 |
| 14 | 293 | 275 | 250 | 272 | 320 | 430 | 2040 | 1060 | 1970 | 786 | 336 | 166 |
| 15 | 307 | 275 | 220 | 270 | 330 | 435 | 1970 | 1050 | 1660 | 760 | 183 | 165 |
| 16 | 335 | 273 | 190 | 265 | 360 | 430 | 1870 | 1030 | 1990 | 772 | 241 | 154 |
| 17 | 338 | 271 | 165 | 265 | 360 | 440 | 1800 | 1010 | 2060 | 725 | 368 | 110 |
| 18 | 336 | 273 | 200 | 260 | 370 | 470 | 1750 | 999 | 1880 | 612 | 374 | 100 |
| 19 | 346 | 293 | 240 | 270 | 380 | 495 | 1710 | 981 | 1730 | 651 | 349 | 91 |
| 20 | 341 | 290 | 260 | 270 | 385 | 500 | 1690 | 979 | 1690 | 687 | 371 | 86 |
| 21 | 336 | 265 | 240 | 258 | 405 | 495 | 1680 | 978 | 1670 | 688 | 405 | 97 |
| 22 | 335 | 250 | 228 | 260 | 415 | 500 | 1650 | 928 | 2020 | 685 | 371 | 79 |
| 23 | 334 | 245 | 215 | 260 | 425 | 560 | 1620 | 821 | 2590 | 681 | 359 | 90 |
| 24 | 332 | 198 | 210 | 258 | 430 | 780 | 1510 | 789 | 2960 | 678 | 311 | 112 |
| 25 | 338 | 165 | 198 | 282 | 450 | 1550 | 1340 | 777 | 2910 | 675 | 270 | 108 |
| 26 | 339 | 230 | 230 | 288 | 465 | 3000 | 1300 | 784 | 2600 | 686 | 272 | 102 |
| 27 | 338 | 268 | 260 | 262 | 480 | 4150 | 1300 | 781 | 2220 | 666 | 309 | 59 |
| 28 | 337 | 265 | 245 | 282 | 495 | 4500 | 1230 | 779 | 1930 | 536 | 302 | 47 |
| 29 | 339 | 220 | 230 | 300 | 498 | 3900 | 1140 | 792 | 1750 | 483 | 297 | 48 |
| 30 | 336 | 195 | 238 | 300 | --- | 3750 | 1110 | 752 | 1630 | 460 | 298 | 40 |
| 31 | 336 | --- | 240 | 300 | --- | 3500 | --- | 656 | --- | 439 | 301 | --- |
| TOTAL | 9701 | 8195 | 7239 | 8237 | 10157 | 35935 | 52890 | 30506 | 59078 | 26929 | 11095 | 4137 |
| MEAN | 313 | 273 | 234 | 266 | 350 | 1159 | 1763 | 984 | 1969 | 869 | 358 | 138 |
| MAX | 346 | 331 | 260 | 300 | 498 | 4500 | 2990 | 1160 | 4090 | 1560 | 499 | 288 |
| MIN | 276 | 165 | 165 | 205 | 145 | 430 | 1110 | 656 | 627 | 439 | 183 | 40 |
| AC-FT | 19240 | 16250 | 14360 | 16340 | 20150 | 71280 | 104900 | 60510 | 117200 | 53410 | 22010 | 8210 |
| CAL YR 1983 | TOTAL | 122274 | | MEAN | 335 | MAX | 880 | MIN | 80 | AC-FT | 242530 | |
| WTR YR 1984 | TOTAL | 264099 | | MEAN | 722 | MAX | 4500 | MIN | 40 | AC-FT | 523800 | |

RED RIVER OF THE NORTH BASIN

35

05051500 RED RIVER OF THE NORTH AT WAHPETON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 03... | 1555 | 279 | 450 | -- | 13.0 | 12.0 | -- | -- | -- | -- | -- | |
| NOV 18... | 1000 | 272 | 480 | -- | 3.5 | 2.5 | -- | -- | -- | -- | -- | |
| JAN 04... | 1435 | 276 | 450 | -- | 1.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 15... | 1140 | 329 | 635 | -- | 4.5 | .0 | -- | -- | -- | -- | -- | |
| APR 04... | 1015 | 2160 | 505 | 7.4 | 11.5 | 6.0 | 210 | 75 | 46 | 24 | 12 | |
| MAY 11... | 1015 | 1090 | 595 | -- | 12.0 | 13.5 | -- | -- | -- | -- | -- | |
| JUN 14... | 1010 | 2020 | 555 | -- | 12.0 | 17.0 | -- | -- | -- | -- | -- | |
| JUL 25... | 1240 | 676 | 560 | -- | 29.0 | 25.0 | -- | -- | -- | -- | -- | |
| AUG 30... | 1305 | 295 | 562 | 8.5 | 24.0 | 21.5 | 290 | 76 | 52 | 38 | 26 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 04... | 11 | .4 | 6.9 | 170 | .000 | 140 | 11 | 84 | 5.9 | .20 | 13 | 301 |
| AUG 30... | 16 | .7 | 15 | 260 | .000 | 210 | 1.3 | 85 | 19 | .20 | 16 | 366 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 04... | 280 | .41 | 1760 | 3 | 50 | 40 | 1 | 22 | 30 | .0 | 0 | 140 |
| AUG 30... | 380 | .50 | 292 | 5 | 100 | 20 | 0 | 26 | 100 | .0 | 1 | 180 |

RED RIVER OF THE NORTH BASIN

05051522 RED RIVER OF THE NORTH AT HICKSON, ND

LOCATION.--Lat 46°39'35", long 96°47'44", in SW1/4 sec.19, T.137 N., R.48 W., Clay County, MN, Hydrologic Unit 09020104, on right bank 60 ft downstream from bridge on township road, and 1 mi southeast of Hickson, ND.

DRAINAGE AREA.--4,300 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1975 to current year.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 877.06 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at elevation 1,070 ft National Geodetic Vertical Datum of 1929, adjustment of 1912; Lake Traverse, capacity, 137,000 acre-ft, available for flood control; numerous other controlled lakes and ponds; and several powerplants.

AVERAGE DISCHARGE.--9 years, 511 ft³/s, 370,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,600 ft³/s Apr. 18, 1979, gage height, 33.03 ft; no flow Oct. 26, 1976, to Jan. 9, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,100 ft³/s Mar. 31, gage height, 25.58 ft; backwater from ice, minimum daily, 66 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-------|-------|-------|-------|--------|-------|--------|-------|--------|-------|
| 1 | 326 | 328 | 240 | 260 | 320 | 505 | 5050 | 1100 | 721 | 1640 | 499 | 335 |
| 2 | 332 | 324 | 225 | 265 | 320 | 510 | 4900 | 1080 | 663 | 1560 | 476 | 336 |
| 3 | 335 | 313 | 235 | 282 | 325 | 515 | 4500 | 1100 | 650 | 1490 | 436 | 323 |
| 4 | 332 | 306 | 250 | 290 | 322 | 515 | 3950 | 1120 | 688 | 1430 | 413 | 285 |
| 5 | 328 | 298 | 270 | 298 | 315 | 500 | 3450 | 1110 | 732 | 1370 | 460 | 257 |
| 6 | 323 | 295 | 270 | 298 | 285 | 470 | 2730 | 1100 | 740 | 1330 | 474 | 239 |
| 7 | 319 | 291 | 270 | 295 | 250 | 465 | 2240 | 1090 | 725 | 1280 | 463 | 225 |
| 8 | 322 | 291 | 270 | 298 | 195 | 450 | 1920 | 1080 | 855 | 1190 | 450 | 206 |
| 9 | 324 | 286 | 265 | 290 | 260 | 415 | 1770 | 1080 | 1440 | 1140 | 423 | 201 |
| 10 | 324 | 282 | 270 | 250 | 310 | 420 | 1680 | 1080 | 2520 | 1100 | 405 | 202 |
| 11 | 326 | 306 | 270 | 232 | 315 | 410 | 1620 | 1090 | 3260 | 1040 | 477 | 200 |
| 12 | 321 | 313 | 260 | 230 | 320 | 405 | 1620 | 1060 | 3650 | 919 | 534 | 205 |
| 13 | 317 | 298 | 270 | 230 | 320 | 400 | 1740 | 1050 | 3680 | 901 | 541 | 210 |
| 14 | 318 | 295 | 272 | 240 | 325 | 408 | 1920 | 1050 | 3350 | 913 | 528 | 212 |
| 15 | 325 | 291 | 270 | 270 | 345 | 395 | 2000 | 1030 | 2690 | 892 | 468 | 205 |
| 16 | 330 | 282 | 260 | 275 | 350 | 388 | 1970 | 1020 | 2010 | 852 | 339 | 201 |
| 17 | 339 | 282 | 245 | 280 | 370 | 398 | 1870 | 1010 | 1820 | 847 | 248 | 202 |
| 18 | 339 | 282 | 210 | 285 | 380 | 410 | 1770 | 996 | 2010 | 846 | 319 | 190 |
| 19 | 350 | 282 | 260 | 275 | 385 | 412 | 1690 | 978 | 1940 | 768 | 403 | 153 |
| 20 | 339 | 280 | 290 | 275 | 405 | 422 | 1650 | 967 | 1770 | 732 | 402 | 125 |
| 21 | 343 | 285 | 280 | 280 | 415 | 440 | 1620 | 961 | 1670 | 759 | 401 | 121 |
| 22 | 343 | 285 | 272 | 282 | 430 | 465 | 1590 | 961 | 1640 | 767 | 428 | 101 |
| 23 | 339 | 200 | 270 | 280 | 465 | 570 | 1570 | 942 | 1780 | 760 | 429 | 105 |
| 24 | 331 | 150 | 272 | 270 | 495 | 800 | 1530 | 876 | 2130 | 760 | 407 | 108 |
| 25 | 331 | 140 | 280 | 280 | 500 | 1340 | 1470 | 822 | 2510 | 760 | 387 | 101 |
| 26 | 328 | 150 | 270 | 290 | 480 | 2080 | 1330 | 803 | 2760 | 760 | 351 | 122 |
| 27 | 331 | 205 | 250 | 290 | 480 | 2700 | 1250 | 795 | 2750 | 754 | 325 | 131 |
| 28 | 331 | 280 | 230 | 300 | 480 | 3750 | 1230 | 798 | 2480 | 775 | 330 | 129 |
| 29 | 328 | 280 | 260 | 305 | 495 | 4050 | 1210 | 796 | 2100 | 681 | 343 | 97 |
| 30 | 324 | 275 | 280 | 310 | --- | 4500 | 1130 | 796 | 1810 | 577 | 339 | 66 |
| 31 | 328 | --- | 270 | 320 | --- | 5000 | --- | 800 | --- | 542 | 335 | --- |
| TOTAL | 10226 | 8175 | 8106 | 8625 | 10657 | 34508 | 63970 | 30541 | 57544 | 30135 | 12833 | 5593 |
| MEAN | 330 | 273 | 261 | 278 | 367 | 1113 | 2132 | 985 | 1918 | 972 | 414 | 186 |
| MAX | 350 | 328 | 290 | 320 | 500 | 5000 | 5050 | 1120 | 3680 | 1640 | 541 | 336 |
| MIN | 317 | 140 | 210 | 230 | 195 | 388 | 1130 | 795 | 650 | 542 | 248 | 66 |
| AC-FT | 20280 | 16220 | 16080 | 17110 | 21140 | 68450 | 126900 | 60580 | 114100 | 59770 | 25450 | 11090 |
| CAL YR 1983 | TOTAL | 134575 | | MEAN | 369 | MAX | 823 | MIN | 140 | AC-FT | 266900 | |
| WTR YR 1984 | TOTAL | 280913 | | MEAN | 768 | MAX | 5050 | MIN | 66 | AC-FT | 557200 | |

RED RIVER OF THE NORTH BASIN

37

05051522 RED RIVER OF THE NORTH AT HICKSON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | | |
|-----------|---|--|---|--|---|--|---|---|--|---|---|---|
| | DATE | TIME | | | | | | | | | | |
| | OCT 06... | 1135 | 318 | 415 | 8.2 | 10.5 | 11.0 | 15 | 17 | 10.6 | 99 | |
| | NOV 28... | 1545 | 277 | 580 | -- | .4 | .0 | -- | -- | -- | -- | |
| | JAN 05... | 1110 | 295 | 620 | -- | 4.0 | .0 | -- | -- | -- | -- | |
| | FEB 13... | 1345 | 319 | 535 | 7.2 | 2.0 | .0 | <1 | 3.1 | 11.8 | 80 | |
| | MAR 22... | 1410 | 462 | 275 | -- | 5.5 | .5 | -- | -- | -- | -- | |
| | APR 03... | 1305 | 4440 | 475 | -- | 10.5 | 3.0 | -- | -- | -- | -- | |
| | MAY 10... | 0955 | 1060 | 585 | 7.8 | 15.0 | 11.5 | 60 | 28 | 8.7 | 83 | |
| | JUN 26... | 1345 | 2770 | 610 | -- | 22.0 | 20.0 | -- | -- | -- | -- | |
| | JUL 26... | 1545 | 755 | 585 | -- | 33.0 | 25.0 | -- | -- | -- | -- | |
| | SEP 05... | 0920 | 258 | 555 | 8.5 | 13.5 | 16.5 | 60 | 33 | 8.0 | 84 | |
| DATE | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS C02) (00405) | SULFATE DIS- SOLVED (MG/L AS S04) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
| OCT 06... | 200 | 5 | 35 | 28 | 9.8 | 9 | .3 | 5.3 | 198 | 2.4 | 24 | 8.9 |
| FEB 13... | 240 | 0 | 43 | 33 | 12 | 9 | .3 | 6.0 | 248 | 30 | 27 | 10 |
| MAY 10... | 280 | 93 | 50 | 37 | 20 | 13 | .5 | 6.9 | 184 | 5.6 | 140 | 13 |
| SEP 05... | 270 | 58 | 50 | 36 | 20 | 13 | .5 | 16 | 215 | 1.3 | 88 | 17 |
| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610) | NITRO- GEN, TOTAL (MG/L AS N) (00600) | NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605) |
| OCT 06... | .20 | 14 | 261 | 240 | .36 | 224 | <.020 | <.10 | <.10 | .040 | -- | 1.3 |
| FEB 13... | .20 | 18 | 292 | 300 | .40 | 251 | .010 | .30 | .28 | .280 | 1.0 | .42 |
| MAY 10... | .20 | 6.1 | 409 | 380 | .56 | 1170 | <.010 | <.10 | <.10 | .040 | -- | .86 |
| SEP 05... | .20 | 16 | 391 | 370 | .53 | 272 | .020 | <.10 | .13 | .010 | -- | 1.2 |
| DATE | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | NITRO- GEN, TOTAL (MG/L AS NO3) (71887) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS, TOTAL (MG/L AS P04) (71886) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P) (70507) | PHOS- PHORUS, HYDRO- LYZABLE TOTAL (MG/L AS P) (00669) | PHOS- PHORUS, HYDRO- + ORTHO TOTAL (MG/L AS P) (00678) | PHOS- PHORUS, ORGANIC TOTAL (MG/L AS P) (00670) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681) | CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689) |
| OCT 06... | 1.3 | -- | .060 | .18 | .020 | .060 | .00 | .06 | .00 | 70 | 8.7 | .6 |
| FEB 13... | .70 | 4.4 | .050 | .15 | .020 | .050 | .00 | .05 | .00 | 50 | 8.8 | .4 |
| MAY 10... | .90 | -- | .130 | .40 | .050 | .040 | .00 | .04 | .09 | 80 | 8.7 | .5 |
| SEP 05... | 1.2 | -- | .150 | -- | .050 | .060 | .04 | .10 | .05 | 110 | 11 | -- |

RED RIVER OF THE NORTH BASIN

05051600 WILD RICE RIVER NEAR RUTLAND, ND

LOCATION.--Lat 46°01'20", long 97°30'40", in SE1/4SE1/4 sec.36, T.130 N., R.55 W., Sargent County, Hydrologic Unit 09020105, on right bank 1,000 ft upstream from bridge on county highway, 2 mi south of Rutland, and 10 mi upstream from Lake Tewaukon.

DRAINAGE AREA.--546 mi², of which about 250 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year (seasonal records only since 1983).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,197.73 ft National Geodetic Vertical Datum of 1929. Prior to Dec. 11, 1960, nonrecording gage at same site and datum.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--23 years (water years 1960-82), 8.08 ft³/s, 5,850 acre-ft/yr; median of yearly mean discharges, 4.7 ft³/s; 3,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,270 ft³/s Apr. 8, 1969, gage height, 8.77 ft, backwater from ice; maximum gage height, 8.78 ft Apr. 8, 1969, backwater from ice; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 150 ft³/s Mar. 28, gage height, 4.62 ft, backwater from ice, no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|-------|--------|------|--------|--------|--------|-------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 76 | 19 | .00 | 18 | .45 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 65 | 20 | .00 | 15 | .66 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 71 | 19 | .00 | 14 | 3.5 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 91 | 17 | .00 | 13 | 4.3 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 95 | 16 | .00 | 11 | 3.3 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 88 | 15 | .71 | 9.3 | 2.6 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 72 | 15 | .63 | 7.6 | 2.8 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 56 | 13 | 1.8 | 5.3 | 3.3 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | 45 | 11 | 2.2 | 3.0 | 3.1 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | 50 | 10 | 2.7 | .96 | 1.5 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | 55 | 9.8 | 2.7 | .10 | .33 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 54 | 9.8 | 2.3 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 49 | 9.8 | 1.3 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | 51 | 9.8 | .74 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | 49 | 9.2 | .57 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | 45 | 8.6 | 1.2 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | 40 | 11 | 1.4 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | 33 | 10 | 1.8 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | 29 | 7.8 | 2.3 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | 25 | 6.3 | 2.1 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | 22 | 5.6 | 1.3 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | 18 | 5.6 | .92 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .10 | 16 | 4.6 | .42 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | 10 | 1.0 | 18 | 4.1 | 2.8 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | 5.0 | .50 | 17 | 3.3 | 13 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | 1.0 | 10 | 15 | 2.8 | 19 | 2.2 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .10 | 80 | 14 | 2.3 | 23 | 2.3 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 140 | 14 | 1.4 | 24 | 2.3 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 120 | 13 | .92 | 22 | 2.4 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 110 | 14 | .15 | 21 | 2.1 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 105 | --- | .00 | --- | 1.3 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | 16.10 | 566.60 | 1300 | 277.87 | 151.89 | 109.86 | 25.84 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .56 | 18.3 | 43.3 | 8.96 | 5.06 | 3.54 | .83 | .00 |
| MAX | .00 | .00 | .00 | .00 | 10 | 140 | 95 | 20 | 24 | 18 | 4.3 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | 13 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | 32 | 1120 | 2580 | 551 | 301 | 218 | 51 | .00 |
| WTR YR 1984 | TOTAL | 2448.16 | | MEAN | 6.69 | MAX | 140 | MIN | .00 | AC-FT | 4860 | |

RED RIVER OF THE NORTH BASIN

39

05051600 WILD RICE RIVER NEAR RUTLAND, ND---CONTINUED

PERIOD OF RECORD.--Water years 1971 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|--|
| APR 03... | 1100 | 67 | 300 | 7.0 | 8.0 | 6.5 | 130 | 48 | 32 | 12 | 6.0 | |
| 26... | 0930 | 15 | 600 | -- | 3.0 | 9.0 | -- | -- | -- | -- | -- | |
| JUN 06... | 1400 | .98 | 410 | -- | 20.0 | 20.0 | -- | -- | -- | -- | -- | |
| 26... | 0900 | 19 | 1000 | -- | 24.0 | 22.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 03... | 8 | .2 | 11 | 100 | .000 | 82 | 16 | 56 | 6.4 | .10 | 13 | 205 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS) PER AC-PT (70303) | SOLIDS, DIS- SOLVED (TONS) PER DAY (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 03... | 190 | .28 | 37 | 3 | 40 | 70 | 0 | 30 | 10 | 1.5 | 0 | 100 |

RED RIVER OF THE NORTH BASIN

05052100 RICHLAND COUNTY DRAIN 65 NEAR GREAT BEND, ND

LOCATION.--Lat 46°05'41", long 96°47'01", in NE1/4NE1/4NE1/4 sec.11, T.130 N., R.49 W., Richland County, Hydrologic Unit 09020105, at bridge on county road 4 mi south and 1 mi east of Great Bend.

DRAINAGE AREA.--38 mi².

PERIOD OF RECORD.--October 1980 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Altitude of gage is 988 ft, from topographic map.

REMARKS.--Records fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 157 ft³/s March 26, 1984, gage height, 4.52 ft, backwater from ice; maximum gage height, 6.16 ft Mar. 31, 1982, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 157 ft³/s Mar. 26, gage height, 4.52 ft, backwater from ice; maximum gage height, 5.55 ft Mar. 24, backwater from ice. No flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| MEAN VALUES | | | | | | | | | | | | |
|-------------|-----|-----|-----|-----|-------|--------|-------|------|-------|-----|-----|-----|
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
| 1 | | | | | .00 | 1.2 | 2.4 | .66 | .00 | .13 | .00 | |
| 2 | | | | | .00 | .35 | 1.7 | .48 | .00 | .10 | .00 | |
| 3 | | | | | .00 | .32 | 1.5 | .42 | .00 | .11 | .00 | |
| 4 | | | | | .00 | .30 | 1.4 | .39 | .00 | .08 | .00 | |
| 5 | | | | | .00 | .20 | 1.5 | .41 | .00 | .09 | .00 | |
| 6 | | | | | .00 | .13 | 1.2 | .39 | .00 | .07 | .00 | |
| 7 | | | | | .00 | .09 | .92 | .41 | .00 | .05 | .00 | |
| 8 | | | | | .00 | .05 | .78 | .48 | .12 | .03 | .00 | |
| 9 | | | | | .00 | .00 | .72 | .41 | 2.2 | .00 | .00 | |
| 10 | | | | | .00 | .00 | .67 | .40 | 4.7 | .00 | .00 | |
| 11 | | | | | .00 | .00 | .76 | .32 | 7.1 | .00 | .00 | |
| 12 | | | | | .00 | .00 | 3.4 | .24 | 6.6 | .00 | .00 | |
| 13 | | | | | .00 | .00 | 11 | .21 | 3.9 | .00 | .00 | |
| 14 | | | | | .00 | .00 | 7.0 | .16 | 2.0 | .00 | .00 | |
| 15 | | | | | .00 | .00 | 3.8 | .11 | 2.0 | .00 | .00 | |
| 16 | | | | | .00 | .00 | 2.1 | .06 | 18 | .00 | .00 | |
| 17 | | | | | .00 | .00 | 1.4 | .02 | 9.7 | .00 | .00 | |
| 18 | | | | | .00 | .00 | 1.0 | .00 | 5.0 | .00 | .00 | |
| 19 | | | | | .00 | .00 | .77 | .00 | 2.7 | .00 | .00 | |
| 20 | | | | | .00 | .00 | .59 | .00 | 1.7 | .00 | .00 | |
| 21 | | | | | .50 | .00 | .48 | .00 | 1.2 | .00 | .00 | |
| 22 | | | | | 1.5 | .69 | .38 | .00 | .89 | .00 | .00 | |
| 23 | | | | | 2.5 | 26 | .31 | .00 | .82 | .00 | .00 | |
| 24 | | | | | 3.4 | 72 | .26 | .00 | .79 | .00 | .00 | |
| 25 | | | | | 4.0 | 91 | .24 | .00 | .83 | .00 | .00 | |
| 26 | | | | | 4.0 | 69 | .22 | .00 | .61 | .00 | .00 | |
| 27 | | | | | 8.0 | 42 | .26 | .00 | .34 | .00 | .00 | |
| 28 | | | | | 8.0 | 24 | .64 | .00 | .24 | .00 | .00 | |
| 29 | | | | | 6.5 | 12 | .99 | .00 | .16 | .00 | .00 | |
| 30 | | | | | --- | 6.3 | .88 | .00 | .13 | .00 | .00 | |
| 31 | | | | | --- | 3.8 | --- | .00 | --- | .00 | .00 | |
| TOTAL | | | | | 38.40 | 349.43 | 49.27 | 5.57 | 71.73 | .66 | .00 | |
| MEAN | | | | | 1.32 | 11.3 | 1.64 | .18 | 2.39 | .02 | .00 | |
| MAX | | | | | 8.0 | 91 | 11 | .66 | 18 | .13 | .00 | |
| MIN | | | | | .00 | .00 | .22 | .00 | .00 | .00 | .00 | |
| AC-FT | | | | | 76 | 693 | 98 | 11 | 142 | 1.3 | .00 | |

RED RIVER OF THE NORTH BASIN

41

05052100 RICHLAND COUNTY DRAIN #65 NEAR GREAT BEND, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1981 to current year

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|-------|------|---|---|--------------------------------|-------------------------------------|-----------------------------|--|---|--|--|--|
| FEB | | | | | | | | | | | |
| 24... | 1205 | 3.2 | 262 | 6.9 | 2.0 | .5 | 110 | 27 | 31 | 8.5 | 8.5 |
| 28... | 1600 | 7.9 | 270 | -- | -3.0 | .5 | -- | -- | -- | -- | -- |
| MAR | | | | | | | | | | | |
| 27... | 1615 | 45 | 405 | -- | 3.5 | 1.0 | -- | -- | -- | -- | -- |
| 30... | 1340 | 5.7 | 530 | -- | 5.0 | 7.0 | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 03... | 1545 | 1.5 | 650 | -- | 11.0 | 7.0 | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | |
| 13... | 1620 | 3.3 | 375 | -- | 19.0 | 17.5 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
|-------|-------------------|---|---|---|---|---|---|--|---|--|---|---|
| FEB | | | | | | | | | | | | |
| 24... | 14 | .4 | 4.6 | 85 | 21 | 23 | 1.9 | .20 | 7.5 | 159 | 140 | .22 |

| DATE | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
|-------|---|--|--|--|--|--|--|--|---|---|--|
| FEB | | | | | | | | | | | |
| 24... | 1.4 | 4 | 0 | 50 | 20 | 10 | 10 | .4 | 1 | 0 | 200 |

05053000 WILD RICE RIVER NEAR ABERCROMBIE, ND

LOCATION.--Lat 46°28'05", long 96°47'00", in NE¼NE¼ sec.36, T.135 N., R.49 W., Richland County, Hydrologic Unit 09020105, on right bank 420 ft upstream from bridge on county highway, 0.75 mi upstream from rubble masonry dam which serves as control, 3.2 mi northwest of Abercrombie, and 7 mi downstream from Antelope Creek.

DRAINAGE AREA.--2,080 mi², of which about 590 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1932 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1388: 1939, 1941(M). WSP 1728: Drainage area.

GAGE.--Water-stage recorder and masonry control. Datum of gage is 907.94 ft National Geodetic Vertical Datum of 1929. Prior to Dec. 7, 1939, nonrecording gage at site 420 ft downstream at datum 5.0 ft lower. Dec. 7, 1939, to Nov. 24, 1952, nonrecording gage at site 0.75 mi downstream at present datum.

REMARKS.--Records good. Some regulation by Fish and Wildlife Service reservoirs, of which Lake Tawaukon is the largest. Some small diversions for irrigation.

AVERAGE DISCHARGE.--52 years, 72.7 ft³/s, 52,670 acre-ft/yr; median of yearly mean discharges, 34 ft³/s, 24,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,540 ft³/s Apr. 11, 1969, gage height, 24.58 ft; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in spring of 1897 reached a stage of 27.5 ft present site and datum, from floodmarks pointed out by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 300 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Feb. 27 | -- | 327 | Ice jam | June 8 | 1645 | 400 | 3.09 |
| Mar. 29 | -- | *2,970 | a*16.74 | June 17 | 0915 | 303 | 2.55 |
| Apr. 15 | 1245 | 306 | 2.70 | | | | |

No flow for several days.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-----|------|---------|-------|-------|--------|--------|--------|-------|-----|
| 1 | .70 | .21 | .10 | .00 | .00 | 159 | 2200 | 156 | 6.3 | 17 | 3.0 | .01 |
| 2 | .69 | .19 | .10 | .00 | .00 | 113 | 1690 | 155 | 6.1 | 13 | 2.2 | .01 |
| 3 | .62 | .17 | .08 | .05 | .00 | 111 | 1190 | 148 | 5.6 | 11 | 1.7 | .00 |
| 4 | .55 | .16 | .08 | .14 | .00 | 120 | 870 | 139 | 7.2 | 7.0 | 1.7 | .00 |
| 5 | .53 | .15 | .06 | .19 | .00 | 120 | 787 | 129 | 45 | 5.3 | 1.5 | .00 |
| 6 | .50 | .14 | .06 | .22 | .00 | 98 | 662 | 123 | 56 | 3.3 | .94 | .00 |
| 7 | .46 | .14 | .05 | .23 | .00 | 60 | 601 | 120 | 90 | 2.3 | 1.1 | .00 |
| 8 | .44 | .13 | .05 | .19 | .00 | 47 | 566 | 113 | 324 | 1.4 | 3.4 | .00 |
| 9 | .42 | .11 | .04 | .14 | .01 | 39 | 502 | 103 | 311 | 1.1 | 6.8 | .00 |
| 10 | .37 | .10 | .04 | .12 | .01 | 36 | 422 | 96 | 192 | 1.0 | 4.3 | .00 |
| 11 | .36 | .09 | .03 | .09 | .02 | 28 | 344 | 88 | 158 | 1.1 | 2.4 | .00 |
| 12 | .34 | .08 | .03 | .07 | .03 | 26 | 300 | 76 | 188 | 1.6 | 1.1 | .00 |
| 13 | .32 | .08 | .02 | .05 | .06 | 22 | 301 | 69 | 219 | 2.0 | .72 | .00 |
| 14 | .29 | .10 | .02 | .04 | .08 | 22 | 293 | 61 | 211 | 1.9 | .47 | .00 |
| 15 | .30 | .10 | .01 | .03 | .27 | 21 | 303 | 52 | 185 | 1.4 | .29 | .00 |
| 16 | .33 | .09 | .01 | .02 | .85 | 20 | 289 | 48 | 152 | 1.4 | .15 | .00 |
| 17 | .33 | .08 | .00 | .01 | 1.4 | 20 | 261 | 44 | 225 | 3.1 | .12 | .00 |
| 18 | .33 | .08 | .00 | .01 | 1.3 | 20 | 249 | 39 | 207 | 1.6 | .20 | .00 |
| 19 | .38 | .09 | .00 | .01 | .83 | 20 | 243 | 33 | 155 | .87 | .20 | .00 |
| 20 | .39 | .15 | .00 | .00 | .79 | 20 | 242 | 28 | 96 | .54 | .18 | .00 |
| 21 | .39 | .14 | .00 | .00 | 1.0 | 20 | 235 | 27 | 90 | .32 | .25 | .00 |
| 22 | .39 | .14 | .00 | .00 | 3.2 | 21 | 223 | 25 | 124 | .18 | .22 | .00 |
| 23 | .39 | .14 | .00 | .00 | 16 | 66 | 209 | 21 | 132 | .10 | .24 | .00 |
| 24 | .36 | .14 | .00 | .00 | 63 | 338 | 194 | 14 | 138 | .37 | .18 | .00 |
| 25 | .34 | .14 | .00 | .00 | 109 | 1090 | 181 | 17 | 162 | 4.5 | .14 | .00 |
| 26 | .31 | .14 | .00 | .00 | 88 | 1880 | 170 | 13 | 138 | 6.9 | .11 | .00 |
| 27 | .29 | .13 | .00 | .00 | 257 | 2440 | 164 | 12 | 64 | 6.2 | .09 | .00 |
| 28 | .27 | .12 | .00 | .00 | 308 | 2770 | 161 | 11 | 40 | 6.3 | .06 | .00 |
| 29 | .25 | .12 | .00 | .00 | 239 | 2950 | 153 | 9.4 | 30 | 6.3 | .04 | .00 |
| 30 | .23 | .12 | .00 | .00 | --- | 2900 | 154 | 8.4 | 23 | 4.8 | .02 | .00 |
| 31 | .22 | --- | .00 | .00 | --- | 2630 | --- | 5.5 | --- | 3.6 | .01 | --- |
| TOTAL | 12.09 | 3.77 | .78 | 1.61 | 1089.85 | 18227 | 14159 | 1983.3 | 3780.2 | 117.48 | 33.83 | .02 |
| MEAN | .39 | .13 | .02 | .05 | 37.6 | 588 | 472 | 64.0 | 126 | 3.79 | 1.09 | .00 |
| MAX | .70 | .21 | .10 | .23 | 308 | 2950 | 2200 | 156 | 324 | 17 | 6.8 | .01 |
| MIN | .22 | .08 | .00 | .00 | .00 | 20 | 153 | 5.5 | 5.6 | .10 | .01 | .00 |
| AC-FT | 24 | 7.5 | 1.5 | 3.2 | 2160 | 36150 | 28080 | 3930 | 7500 | 233 | 67 | .04 |
| CAL YR 1983 | TOTAL | 5272.29 | | MEAN | 14.4 | MAX | 262 | MIN | .00 | AC-FT | 10460 | |
| WTR YR 1984 | TOTAL | 39408.93 | | MEAN | 108 | MAX | 2950 | MIN | .00 | AC-FT | 78170 | |

RED RIVER OF THE NORTH BASIN

43

05053000 WILD RICE RIVER NR ABERCROMBIE, ND---CONTINUED

PERIOD OF RECORD.--Water years 1967 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|--|---|--|--|---|--|---|--|--|---|---|
| FEB 28... | 1156 | 288 | 312 | 7.0 | -3.0 | 1.0 | 100 | 24 | 25 | 9.8 | 15 |
| AUG 30... | 0915 | .02 | 1440 | 7.7 | -- | 17.0 | 580 | 162 | 120 | 67 | 130 |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB AS HCO3) (95440) | CAR- BONATE, FET-LAB AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | |
| FEB 28... | 22 | .7 | 9.4 | 96 | .000 | 90 | 15 | 32 | 11 | .20 | |
| AUG 30... | 32 | 2 | 23 | 510 | .000 | 410 | 16 | 360 | 59 | .40 | |
| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| FEB 28... | 12 | 191 | 160 | .26 | 149 | 3.8 | .300 | 2 | 170 | 60 | |
| AUG 30... | 24 | 1080 | 1000 | 1.5 | .06 | -- | -- | 13 | -- | 270 | |
| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | | |
| FEB 28... | 11 | 210 | 480 | 19 | 220 | <.1 | <1 | 90 | 73 | | |
| AUG 30... | -- | 40 | 0 | 100 | 1200 | .0 | 1 | 650 | -- | | |

RED RIVER OF THE NORTH BASIN

05054000 RED RIVER OF THE NORTH AT FARGO, ND

LOCATION.--Lat 46°51'40", long 96°47'00", in NW1/4NE1/4 sec.18, T.139 N., R.48 W., Cass County, Hydrologic Unit 09020104, at city waterplant on 4th St. S. in Fargo, 25 mi upstream from mouth of Sheyenne River, and at mile 453.0.

DRAINAGE AREA.--6,800 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1901 to current year. Published as "at Moorhead, Minn." 1901. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1902-4, 1906-7, 1910-14, 1916, 1918, 1924. WSP 1388: 1905-6, 1917-20(M), 1935(M), 1938-39(M), 1943.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 861.8 ft National Geodetic Vertical Datum of 1929. Oct. 1, 1960 to Sept. 30, 1962, water-stage recorder at present site at datum 5.6 ft higher. See WSP 1728 or 1913 for history of changes prior to Oct. 1, 1960.

REMARKS.--Records good except those for loop ratings, which are poor. Flow regulated by Orwell Reservoir, capacity, 14,100 acre-ft at elevation 1,070 ft National Geodetic Vertical Datum of 1929, adjustment of 1912; Lake Traverse, capacity, 137,000 acre-ft, available for flood control; other controlled lakes and ponds; and several powerplants. Some small diversions for municipal supply. Figures of daily discharge do not include diversions to cities of Fargo and Moorhead and from Sheyenne River.

AVERAGE DISCHARGE (UNADJUSTED).--83 years, 557 ft³/s, 403,500 acre-ft/yr; median of yearly mean discharges, 443 ft³/s, 321,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,300 ft³/s Apr. 15, 1969, gage height, 37.34 ft; no flow for many days in each year for period 1932-41, Sept. 30, Oct. 1-2, 1970, Oct. 10-19, 1976.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 7, 1897 reached a stage of 39.1 ft present datum, discharge, 25,000 ft³/s at site 1.5 mi downstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9,550 ft³/s Apr. 1, gage height, 28.27 ft; minimum daily, 87 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|--------|-------|-------|-------|-------|-------|--------|--------|-------|--------|-------|-------|-------|
| 1 | 309 | 348 | 220 | 248 | 280 | 640 | 9450 | 1390 | 890 | 1870 | 494 | 306 |
| 2 | 301 | 338 | 208 | 250 | 290 | 635 | 9350 | 1360 | 817 | 1760 | 463 | 328 |
| 3 | 305 | 333 | 202 | 250 | 285 | 610 | 8520 | 1360 | 769 | 1660 | 431 | 317 |
| 4 | 299 | 324 | 220 | 232 | 285 | 590 | 7550 | 1390 | 796 | 1590 | 388 | 285 |
| 5 | 292 | 316 | 240 | 235 | 285 | 510 | 6430 | 1400 | 838 | 1530 | 392 | 257 |
| 6 | 282 | 310 | 242 | 250 | 315 | 500 | 5370 | 1400 | 887 | 1460 | 418 | 226 |
| 7 | 281 | 308 | 235 | 252 | 320 | 485 | 4370 | 1400 | 938 | 1400 | 408 | 213 |
| 8 | 282 | 301 | 232 | 260 | 270 | 470 | 3480 | 1350 | 1790 | 1350 | 394 | 196 |
| 9 | 283 | 299 | 230 | 260 | 210 | 430 | 2700 | 1310 | 2330 | 1260 | 371 | 189 |
| 10 | 284 | 299 | 230 | 255 | 250 | 405 | 2450 | 1300 | 2780 | 1200 | 343 | 181 |
| 11 | 279 | 305 | 230 | 235 | 295 | 395 | 2330 | 1290 | 3330 | 1140 | 357 | 173 |
| 12 | 278 | 333 | 230 | 245 | 300 | 385 | 2250 | 1280 | 3820 | 1020 | 463 | 201 |
| 13 | 278 | 326 | 236 | 220 | 290 | 380 | 2240 | 1250 | 4050 | 909 | 503 | 192 |
| 14 | 278 | 305 | 238 | 215 | 275 | 375 | 2350 | 1230 | 3880 | 894 | 504 | 191 |
| 15 | 301 | 301 | 232 | 245 | 295 | 360 | 2470 | 1210 | 3250 | 898 | 492 | 191 |
| 16 | 316 | 297 | 212 | 235 | 310 | 330 | 2470 | 1180 | 2350 | 877 | 402 | 191 |
| 17 | 299 | 293 | 195 | 240 | 330 | 330 | 2380 | 1150 | 1990 | 850 | 273 | 187 |
| 18 | 299 | 297 | 222 | 260 | 360 | 330 | 2260 | 1140 | 2070 | 843 | 223 | 183 |
| 19 | 331 | 305 | 252 | 245 | 365 | 330 | 2150 | 1110 | 2150 | 803 | 306 | 168 |
| 20 | 338 | 308 | 252 | 262 | 380 | 330 | 2070 | 1090 | 2000 | 704 | 379 | 137 |
| 21 | 339 | 312 | 250 | 278 | 400 | 360 | 2020 | 1100 | 1840 | 691 | 386 | 120 |
| 22 | 344 | 313 | 250 | 295 | 415 | 450 | 1990 | 1070 | 1740 | 785 | 383 | 102 |
| 23 | 347 | 305 | 248 | 255 | 430 | 600 | 1960 | 1060 | 1780 | 746 | 416 | 88 |
| 24 | 340 | 239 | 248 | 270 | 460 | 1180 | 1930 | 1020 | 2050 | 738 | 404 | 99 |
| 25 | 334 | 157 | 260 | 262 | 490 | 2000 | 1870 | 954 | 2300 | 733 | 385 | 92 |
| 26 | 332 | 140 | 270 | 250 | 470 | 3050 | 1770 | 921 | 2500 | 732 | 360 | 93 |
| 27 | 335 | 150 | 250 | 250 | 450 | 4900 | 1660 | 906 | 2580 | 732 | 316 | 100 |
| 28 | 335 | 182 | 212 | 270 | 500 | 5500 | 1560 | 920 | 2470 | 738 | 283 | 103 |
| 29 | 337 | 240 | 212 | 262 | 540 | 6520 | 1540 | 917 | 2250 | 725 | 290 | 103 |
| 30 | 336 | 242 | 228 | 255 | --- | 7930 | 1470 | 918 | 2060 | 620 | 304 | 87 |
| 31 | 339 | --- | 242 | 275 | --- | 8850 | --- | 921 | --- | 541 | 294 | --- |
| TOTAL | 9633 | 8526 | 7228 | 7816 | 10145 | 50160 | 100410 | 36297 | 63295 | 31799 | 11825 | 5299 |
| MEAN* | 311 | 284 | 233 | 252 | 350 | 1618 | 3347 | 1171 | 2110 | 1026 | 381 | 177 |
| MAX | 347 | 348 | 270 | 295 | 540 | 8850 | 9450 | 1400 | 4050 | 1870 | 504 | 328 |
| MIN | 278 | 140 | 195 | 215 | 210 | 330 | 1470 | 906 | 769 | 541 | 223 | 87 |
| AC-FT | 19110 | 16910 | 14340 | 15500 | 20120 | 99490 | 199200 | 72000 | 125500 | 63070 | 23450 | 10510 |
| (+) | 1294 | 1262 | 1259 | 1285 | 1188 | 1257 | 1271 | 1552 | 1381 | 2079 | 2408 | 1461 |
| MEAN* | 332 | 305 | 254 | 273 | 371 | 1638 | 3368 | 1196 | 2133 | 1060 | 420 | 202 |
| AC-FT* | 20400 | 18170 | 15600 | 16780 | 21310 | 100750 | 200430 | 73550 | 126930 | 65150 | 25870 | 11970 |

| OBSERVED | | | | ADJUSTED | | | |
|-------------|-------|--------|----------|----------|---------|--------------|--------------|
| CAL YR 1983 | TOTAL | 140970 | MEAN 386 | MAX 1620 | MIN 140 | AC-FT 279600 | MEAN 406 |
| WTR YR 1984 | TOTAL | 342433 | MEAN 936 | MAX 9450 | MIN 87 | AC-FT 679200 | MEAN 963 |
| | | | | | | | AC-FT 294555 |
| | | | | | | | AC-FT 696917 |

* Diversions in acre-feet to cities of Fargo and Moorhead.
† Adjusted for diversions to cities of Fargo and Moorhead.

RED RIVER OF THE NORTH BASIN

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05054000 RED RIVER OF THE NORTH AT FARGO, ND---CONTINUED

PERIOD OF RECORD---Water years 1956 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| MAR 30... | 1045 | 7820 | 288 | 7.7 | 5.0 | 1.0 | 120 | 11 | 27 | 12 | 10 | |
| SEP 05... | 1240 | 263 | 550 | 8.6 | 22.0 | 19.0 | 270 | 49 | 47 | 36 | 19 | |
| | | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HC03) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SI02) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 15 | .4 | 7.1 | 130 | .000 | 110 | 4.1 | 34 | 4.5 | .20 | 10 | 176 |
| SEP 05... | 13 | .5 | 15 | 270 | .000 | 220 | 1.1 | 75 | 22 | .20 | 16 | 368 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 170 | .24 | 3720 | 13 | 270 | 40 | 0 | 100 | 100 | .0 | 1 | 650 |
| SEP 05... | 360 | .50 | 261 | 5 | 100 | 20 | 0 | 26 | 10 | .0 | 1 | 180 |

RED RIVER OF THE NORTH BASIN

05054020 RED RIVER OF THE NORTH BELOW FARGO, ND

LOCATION.--Lat 46°55'50", long 96°47'05", in SW1/4NE1/4 sec.19, T.140 N., R.48 W., Cass County, Hydrologic Unit 09020104, at bridge on county highway 2 mi north of North Dakota State University campus in Fargo, and 12 mi above mouth of Sheyenne River.

DRAINAGE AREA.--6,820 mi², approximately.

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-----------|------|--|--|---|--|--|---|--|---|
| OCT 07... | 0955 | 284 | 480 | 8.4 | 8.0 | 12.0 | 40 | -- | -- |
| NOV 22... | 1550 | 307 | 490 | 8.0 | - .9 | 1.0 | 5 | -- | -- |
| JAN 06... | 0935 | 253 | 640 | 7.2 | - .9 | 1.0 | <1 | -- | -- |
| FEB 16... | 0955 | 310 | 620 | 7.5 | 3.0 | 1.5 | 40 | 12.1 | 84 |
| MAY 10... | 1450 | 1300 | 700 | 8.0 | 17.5 | 15.5 | 50 | 8.5 | 89 |
| JUN 12... | 1305 | 3860 | 450 | 8.3 | 28.0 | 19.0 | 350 | 7.9 | 89 |
| AUG 01... | 1330 | 493 | 520 | 8.3 | 31.5 | 26.0 | 100 | 7.1 | 90 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|
| OCT 07... | 210 | 8 | 36 | 29 | 10 | 9 | .3 | 4.3 | 202 | 1.5 |
| NOV 22... | 220 | 4 | 38 | 30 | 13 | 11 | .4 | 6.1 | 215 | 4.1 |
| JAN 06... | 260 | 15 | 47 | 35 | 18 | 13 | .5 | 6.7 | 247 | 30 |
| FEB 16... | 260 | 14 | 48 | 33 | 45 | 27 | 1 | 7.8 | 242 | 15 |
| MAY 10... | 310 | 109 | 60 | 39 | 25 | 15 | .6 | 7.6 | 202 | 3.9 |
| JUN 12... | 180 | 76 | 41 | 19 | 14 | 14 | .5 | 5.2 | 105 | 1.0 |
| AUG 01... | 270 | 60 | 52 | 35 | 20 | 13 | .5 | 5.4 | 214 | 2.1 |

| DATE | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) |
|-----------|--|--|---|--|---|--|--|--|--|---|
| OCT 07... | 25 | 7.9 | .20 | 11 | 257 | 240 | .35 | 197 | <.10 | .040 |
| NOV 22... | 31 | 10 | .20 | 11 | 295 | 270 | .40 | 245 | <.10 | .080 |
| JAN 06... | 35 | 17 | .20 | 17 | 345 | 320 | .47 | 236 | .30 | .220 |
| FEB 16... | 49 | 58 | .20 | 17 | 393 | 400 | .53 | 329 | .52 | .220 |
| MAY 10... | 150 | 14 | .30 | 7.3 | 488 | 420 | .66 | 1710 | <.10 | .050 |
| JUN 12... | 91 | 5.1 | .20 | 12 | 260 | 250 | .35 | 2710 | .82 | .120 |
| AUG 01... | 100 | 11 | .20 | 17 | 387 | 370 | .53 | 515 | <.10 | .140 |

RED RIVER OF THE NORTH BASIN

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05054020 RED RIVER OF THE NORTH BELOW FARGO, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) |
|--------------|--|---|---|--|---|--|---|---|---|---|
| OCT 07... | -- | -- | -- | 60 | -- | -- | -- | -- | -- | -- |
| NOV 22... | -- | -- | -- | 60 | -- | -- | -- | -- | -- | -- |
| JAN 06... | <10 | 2 | 86 | 80 | 1 | <10 | <1 | 5 | 57 | <1 |
| FEB 16... | -- | -- | -- | 70 | -- | -- | -- | -- | -- | -- |
| MAY 10... | -- | -- | -- | 100 | -- | -- | -- | -- | -- | -- |
| JUN 12... | 40 | 2 | 230 | 150 | <1 | <10 | <1 | 7 | 54 | <1 |
| AUG 01... | -- | -- | -- | 100 | -- | -- | -- | -- | -- | -- |
| DATE | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | CYANIDE TOTAL (MG/L AS CN) (00720) |
| JAN 06... | 20 | 17 | <.1 | 6 | 1 | <1 | 160 | <1 | 50 | <.01 |
| JUN 12... | 25 | 6 | <.1 | 1 | 5 | <1 | 160 | 7 | 29 | <.01 |

RED RIVER OF THE NORTH BASIN

05054500 SHEYENNE RIVER ABOVE HARVEY, ND

LOCATION.--Lat 47°42'10", long 99°56'55", in SW1/4SE1/4 sec.24, T.149 N., R.73 W., Wells County, Hydrologic Unit 09020202, on right bank just downstream from county road, and 4.5 mi south of Harvey.

DRAINAGE AREA.--424 mi², of which about 270 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1955 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,547.30 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--29 years, 8.12 ft³/s, 5,880 acre-ft/yr; median of yearly mean discharges, 6.0 ft³/s, 4,350 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,000 ft³/s Apr. 20, 1979, gage height, 9.45 ft; maximum gage height, 10.30 ft Apr. 1, 1971, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 25 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 23 | -- | ice jam | *89.50 | Apr. 14 | 1530 | *145 | 8.38 |
| Mar. 26 | 0015 | a140 | 8.94 | May 1 | 0500 | 105 | 8.41 |
| Apr. 5 | 0015 | 125 | 7.84 | | | | |

No flow Dec. 25-30.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|------|-------|--------|------|------|-------|-------|-------|--------|
| 1 | 1.9 | 1.1 | 2.0 | 1.0 | 2.7 | 10 | 95 | 103 | 20 | 3.4 | 3.3 | 3.1 |
| 2 | 2.5 | 1.1 | 1.8 | 2.0 | 2.8 | 8.0 | 106 | 89 | 22 | 3.4 | 3.2 | 3.3 |
| 3 | 3.4 | 1.6 | 1.8 | 4.0 | 2.9 | 8.0 | 113 | 74 | 24 | 2.5 | 3.2 | 3.5 |
| 4 | 2.5 | 1.4 | 1.8 | 5.0 | 3.0 | 7.5 | 120 | 83 | 22 | 3.2 | 3.4 | 3.1 |
| 5 | 1.9 | 1.4 | 1.7 | 4.2 | 2.8 | 7.5 | 123 | 95 | 25 | 2.9 | 3.5 | 3.2 |
| 6 | 1.6 | 1.4 | 1.7 | 5.0 | 2.7 | 7.5 | 115 | 98 | 23 | 2.8 | 3.3 | 2.9 |
| 7 | 1.6 | 16 | 1.7 | 5.0 | 2.8 | 7.0 | 109 | 98 | 22 | 3.4 | 3.7 | 2.4 |
| 8 | 1.5 | 3.5 | 1.6 | 4.8 | 3.0 | 5.0 | 102 | 92 | 24 | 3.6 | 3.6 | 2.3 |
| 9 | 1.4 | 2.2 | 1.6 | 4.8 | 3.2 | 2.0 | 97 | 84 | 28 | 2.1 | 3.4 | 2.9 |
| 10 | 1.8 | 1.9 | 1.5 | 4.7 | 3.5 | 1.0 | 92 | 76 | 31 | 2.2 | 3.5 | 2.6 |
| 11 | 1.7 | 2.0 | 1.5 | 4.6 | 3.6 | 1.2 | 92 | 73 | 33 | 3.2 | 3.4 | 2.4 |
| 12 | 1.6 | 2.0 | 1.4 | 4.5 | 3.7 | 1.2 | 111 | 72 | 31 | 3.2 | 3.6 | 2.2 |
| 13 | 1.5 | 2.3 | 1.3 | 4.2 | 3.7 | 5.0 | 131 | 71 | 30 | 3.4 | 3.5 | 1.9 |
| 14 | 1.3 | 2.4 | 1.2 | 4.0 | 3.8 | 20 | 141 | 69 | 26 | 4.5 | 3.6 | 1.4 |
| 15 | .96 | 2.4 | 1.1 | 3.5 | 3.9 | 15 | 133 | 66 | 26 | 3.8 | 3.4 | 1.4 |
| 16 | .81 | 2.3 | 1.0 | 3.0 | 4.0 | 45 | 108 | 63 | 21 | 3.8 | 3.4 | 1.4 |
| 17 | .86 | 2.2 | .80 | 2.8 | 4.5 | 50 | 88 | 59 | 18 | 3.7 | 3.3 | 1.2 |
| 18 | .91 | 2.1 | .60 | 2.6 | 5.0 | 60 | 79 | 44 | 14 | 3.4 | 3.1 | .76 |
| 19 | .91 | 2.1 | .40 | 2.4 | 6.0 | 70 | 73 | 48 | 15 | 3.4 | 3.1 | 2.4 |
| 20 | .96 | 2.1 | .20 | 2.2 | 7.0 | 80 | 71 | 55 | 13 | 3.6 | 3.2 | 3.6 |
| 21 | .96 | 2.1 | .20 | 2.0 | 8.0 | 90 | 68 | 52 | 9.2 | 3.6 | 3.1 | 3.0 |
| 22 | 1.0 | 2.1 | .10 | 2.0 | 10 | 100 | 64 | 48 | 9.8 | 3.6 | 2.8 | 2.2 |
| 23 | 1.2 | 2.1 | .10 | 2.0 | 12 | 100 | 63 | 46 | 13 | 3.5 | 3.2 | .91 |
| 24 | 1.4 | 2.1 | .05 | 2.0 | 14 | 110 | 64 | 44 | 10 | 3.5 | 2.9 | 2.7 |
| 25 | 1.6 | 2.1 | .00 | 2.0 | 20 | 115 | 63 | 35 | 9.4 | 3.6 | 3.0 | 12 |
| 26 | 1.3 | 2.1 | .00 | 2.2 | 18 | 120 | 64 | 35 | 6.8 | 3.5 | 3.0 | 11 |
| 27 | 1.2 | 2.1 | .00 | 2.3 | 15 | 80 | 82 | 38 | 5.7 | 3.4 | 2.9 | 12 |
| 28 | 1.2 | 2.1 | .00 | 2.4 | 12 | 54 | 93 | 35 | 4.4 | 3.0 | 2.9 | 12 |
| 29 | 1.2 | 2.1 | .00 | 2.5 | 10 | 65 | 55 | 31 | 3.5 | 3.2 | 2.7 | 14 |
| 30 | 1.2 | 2.1 | .00 | 2.5 | --- | 60 | 87 | 26 | 3.3 | 3.5 | 3.1 | 11 |
| 31 | 1.2 | --- | .10 | 2.6 | --- | 84 | --- | 24 | --- | 3.6 | 3.1 | --- |
| TOTAL | 45.07 | 74.5 | 27.25 | 98.8 | 193.6 | 1388.9 | 2802 | 1926 | 543.1 | 103.5 | 100.4 | 128.77 |
| MEAN | 1.45 | 2.48 | .88 | 3.19 | 6.68 | 44.8 | 93.4 | 62.1 | 18.1 | 3.34 | 3.24 | 4.29 |
| MAX | 3.4 | 16 | 2.0 | 5.0 | 20 | 120 | 141 | 103 | 33 | 4.5 | 3.7 | 14 |
| MIN | .81 | 1.1 | .00 | 1.0 | 2.7 | 1.0 | 55 | 24 | 3.3 | 2.1 | 2.7 | .76 |
| AC-FT | 89 | 148 | 54 | 196 | 384 | 2750 | 5560 | 3820 | 1080 | 205 | 199 | 255 |
| CAL YR 1983 | TOTAL | 7461.31 | | MEAN | 20.4 | MAX | 214 | MIN | .00 | AC-FT | 14800 | |
| WTR YR 1984 | TOTAL | 7431.89 | | MEAN | 20.3 | MAX | 141 | MIN | .00 | AC-FT | 14740 | |

05054500 SHEYENNE RIVER ABOVE HARVEY, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG.C) | COLOR (PLAT- INUM- COBALT UNITS) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|-----------|------|---|---|--------------------------------|-------------------------------------|-----------------------------|--|--|---|--|--|--|
| OCT 18... | 1218 | .99 | 1380 | 8.3 | 7.0 | 2.0 | 30 | 180 | 0 | 38 | 20 | 260 |
| NOV 30... | 1311 | 2.1 | 1600 | 8.0 | -10.0 | .0 | 20 | 230 | 0 | 46 | 27 | 290 |
| JAN 04... | 1023 | 5.3 | 1580 | 8.0 | 2.0 | .0 | 5 | 170 | 0 | 37 | 19 | 310 |
| MAR 26... | 1300 | 122 | 320 | 7.7 | 1.0 | .5 | 70 | 79 | 0 | 18 | 8.3 | 33 |
| APR 23... | 1100 | 63 | 1160 | 8.1 | 15.0 | 14.0 | 50 | 260 | 0 | 33 | 43 | 160 |
| JUN 04... | 1130 | 22 | 1320 | 8.0 | 13.0 | 13.5 | 45 | 220 | 0 | 29 | 37 | 220 |
| JUL 19... | 1630 | 3.4 | 1360 | 9.0 | 30.0 | 26.0 | 70 | 64 | 0 | 15 | 6.5 | 300 |
| AUG 30... | 1230 | 3.2 | 1320 | 8.7 | 20.0 | 13.0 | 250 | 61 | 0 | 15 | 5.6 | 300 |

| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | CARBON DIOXIDE SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
|-----------|-------------------|---|---|---|---|---|---|--|---|--|--|---|
| OCT 18... | 75 | 9 | 5.1 | 515 | 5.0 | 220 | 17 | .40 | 30 | 938 | 900 | 1.3 |
| NOV 30... | 73 | 9 | 6.1 | 606 | 12 | 280 | 17 | .30 | 37 | 1070 | 1100 | 1.5 |
| JAN 04... | 79 | 11 | 6.5 | 622 | 12 | 230 | 21 | .40 | 47 | 1060 | 1000 | 1.4 |
| MAR 26... | 44 | 2 | 10 | 111 | 4.3 | 44 | 3.6 | .10 | 11 | 200 | 200 | .27 |
| APR 23... | 56 | 4 | 11 | 378 | 5.8 | 240 | 14 | .20 | 12 | 772 | 740 | 1.0 |
| JUN 04... | 67 | 6 | 9.1 | 406 | 7.8 | 240 | 16 | .30 | 17 | 804 | 810 | 1.1 |
| JUL 19... | 90 | 17 | 4.8 | 522 | 1.0 | 160 | 16 | .40 | 29 | 755 | 850 | 1.0 |
| AUG 30... | 91 | 17 | 4.5 | 517 | 1.9 | 190 | 16 | .50 | 41 | 881 | 880 | 1.2 |

| DATE | SOLIDS, DIS- SOLVED (TONS PER DAY) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC DIS- SOLVED (UG/L AS AS) | BARIUM, DIS- SOLVED (UG/L AS BA) | BORON, DIS- SOLVED (UG/L AS B) | CADMIUM DIS- SOLVED (UG/L AS CD) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) | COBALT, DIS- SOLVED (UG/L AS CO) | COPPER, DIS- SOLVED (UG/L AS CU) | IRON, DIS- SOLVED (UG/L AS FE) |
|-----------|---|---|--|---|--|--|--|--|---|--|--|--|
| OCT 18... | 2.5 | <.10 | .160 | -- | -- | -- | 730 | -- | -- | -- | -- | -- |
| NOV 30... | 6.1 | <.10 | .160 | -- | -- | -- | 770 | -- | -- | -- | -- | -- |
| JAN 04... | 15 | .12 | .360 | -- | -- | -- | 830 | -- | -- | -- | -- | -- |
| MAR 26... | 66 | .46 | .260 | 110 | 1 | 40 | 100 | <1 | <10 | <1 | 2 | 180 |
| APR 23... | 131 | <.10 | .060 | -- | -- | -- | 460 | -- | -- | -- | -- | -- |
| JUN 04... | 47 | <.10 | .080 | -- | -- | -- | 550 | -- | -- | -- | -- | -- |
| JUL 19... | 6.9 | <.10 | .150 | -- | -- | -- | 760 | -- | -- | -- | -- | -- |
| AUG 30... | 7.6 | .13 | .140 | 50 | 1 | 47 | 920 | <1 | <10 | 1 | <1 | 66 |

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, DIS- SOLVED (UG/L AS ZN) | CYANIDE TOTAL (MG/L AS CN) |
|-----------|--|--|--|--|---|--|---|--|--|--|-------------------------------------|
| MAR 26... | <1 | 22 | 87 | .6 | <1 | 2 | <1 | 80 | -- | 5 | <.01 |
| AUG 30... | 2 | 130 | 42 | .8 | <1 | 1 | <1 | 120 | 2 | 31 | <.01 |

RED RIVER OF THE NORTH BASIN

05056000 SHEYENNE RIVER NEAR WARWICK, ND

LOCATION.--Lat 47°48'20", long 98°42'57", on south quarter of line between secs.15 and 16, T.150 N., R.63 W., Eddy County, Hydrologic Unit 09020203, on left bank on downstream side of county highway bridge, and 3.3 mi south of Warwick.

DRAINAGE AREA.--2,070 mi², approximately, of which about 1,310 mi² is probably noncontributing - includes 227 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1949 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1438: 1952(M). WSP 1728: Drainage area.

GAGE.--Water-stage recorder and rubble masonry control. Altitude of gage is 1,370 ft, by barometer.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--35 years, 56.6 ft³/s, 41,010 acre-ft/yr; median of yearly mean discharges, 51 ft³/s, 36,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,660 ft³/s Apr. 14, 1969, gage height, 7.51 ft; maximum gage height, 7.83 ft Apr. 18, 1956; no flow Aug. 7 to Sept. 1, Sept. 3-9, 1961.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|---------|--------------------------------|------------------|-------|------|--------------------------------|------------------|
| Mar. 28 | unknown | *1,030 | 4.78 | May 7 | 1815 | 355 | 3.45 |
| Apr. 17 | 1915 | 248 | 3.20 | | | | |

Minimum daily, 0.51 ft³/s Aug. 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|-------|-------|-------|-------|-------|--------|--------|-------|-------|
| 1 | 28 | 22 | 12 | 3.9 | 5.4 | 138 | 825 | 214 | 58 | 10 | 4.0 | .64 |
| 2 | 21 | 20 | 12 | 3.8 | 5.4 | 125 | 662 | 210 | 54 | 12 | 5.0 | .78 |
| 3 | 4.4 | 21 | 12 | 3.8 | 5.4 | 109 | 500 | 226 | 52 | 14 | 4.8 | 1.1 |
| 4 | 4.4 | 22 | 11 | 3.8 | 5.5 | 93 | 400 | 254 | 50 | 12 | 4.8 | 1.1 |
| 5 | 11 | 21 | 11 | 3.9 | 6.1 | 81 | 324 | 270 | 46 | 11 | 4.6 | 1.1 |
| 6 | 17 | 24 | 9.6 | 4.1 | 5.9 | 73 | 266 | 297 | 46 | 10 | 3.8 | 1.1 |
| 7 | 37 | 27 | 8.9 | 4.2 | 5.9 | 72 | 230 | 356 | 32 | 9.0 | 3.4 | 1.3 |
| 8 | 44 | 27 | 8.6 | 4.2 | 5.8 | 72 | 198 | 356 | 60 | 8.0 | 3.4 | 1.1 |
| 9 | 40 | 29 | 7.8 | 4.2 | 6.0 | 73 | 190 | 342 | 60 | 7.0 | 3.8 | 1.5 |
| 10 | 43 | 31 | 7.0 | 4.2 | 6.6 | 67 | 176 | 320 | 72 | 6.1 | 3.8 | 1.5 |
| 11 | 39 | 26 | 6.8 | 4.5 | 6.8 | 54 | 169 | 292 | 64 | 5.2 | 3.8 | 1.8 |
| 12 | 38 | 13 | 6.8 | 4.7 | 6.8 | 44 | 194 | 279 | 64 | 4.3 | 2.6 | 1.8 |
| 13 | 46 | 11 | 7.3 | 4.2 | 6.8 | 32 | 234 | 242 | 60 | 3.5 | 1.8 | 1.5 |
| 14 | 43 | 11 | 6.8 | 4.2 | 6.8 | 26 | 242 | 222 | 58 | 2.7 | 1.5 | 1.5 |
| 15 | 35 | 11 | 6.7 | 4.3 | 6.8 | 22 | 230 | 202 | 54 | 2.0 | 1.3 | 1.5 |
| 16 | 31 | 13 | 6.8 | 4.7 | 7.1 | 20 | 226 | 183 | 52 | 1.5 | 1.5 | 1.5 |
| 17 | 26 | 13 | 6.2 | 4.5 | 7.6 | 18 | 242 | 162 | 49 | 1.1 | 1.5 | 1.5 |
| 18 | 28 | 14 | 6.1 | 4.4 | 7.6 | 18 | 250 | 166 | 46 | .90 | 1.8 | 1.3 |
| 19 | 25 | 15 | 5.7 | 4.2 | 7.5 | 18 | 242 | 158 | 47 | .85 | 1.5 | 1.8 |
| 20 | 20 | 17 | 5.4 | 4.2 | 8.8 | 16 | 234 | 137 | 47 | .80 | 2.0 | 1.1 |
| 21 | 19 | 18 | 5.4 | 4.2 | 16 | 16 | 222 | 122 | 46 | .75 | 2.6 | .95 |
| 22 | 11 | 24 | 5.4 | 4.1 | 37 | 18 | 210 | 122 | 47 | .70 | 2.0 | 1.7 |
| 23 | 9.5 | 24 | 5.1 | 4.0 | 58 | 60 | 198 | 120 | 44 | .67 | 1.8 | 1.3 |
| 24 | 11 | 21 | 4.9 | 4.4 | 71 | 201 | 180 | 110 | 35 | .65 | 1.5 | 2.3 |
| 25 | 10 | 18 | 5.1 | 4.7 | 65 | 740 | 169 | 93 | 25 | .65 | 1.5 | 3.3 |
| 26 | 11 | 16 | 4.8 | 4.6 | 68 | 793 | 155 | 93 | 17 | .63 | 1.3 | 3.8 |
| 27 | 26 | 15 | 4.7 | 4.6 | 86 | 956 | 169 | 78 | 12 | .63 | 1.3 | 3.8 |
| 28 | 40 | 14 | 4.3 | 4.5 | 110 | 1010 | 202 | 76 | 12 | .61 | 1.3 | 5.4 |
| 29 | 45 | 13 | 4.0 | 4.8 | 130 | 934 | 238 | 70 | 10 | .61 | 1.5 | 4.7 |
| 30 | 39 | 13 | 4.1 | 4.7 | --- | 910 | 218 | 68 | 9.0 | 1.0 | .95 | 4.2 |
| 31 | 26 | --- | 3.8 | 4.7 | --- | 870 | --- | 62 | --- | 2.6 | .51 | --- |
| TOTAL | 828.3 | 564 | 216.1 | 133.3 | 771.6 | 7679 | 7995 | 5902 | 1328.0 | 131.45 | 76.96 | 57.97 |
| MEAN | 26.7 | 18.8 | 6.97 | 4.30 | 26.6 | 248 | 267 | 190 | 44.3 | 4.24 | 2.48 | 1.93 |
| MAX | 46 | 31 | 12 | 4.8 | 130 | 1010 | 825 | 356 | 72 | 14 | 5.0 | 5.4 |
| MIN | 4.4 | 11 | 3.8 | 3.8 | 5.4 | 16 | 155 | 62 | 9.0 | .61 | .51 | .64 |
| AC-FT | 1640 | 1120 | 429 | 264 | 1530 | 15230 | 15860 | 11710 | 2630 | 261 | 153 | 115 |
| CAL YR 1983 | TOTAL | 43546.21 | | MEAN | 119 | MAX | 1460 | MIN | .47 | AC-FT | 86370 | |
| WTR YR 1984 | TOTAL | 25683.68 | | MEAN | 70.2 | MAX | 1010 | MIN | .51 | AC-FT | 50940 | |

RED RIVER OF THE NORTH BASIN

51

05056000 SHEYENNE RIVER NR WARWICK, ND--CONTINUED

PERIOD OF RECORD.--Water years 1951, 1953, 1958 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 04... | 1620 | 4.5 | 625 | -- | 8.0 | 12.0 | -- | -- | -- | -- | -- | |
| NOV 15... | 1430 | 11 | 700 | -- | 3.0 | 4.0 | -- | -- | -- | -- | -- | |
| JAN 11... | 1235 | 4.6 | 880 | -- | -13.0 | .5 | -- | -- | -- | -- | -- | |
| FEB 14... | 1415 | 6.7 | 920 | -- | 3.0 | 3.5 | -- | -- | -- | -- | -- | |
| MAR 30... | 1810 | 890 | 890 | -- | 4.0 | 1.5 | -- | -- | -- | -- | -- | |
| MAY 17... | 1410 | 157 | 1110 | -- | 21.0 | 18.0 | -- | -- | -- | -- | -- | |
| JUN 21... | 1705 | 44 | 1040 | -- | 20.0 | 26.0 | -- | -- | -- | -- | -- | |
| AUG 08... | 1545 | 4.2 | 840 | 8.7 | -- | 26.5 | 260 | 0 | 41 | 39 | 120 | |
| SEP 21... | 1635 | .99 | 450 | -- | 25.0 | 16.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| AUG 08... | 49 | 3 | 10 | 340 | 28 | 280 | 1.1 | 170 | 13 | .20 | 2.8 | 169 |
| SEP 09... | 39 | 2 | 8.0 | 370 | .000 | 300 | 2.3 | 93 | 10 | .20 | 23 | 451 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| AUG 08... | 620 | .23 | 1.9 | 10 | 190 | 10 | 0 | 75 | 0 | .0 | 0 | 230 |
| SEP 09... | 470 | .61 | 6.3 | 7 | 80 | 10 | -- | 50 | 20 | .1 | 0 | 200 |

RED RIVER OF THE NORTH BASIN

05056100 MAUVAIS COULEE NEAR CANDO, ND

LOCATION.--Lat 48°26'53", long 99°06'08", in SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.1, T.157 N., R.66 W., Towner County, Hydrologic Unit 09020201, on left bank 0.3 mi upstream from highway bridge, about 4 mi upstream from West Fork, 5.5 mi southeast of Cando, and 7 mi northeast of Maza.

DRAINAGE AREA.--387 mi², of which about 10 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1956 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Altitude of gage is 1,445 ft, from topographic map. Prior to July 2, 1957, nonrecording gage at present site and datum.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--26 years (water years 1957-82), 19.2 ft³/s, 13,910 acre-ft/yr; median of yearly mean discharges, 13 ft³/s, 9,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,660 ft³/s Apr. 25, 1979, gage height, 11.18 ft; no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 16, 1954, reached a stage of 9.83 ft, and flood of Apr. 20, 1956, reached a stage of 10.71 ft, from floodmarks set by local resident.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 71 ft³/s May 11, gage height, 3.49 ft; no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|--------|-------|-------|------|------|------|
| 1 | | | | | | .00 | .00 | 4.6 | 7.9 | 1.0 | .21 | .00 |
| 2 | | | | | | .00 | .00 | 8.9 | 7.7 | .95 | .16 | .00 |
| 3 | | | | | | .00 | 2.0 | 8.6 | 6.8 | .81 | .14 | .00 |
| 4 | | | | | | .00 | 10 | 64 | 6.5 | .67 | .10 | .00 |
| 5 | | | | | | .00 | 17 | 49 | 6.6 | .56 | .10 | .00 |
| 6 | | | | | | .00 | 22 | 31 | 6.1 | .49 | .09 | .00 |
| 7 | | | | | | .00 | 28 | 26 | 5.9 | .57 | .06 | .00 |
| 8 | | | | | | .00 | 28 | 26 | 8.5 | .92 | .02 | .00 |
| 9 | | | | | | .00 | 27 | 29 | 8.7 | .73 | .00 | .00 |
| 10 | | | | | | .00 | 24 | 44 | 7.2 | .34 | .00 | .00 |
| 11 | | | | | | .00 | 23 | 66 | 6.7 | .20 | .00 | .00 |
| 12 | | | | | | .00 | 23 | 70 | 6.3 | .03 | .00 | .00 |
| 13 | | | | | | .00 | 21 | 56 | 6.5 | .00 | .00 | .00 |
| 14 | | | | | | .00 | 20 | 43 | 6.1 | .00 | .00 | .00 |
| 15 | | | | | | .00 | 20 | 35 | 5.9 | .00 | .00 | .00 |
| 16 | | | | | | .00 | 18 | 31 | 5.3 | .00 | .00 | .00 |
| 17 | | | | | | .00 | 17 | 27 | 4.6 | .00 | .00 | .02 |
| 18 | | | | | | .00 | 17 | 23 | 3.0 | .00 | .00 | .04 |
| 19 | | | | | | .00 | 20 | 20 | 2.4 | .00 | .00 | .00 |
| 20 | | | | | | .00 | 23 | 18 | 2.2 | .00 | .11 | .00 |
| 21 | | | | | | .00 | 25 | 17 | 3.2 | .00 | .19 | .00 |
| 22 | | | | | | .00 | 23 | 16 | 5.1 | .00 | .13 | .06 |
| 23 | | | | | | .00 | 20 | 16 | 3.2 | .00 | .04 | .05 |
| 24 | | | | | | .00 | 17 | 14 | 2.8 | .00 | .01 | .05 |
| 25 | | | | | | .00 | 16 | 13 | 2.9 | .00 | .00 | .15 |
| 26 | | | | | | .00 | 15 | 12 | 3.0 | .00 | .00 | .28 |
| 27 | | | | | | .00 | 6.5 | 11 | 2.6 | .00 | .00 | .40 |
| 28 | | | | | | .00 | 6.9 | 10 | 2.1 | .00 | .00 | .54 |
| 29 | | | | | | .00 | 6.2 | 9.6 | 1.4 | .00 | .00 | .65 |
| 30 | | | | | | .00 | 5.5 | 8.8 | 1.2 | .00 | .00 | .71 |
| 31 | | | | | | .00 | --- | 8.0 | --- | .04 | .00 | --- |
| TOTAL | | | | | | .00 | 501.10 | 815.5 | 148.4 | 7.31 | 1.36 | 2.95 |
| MEAN | | | | | | .00 | 16.7 | 26.3 | 4.95 | .24 | .04 | .10 |
| MAX | | | | | | .00 | 28 | 70 | 8.7 | 1.0 | .21 | .71 |
| MIN | | | | | | .00 | .00 | 4.6 | 1.2 | .00 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

53

05056100 MAUVAIS COULEE NR CANDO, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 05... | 1300 | .59 | 1400 | -- | 10.0 | 11.0 | -- | -- | -- | -- | -- |
| APR 05... | 1320 | 18 | 755 | 7.8 | 16.0 | 6.0 | 320 | 182 | 72 | 33 | 35 |
| MAY 17... | 1110 | 42 | 854 | -- | 17.0 | 16.0 | -- | -- | -- | -- | -- |
| JUN 20... | 0925 | 2.3 | 1050 | -- | 15.0 | 20.5 | -- | -- | -- | -- | -- |
| AUG 08... | 1035 | E.01 | 1200 | 7.7 | 25.5 | 23.0 | 530 | 303 | 93 | 73 | 78 |
| SEP 19... | 1300 | E.01 | 1270 | -- | 27.0 | 18.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| APR 05... | 18 | .9 | 17 | 160 | | 130 | 4.0 | 240 | 21 | .10 | 11 | 537 |
| AUG 08... | 24 | 2 | 14 | 280 | .000 | 230 | 8.9 | 420 | 38 | .20 | 17 | 902 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|--|--|--|---|---|---|---|---|---|---|--|---|
| APR 05... | 510 | .73 | 26 | 3 | 60 | 40 | 0 | 60 | 600 | .4 | 0 | 260 |
| AUG 08... | 870 | 1.2 | -- | 5 | 80 | 20 | 0 | 93 | 240 | .0 | 0 | 500 |

RED RIVER OF THE NORTH BASIN

05056200 EDMORE COULEE NEAR EDMORE, ND

LOCATION.--Lat 48°20'14", long 98°39'33", in NW¼ sec.17, T.156 N., R.62 W., Ramsey County, Hydrologic Unit 09020201, on right bank 50 ft upstream from bridge on county highway, 11 mi southwest of Edmore, and about 13 mi upstream from Sweetwater Lake.

DRAINAGE AREA.--382 mi², of which about 100 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to June 1956, June 1957 to current year (seasonal records only since 1983).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Prior to June 26, 1957, nonrecording gage at same site and datum.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--25 years (1957-82), 13.7 ft³/s, 9,930 acre-ft/yr; median of yearly mean discharges, 9.2 ft³/s, 6,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,110 ft³/s Apr. 25, 1979, gage height, 7.31 ft; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 103 ft³/s Mar. 31, gage height, 4.18 ft, no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|--------|-------|-------|--------|-------|-------|-----|
| 1 | | | | | | .00 | 76 | 7.7 | .46 | 5.8 | 3.0 | .00 |
| 2 | | | | | | .00 | 61 | 7.8 | .39 | 5.4 | 2.8 | .00 |
| 3 | | | | | | .00 | 52 | 7.6 | .30 | 4.4 | 2.4 | .00 |
| 4 | | | | | | .00 | 45 | 6.4 | .32 | 4.3 | 2.1 | .00 |
| 5 | | | | | | .00 | 42 | 5.6 | .41 | 4.5 | 1.8 | .00 |
| 6 | | | | | | .00 | 37 | 5.0 | .44 | 4.2 | 1.6 | .00 |
| 7 | | | | | | .00 | 33 | 5.4 | .52 | 4.1 | 1.4 | .00 |
| 8 | | | | | | .00 | 30 | 4.1 | 2.8 | 4.9 | 1.1 | .00 |
| 9 | | | | | | .00 | 26 | 3.3 | 16 | 5.3 | .91 | .00 |
| 10 | | | | | | .00 | 25 | 3.2 | 12 | 5.2 | .74 | .00 |
| 11 | | | | | | .00 | 24 | 3.0 | 6.0 | 5.0 | .60 | .00 |
| 12 | | | | | | .00 | 32 | 2.4 | 8.5 | 4.8 | .41 | .00 |
| 13 | | | | | | .00 | 32 | 2.5 | 12 | 4.3 | .28 | .00 |
| 14 | | | | | | .00 | 25 | 2.7 | 4.3 | 5.0 | .17 | .00 |
| 15 | | | | | | .00 | 22 | 2.0 | 1.6 | 5.2 | .08 | .00 |
| 16 | | | | | | .00 | 20 | 1.8 | 1.2 | 5.2 | .01 | .00 |
| 17 | | | | | | .00 | 20 | 1.6 | 1.2 | 5.1 | .00 | .00 |
| 18 | | | | | | .00 | 18 | 1.2 | 1.0 | 4.6 | .00 | .00 |
| 19 | | | | | | .00 | 18 | .89 | 1.0 | 4.0 | .00 | .00 |
| 20 | | | | | | .50 | 16 | .77 | 10 | 3.7 | .00 | .00 |
| 21 | | | | | | 2.0 | 15 | 1.2 | 17 | 3.5 | .00 | .00 |
| 22 | | | | | | 1.0 | 13 | .85 | 16 | 3.6 | .00 | .00 |
| 23 | | | | | | 1.0 | 12 | .70 | 14 | 3.6 | .00 | .00 |
| 24 | | | | | | 5.0 | 10 | .74 | 11 | 3.5 | .00 | .00 |
| 25 | | | | | | 5.0 | 8.5 | .49 | 9.5 | 3.5 | .00 | .00 |
| 26 | | | | | | 3.0 | 7.2 | .49 | 9.5 | 3.6 | .00 | .00 |
| 27 | | | | | | 1.0 | 6.5 | .64 | 8.7 | 3.7 | .00 | .00 |
| 28 | | | | | | 10 | 6.0 | 1.1 | 7.3 | 3.6 | .00 | .00 |
| 29 | | | | | | 70 | 5.5 | .81 | 6.7 | 3.4 | .00 | .00 |
| 30 | | | | | | 98 | 7.2 | .54 | 6.2 | 3.2 | .00 | .00 |
| 31 | | | | | | 96 | --- | .60 | --- | 3.2 | .00 | --- |
| TOTAL | | | | | | 292.50 | 744.9 | 83.12 | 186.34 | 133.4 | 19.40 | .00 |
| MEAN | | | | | | 9.44 | 24.8 | 2.68 | 6.21 | 4.30 | .63 | .00 |
| MAX | | | | | | 98 | 76 | 7.8 | 17 | 5.8 | 3.0 | .00 |
| MIN | | | | | | .00 | 5.5 | .49 | .30 | 3.2 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

55

05056200 EDMORE COULEE NR EDMORE, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| MAR 30... | 1310 | 99 | 562 | 7.4 | 4.0 | 4.0 | 180 | 62 | 41 | 18 | 48 | |
| APR 06... | 1050 | 38 | 730 | -- | 12.0 | 8.0 | -- | -- | -- | -- | -- | |
| MAY 10... | 1500 | 3.6 | 1100 | -- | 13.0 | 14.0 | -- | -- | -- | -- | -- | |
| JUN 21... | 1130 | 17 | 1380 | -- | -- | 22.5 | -- | -- | -- | -- | -- | |
| AUG 09... | 1500 | .83 | 917 | 8.3 | 25.5 | 23.0 | 340 | 82 | 62 | 46 | 83 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 35 | 2 | 13 | 140 | .000 | 120 | 8.9 | 140 | 20 | .10 | 12 | 382 |
| AUG 09... | 33 | 2 | 24 | 320 | .000 | 260 | 2.5 | 230 | 28 | .20 | 7.8 | 669 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELF- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 360 | .52 | 102 | 2 | 60 | 50 | 0 | 30 | 310 | .4 | 1 | 130 |
| AUG 09... | 640 | .91 | 1.5 | 6 | 60 | 20 | 0 | 53 | 1100 | .0 | 0 | 330 |

RED RIVER OF THE NORTH BASIN

05056220 SWEETWATER LAKE AT SWEETWATER, ND

LOCATION.--Lat 48°12'39", long 98°52'15", in NE1/4SW1/4 sec.27, T.155 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, at southwest arm of lake 6 mi north of Devils Lake.

DRAINAGE AREA.--670 mi² of which about 290 mi² is probably noncontributing.

PERIOD OF RECORD.--1960, 1962 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | TEMPER- ATURE, AIR (DEG C) (00020) | BARO- METRIC PRES- SURE (MM HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED SATUR- ATION (MG/L) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE AS CACO3) (95902) |
|-------|------|--|---|--|---|--|--|---|---|---|---|
| NOV | | | | | | | | | | | |
| O2... | 1150 | 5.0 | 732 | 850 | 8.9 | 6.0 | 11.6 | 97 | 20 | 260 | 17 |
| MAY | | | | | | | | | | | |
| 15... | 1200 | 23.0 | 729 | 870 | 8.4 | 14.0 | 15.8 | 161 | 45 | 250 | 32 |

| DATE | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SI02) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|-------|---|---|---|--|--|---|--|--|---|--|---|
| NOV | | | | | | | | | | | |
| O2... | 30 | 44 | 89 | 2 | 24 | 240 | 180 | 29 | .20 | 32 | 600 |
| MAY | | | | | | | | | | | |
| 15... | 32 | 42 | 87 | 2 | 22 | 221 | 170 | 28 | .10 | 19 | 530 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) |
|-------|--|--|---|--|---|---|---|---|--|---|---|
| NOV | | | | | | | | | | | |
| O2... | 570 | .14 | .060 | <10 | 4 | 100 | 90 | <1 | <10 | 6 | 2 |
| MAY | | | | | | | | | | | |
| 15... | 530 | <.10 | .030 | -- | -- | -- | 80 | -- | -- | -- | -- |

| DATE | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|-------|---|---|---|---|---|--|---|---|---|---|
| NOV | | | | | | | | | | |
| O2... | 3 | <1 | 61 | 10 | <.1 | <1 | 7 | 210 | <1 | 7 |

05056225 WEBSTER COULEE AT WEBSTER, ND

LOCATION.--Lat 48°16'55", long 98°53'45", in SW1/4SW1/4SW1/4 sec.33, T.156 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, on left bank 0.8 mi west of Webster.

DRAINAGE AREA.--About 670 mi², of which about 280 mi² is probably noncontributing.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1980 to current year.

REMARKS.--During period of flow once daily observations of gage height are obtained, those records are available from files at the Bismarck District Office. The annual maximum discharge is published in the Crest-stage partial record section of this report.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, RIDE, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, RIDE, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|--|---|--|---|---|--|---|--|--|--|--|
| MAY 10... | 0930 | 65 | 710 | 8.2 | 6.0 | 10.0 | 240 | 35 | 46 | 31 | 64 |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | |
| MAY 10... | 34 | 2 | 19 | 250 | .000 | 210 | 2.5 | 150 | 21 | .10 | |
| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| MAY 10... | 10 | 468 | 450 | .64 | 82 | <.10 | .030 | 2 | 72 | 70 | |
| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | | |
| MAY 10... | -- | 30 | 0 | 60 | 40 | .5 | 0 | 190 | -- | | |

RED RIVER OF THE NORTH BASIN

05056239 STARKWEATHER COULEE NEAR WEBSTER, ND

LOCATION.--Lat 48°19'13", long 98°56'23", in NW1/4SW1/4NW1/4 sec.19, T.156 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, on bridge 3.8 mi northwest of Webster.

DRAINAGE AREA.--About 310 mi², of which about 100 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to current year.

GAGE.--Nonrecording gage.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 252 ft³/s Apr. 14, 1982, gage height, 7.24 ft; no flow for many months each year.

EXTREMES FOR CURRENT YEAR.--Maximum observed discharge of about 112 ft³/s June 9, gage height, 4.90 ft; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|------|--------|--------|-------|--------|-------|------|-----|
| 1 | 1.9 | .00 | .00 | .00 | .00 | .00 | 50 | .00 | .00 | 2.5 | .00 | .00 |
| 2 | 1.9 | .00 | .00 | .00 | .00 | .00 | 57 | .00 | .00 | 2.2 | .00 | .00 |
| 3 | 1.9 | .00 | .00 | .00 | .00 | .00 | 40 | .50 | .00 | 2.0 | .00 | .00 |
| 4 | 1.9 | .00 | .00 | .00 | .00 | .00 | 31 | 1.0 | .00 | 1.5 | .00 | .00 |
| 5 | 1.9 | .00 | .00 | .00 | .00 | .00 | 26 | 5.0 | .00 | 1.1 | .00 | .00 |
| 6 | 1.9 | .00 | .00 | .00 | .00 | .00 | 21 | 10 | 10 | .00 | .00 | .00 |
| 7 | 2.0 | .00 | .00 | .00 | .00 | .00 | 18 | 14 | 40 | .00 | .00 | .00 |
| 8 | 1.9 | .00 | .00 | .00 | .00 | .00 | 16 | 12 | 79 | 2.0 | .00 | .00 |
| 9 | 1.9 | .00 | .00 | .00 | .00 | .00 | 12 | 8.7 | 110 | 2.9 | .00 | .00 |
| 10 | 1.8 | .00 | .00 | .00 | .00 | .00 | 9.7 | 7.3 | 105 | .92 | .00 | .00 |
| 11 | 1.6 | .00 | .00 | .00 | .00 | .00 | 7.4 | 7.1 | 83 | .00 | .00 | .00 |
| 12 | 1.6 | .00 | .00 | .00 | .00 | .00 | 14 | 7.1 | 59 | .00 | .00 | .00 |
| 13 | 1.2 | .00 | .00 | .00 | .00 | .00 | 12 | 6.9 | 39 | .00 | .00 | .00 |
| 14 | .95 | .00 | .00 | .00 | .00 | .00 | 3.3 | 5.8 | 35 | .00 | .00 | .00 |
| 15 | .80 | .00 | .00 | .00 | .00 | .00 | 7.8 | 3.9 | 20 | .00 | .00 | .00 |
| 16 | .72 | .00 | .00 | .00 | .00 | .00 | 37 | 1.3 | 15 | .00 | .00 | .00 |
| 17 | .51 | .00 | .00 | .00 | .00 | .00 | 43 | .02 | 11 | .00 | .00 | .00 |
| 18 | .32 | .00 | .00 | .00 | .00 | .00 | 16 | .00 | 7.8 | .00 | .00 | .00 |
| 19 | .19 | .00 | .00 | .00 | .00 | .00 | 8.7 | .00 | 6.4 | .00 | .00 | .00 |
| 20 | .14 | .00 | .00 | .00 | .00 | .00 | 3.8 | .00 | 5.3 | .00 | .00 | .00 |
| 21 | .09 | .00 | .00 | .00 | .00 | .00 | .10 | .00 | 4.8 | .00 | .00 | .00 |
| 22 | .09 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.5 | .00 | .00 | .00 |
| 23 | .04 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.3 | .00 | .00 | .00 |
| 24 | .02 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 4.1 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 3.9 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 3.8 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | 3.6 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 10 | .00 | .00 | 3.6 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 30 | .00 | .00 | 3.9 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 52 | .00 | .00 | 2.9 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 50 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 27.27 | .00 | .00 | .00 | .00 | 142.00 | 433.80 | 90.62 | 664.90 | 15.12 | .00 | .00 |
| MEAN | .88 | .00 | .00 | .00 | .00 | 4.58 | 14.5 | 2.92 | 22.2 | .49 | .00 | .00 |
| MAX | 2.0 | .00 | .00 | .00 | .00 | 52 | 57 | 14 | 110 | 2.9 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | 54 | .00 | .00 | .00 | .00 | 282 | 860 | 180 | 1320 | 30 | .00 | .00 |
| CAL YR 1983 | TOTAL | 3408.20 | | MEAN | 9.34 | MAX | 150 | MIN | .00 | AC-FT | 6760 | |
| WTR YR 1984 | TOTAL | 1373.71 | | MEAN | 3.75 | MAX | 110 | MIN | .00 | AC-FT | 2720 | |

RED RIVER OF THE NORTH BASIN

59

05056239 STARKWEATHER COULEE NEAR WEBSTER, ND--CONTINUED

PERIOD OF RECORD.--Water years 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 05... | 0920 | 1.5 | 580 | -- | 8.0 | 9.0 | -- | -- | -- | -- | -- | |
| MAR 30... | 1025 | 52 | 408 | 7.7 | 3.0 | 2.5 | 180 | 75 | 44 | 16 | 12 | |
| MAY 10... | 1245 | 7.8 | 635 | -- | 9.0 | 14.0 | -- | -- | -- | -- | -- | |
| JUN 21... | 0950 | 5.0 | 865 | -- | 16.0 | 21.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 12 | .4 | 12 | 18 | 52 | 100 | .6 | 83 | 15 | .10 | 13 | 284 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 310 | .39 | 40 | 4 | 0 | 30 | 0 | 20 | 50 | .4 | 1 | 190 |

RED RIVER OF THE NORTH BASIN

05056241 DRY LAKE NEAR PENN, ND

LOCATION.--Lat 48°13'52", long 98°58'59", in NW $\frac{1}{4}$ NW $\frac{1}{4}$ SW $\frac{1}{4}$ sec.23, T.155 N., R.65 W., Ramsey County, Hydrologic Unit 09020201, on west shoreline of Dry Lake, 6 mi east of Penn.

DRAINAGE AREA.--920 mi², approximately.

PERIOD OF RECORD.--October 1983 to September 1984 (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 47.38 ft June 17, 1984; minimum recorded, 45.18 ft Oct. 9 and Nov. 4, 1983.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 47.38 ft June 17, 1984; minimum recorded, 45.18 ft Oct. 9 and Nov. 4.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-----|-----|-------|-------|-------|-------|-------|-------|-------|
| 1 | 45.49 | 45.61 | 45.46 | | | --- | 45.93 | 46.61 | 46.81 | 46.83 | 46.52 | 45.99 |
| 2 | 45.59 | 45.73 | 45.53 | | | --- | 45.97 | 46.61 | 46.79 | 46.84 | 46.49 | 45.95 |
| 3 | 45.61 | 45.56 | 45.52 | | | --- | 46.00 | 46.58 | 46.81 | 46.85 | 46.46 | 45.96 |
| 4 | 45.55 | 45.44 | 45.50 | | | --- | 46.02 | 46.59 | 46.86 | 46.85 | 46.45 | 45.92 |
| 5 | 45.57 | 45.61 | 45.50 | | | --- | 46.03 | 46.61 | 46.90 | 46.87 | 46.43 | 45.85 |
| 6 | 45.58 | 45.62 | 45.50 | | | --- | 46.05 | 46.68 | 46.88 | 46.82 | 46.43 | 45.78 |
| 7 | 45.63 | 45.60 | 45.48 | | | --- | 46.06 | 46.77 | 46.89 | 46.73 | 46.38 | 45.81 |
| 8 | 45.52 | 45.66 | 45.41 | | | --- | 46.06 | 46.74 | 47.02 | 46.81 | 46.38 | 45.85 |
| 9 | 45.41 | 45.65 | 45.50 | | | --- | 46.07 | 46.68 | 47.14 | 46.82 | 46.37 | 45.87 |
| 10 | 45.51 | 45.61 | 45.50 | | | --- | 46.07 | 46.70 | 47.18 | 46.79 | 46.34 | 45.86 |
| 11 | 45.61 | 45.58 | 45.49 | | | --- | 46.11 | 46.78 | 47.15 | 46.79 | 46.28 | 45.84 |
| 12 | 45.71 | 45.55 | 45.35 | | | --- | 46.19 | 46.72 | 47.24 | 46.74 | 46.29 | 45.82 |
| 13 | 45.60 | 45.57 | 45.35 | | | --- | 46.36 | 46.81 | 47.27 | 46.76 | 46.29 | 45.89 |
| 14 | 45.60 | 45.62 | 45.38 | | | --- | 46.42 | 46.79 | 47.26 | 46.74 | 46.26 | 45.87 |
| 15 | 45.63 | 45.59 | --- | | | --- | 46.39 | 46.67 | 47.29 | 46.73 | 46.28 | 45.84 |
| 16 | 45.61 | 45.56 | --- | | | --- | 46.35 | 46.61 | 47.30 | 46.72 | 46.20 | 45.72 |
| 17 | 45.60 | 45.57 | --- | | | --- | 46.36 | 46.69 | 47.32 | 46.68 | 46.25 | 45.79 |
| 18 | 45.66 | 45.58 | --- | | | --- | 46.38 | 46.79 | 47.31 | 46.62 | 46.21 | 45.83 |
| 19 | 45.61 | 45.68 | --- | | | --- | 46.38 | 46.83 | 47.21 | 46.65 | 46.10 | 45.86 |
| 20 | 45.55 | 45.67 | --- | | | --- | 46.40 | 46.81 | 47.19 | 46.58 | 46.16 | 45.78 |
| 21 | 45.56 | 45.46 | --- | | | --- | 46.41 | 46.79 | 47.13 | 46.58 | 46.18 | 45.79 |
| 22 | 45.57 | 45.46 | --- | | | --- | 46.41 | 46.86 | 47.12 | 46.64 | 46.17 | 45.58 |
| 23 | 45.58 | 45.46 | --- | | | --- | 46.41 | 46.80 | 47.11 | 46.60 | 46.09 | 45.76 |
| 24 | 45.65 | 45.47 | --- | | | --- | 46.45 | 46.85 | 47.03 | 46.59 | 46.06 | 45.84 |
| 25 | 45.59 | 45.47 | --- | | | --- | 46.45 | 46.91 | 46.92 | 46.57 | 46.08 | 45.71 |
| 26 | 45.60 | 45.59 | --- | | | --- | 46.90 | 46.84 | 46.97 | 46.58 | 46.06 | 45.66 |
| 27 | 45.61 | 45.54 | --- | | | 45.94 | 47.11 | 46.86 | 46.89 | 46.56 | 46.05 | 45.70 |
| 28 | 45.66 | 45.54 | --- | | | 45.89 | 46.62 | 46.84 | 46.91 | 46.51 | 46.05 | 45.65 |
| 29 | 45.55 | 45.55 | --- | | | 45.86 | 46.59 | 46.77 | 46.88 | 46.44 | 46.00 | 45.62 |
| 30 | 45.58 | 45.43 | --- | | | 45.87 | 46.61 | 46.73 | 46.81 | 46.47 | 45.97 | 45.63 |
| 31 | 45.55 | --- | --- | | | 45.89 | --- | 46.83 | --- | 46.53 | 45.99 | --- |
| MEAN | 45.59 | 45.57 | --- | | | --- | 46.32 | 46.75 | 47.05 | 46.69 | 46.23 | 45.80 |
| MAX | 45.71 | 45.73 | --- | | | --- | 47.11 | 46.91 | 47.32 | 46.87 | 46.52 | 45.99 |
| MIN | 45.41 | 45.43 | --- | | | --- | 45.93 | 46.58 | 46.79 | 46.44 | 45.97 | 45.58 |

RED RIVER OF THE NORTH BASIN

61

05056250 LAKE ALICE NEAR CHURCHS FERRY, ND

LOCATION.--Lat 48°07'21", long 99°05'42", in SE1/4NE1/4NE1/4 sec.11, T.156 N., R.66 W., Ramsey County, Hydrologic Unit 09020201, at northwest corner of lake 7.5 mi northwest of Churchs Ferry.

DRAINAGE AREA.--2,100 mi², approximately, of which about 500 mi² is probably noncontributing.

PERIOD OF RECORD.--1960, 1962-64, 1966 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | TEMPER- ATURE, AIR (DEG C) (00020) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | |
|--------------|------|--|--|---|---|--|--|---|---|--|--|---|
| | | | | | | | | | | | | |
| NOV 02... | 1320 | 7.5 | 732 | 1140 | 8.1 | 6.0 | 8.0 | 67 | 45 | 430 | 144 | |
| MAY 15... | 1700 | 23.0 | 728 | 910 | 7.7 | 16.5 | 10.1 | 109 | 70 | 310 | 92 | |
| DATE | | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| NOV 02... | 73 | 59 | 84 | 2 | 28 | 282 | 270 | 45 | .20 | 5.4 | 749 | |
| MAY 15... | 65 | 35 | 63 | 2 | 29 | 215 | 200 | 40 | .10 | 5.4 | 608 | |
| DATE | | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) |
| NOV 02... | 730 | <.10 | .040 | 10 | 1 | 100 | 100 | <1 | <10 | 1 | 1 | |
| MAY 15... | 570 | <.10 | .170 | -- | -- | -- | 80 | -- | -- | -- | -- | |
| DATE | | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | |
| NOV 02... | 46 | <1 | 80 | 180 | <.1 | <1 | 6 | 300 | <1 | 17 | | |

RED RIVER OF THE NORTH BASIN

05056260 LAKE IRVINE NEAR CHURCHS FERRY, ND

LOCATION.--Lat 48°16'57", long 99°10'25", in SE1/4SW1/4 sec.32, T.156 N., R.66 W., Ramsey County Hydrologic Unit 09020201, at south end of lake 1 1/4 mi northwest of Churchs Ferry.

DRAINAGE AREA.--2,120 mi², approximately, of which about 500 mi² is probably noncontributing.

PERIOD OF RECORD.--Water years 1966 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | TEMPER- ATURE, AIR (DEG C) (00020) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | |
|--------------|------|--|--|---|---|--|--|---|---|--|--|---|
| NOV 02... | 1440 | 7.0 | 733 | 1310 | 9.0 | 5.5 | 11.4 | 94 | 700 | 460 | 141 | |
| MAY 15... | 1545 | 23.0 | 728 | 850 | 8.3 | 17.0 | 9.3 | 101 | 300 | 290 | 66 | |
| DATE | | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| NOV 02... | 77 | 65 | 110 | 2 | 39 | 320 | 330 | 51 | .30 | 22 | 933 | |
| MAY 15... | 50 | 41 | 64 | 2 | 21 | 228 | 200 | 30 | .20 | 9.0 | 574 | |
| DATE | | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) |
| NOV 02... | 890 | <.10 | .110 | 70 | 8 | 270 | 130 | 1 | <10 | 2 | 7 | |
| MAY 15... | 550 | <.10 | .060 | -- | -- | -- | 100 | -- | -- | -- | -- | |
| DATE | | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | |
| NOV 02... | 36 | <1 | 100 | 13 | <.1 | 1 | 11 | 350 | 9 | 81 | | |

05056390 LITTLE COULEE NEAR BRINSMADE, ND

LOCATION.--Lat 48°11'15", long 99°14'34", in SW1/4 sec.2, T.154 N., R.67 W., Benson County, Hydrologic Unit 09020201, on right bank 100 ft downstream from bridge on township road, 0.5 mi downstream from Silver Lake, and 4 mi east of Brinsmade.

DRAINAGE AREA.--350 mi², of which 160 mi² is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1975 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Altitude of gage is 1,435 ft, from topographic map.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--7 years (water years 1976-82), 7.02 ft³/s, 5,090 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 425 ft³/s May 1, 1979, gage height, 10.43 ft; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 5.6 ft³/s May. 1, gage height, 8.37 ft, maximum gage height 8.40 ft, Apr. 29; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-----|-------|-------|------|-----|-----|-----|
| 1 | | | | | | .00 | .00 | 5.6 | .28 | .01 | .00 | .00 |
| 2 | | | | | | .00 | .00 | 4.0 | .28 | .01 | .00 | .00 |
| 3 | | | | | | .00 | .00 | 1.5 | .28 | .00 | .00 | .00 |
| 4 | | | | | | .00 | .00 | 1.1 | .29 | .00 | .00 | .00 |
| 5 | | | | | | .00 | .00 | 1.2 | .36 | .00 | .00 | .00 |
| 6 | | | | | | .00 | .00 | 1.1 | .37 | .00 | .00 | .00 |
| 7 | | | | | | .00 | .00 | 1.5 | .39 | .00 | .00 | .00 |
| 8 | | | | | | .00 | .00 | 1.4 | .95 | .00 | .00 | .00 |
| 9 | | | | | | .00 | .00 | .98 | .71 | .00 | .00 | .00 |
| 10 | | | | | | .00 | .00 | .73 | .39 | .00 | .00 | .00 |
| 11 | | | | | | .00 | .03 | .63 | .30 | .00 | .00 | .00 |
| 12 | | | | | | .00 | .09 | .61 | .27 | .00 | .00 | .00 |
| 13 | | | | | | .00 | .09 | .55 | .25 | .00 | .00 | .00 |
| 14 | | | | | | .00 | .09 | .53 | .24 | .00 | .00 | .00 |
| 15 | | | | | | .00 | .09 | .47 | .27 | .00 | .00 | .00 |
| 16 | | | | | | .00 | .11 | .43 | .32 | .00 | .00 | .00 |
| 17 | | | | | | .00 | .13 | .37 | .29 | .00 | .00 | .00 |
| 18 | | | | | | .00 | .15 | .32 | .17 | .00 | .00 | .00 |
| 19 | | | | | | .00 | .17 | .30 | .11 | .00 | .00 | .00 |
| 20 | | | | | | .00 | .19 | .30 | .08 | .00 | .00 | .00 |
| 21 | | | | | | .00 | .22 | .31 | .08 | .00 | .00 | .00 |
| 22 | | | | | | .00 | .24 | .34 | .09 | .00 | .00 | .00 |
| 23 | | | | | | .06 | .27 | .35 | .09 | .00 | .00 | .00 |
| 24 | | | | | | .07 | .29 | .34 | .09 | .00 | .00 | .00 |
| 25 | | | | | | .05 | .35 | .32 | .08 | .00 | .00 | .00 |
| 26 | | | | | | .04 | .53 | .30 | .07 | .00 | .00 | .00 |
| 27 | | | | | | .04 | 1.1 | .30 | .06 | .00 | .00 | .00 |
| 28 | | | | | | .05 | 3.1 | .29 | .05 | .00 | .00 | .00 |
| 29 | | | | | | .05 | 4.4 | .29 | .04 | .00 | .00 | .00 |
| 30 | | | | | | .00 | 5.4 | .30 | .02 | .00 | .00 | .00 |
| 31 | | | | | | .00 | --- | .29 | --- | .00 | .00 | --- |
| TOTAL | | | | | | .36 | 17.04 | 27.05 | 7.27 | .02 | .00 | .00 |
| MEAN | | | | | | .01 | .57 | .87 | .24 | .00 | .00 | .00 |
| MAX | | | | | | .07 | 5.4 | 5.6 | .95 | .01 | .00 | .00 |
| MIN | | | | | | .00 | .00 | .29 | .02 | .00 | .00 | .00 |
| AC-FT | | | | | | .7 | 34 | 54 | 14 | .04 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

05056400 BIG COULEE NEAR CHURCHS FERRY, ND

LOCATION.--Lat 48°10'40", long 99°13'15", in NW1/4NW1/4 sec.12, T.154 N., R.67 W., Benson County, Hydrologic Unit 09020201, on right bank on downstream side of bridge on U.S. Highway 281, 1 mi downstream from Little Coulee, and 6 mi south of Churchs Ferry.

DRAINAGE AREA.--2,510 mi², approximately, of which about 690 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1950 to current year. Prior to October 1960, published as Mauvais Coulee near Churchs Ferry.

GAGE.--Water-stage recorder. Datum of gage is 1,432.65 ft National Geodetic Vertical Datum of 1929. Prior to June 21, 1950, reference marks, and June 21, 1950, to July 17, 1956, nonrecording gage at former bridge on U.S. Highway 281, 0.1 mi upstream at datum 0.70 ft higher.

REMARKS.--Records good. Flow affected by many lakes on the mainstem and tributaries.

AVERAGE DISCHARGE.--34 years, 41.1 ft³/s, 29,780 acre-ft/yr; median of yearly mean discharges, 14 ft³/s, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,420 ft³/s May 6, 1979, gage height, 7.59 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 152 ft³/s, Apr. 27; gage height, 3.22 ft; No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|--------|------|------|-------|-------|-------|-------|-------|------|-----|
| 1 | .11 | .11 | 14 | .00 | .00 | .00 | 2.9 | 28 | 15 | 5.1 | .47 | .00 |
| 2 | .19 | .11 | 14 | .00 | .00 | .00 | 3.8 | 35 | 16 | 5.2 | .36 | .00 |
| 3 | .33 | .17 | 13 | .00 | .00 | .00 | 6.7 | 37 | 13 | 4.8 | .38 | .00 |
| 4 | .30 | .17 | 13 | .00 | .00 | .00 | 15 | 39 | 16 | 6.0 | .41 | .00 |
| 5 | .17 | .20 | 12 | .00 | .00 | .00 | 25 | 45 | 22 | 6.0 | .38 | .00 |
| 6 | .07 | .20 | 10 | .00 | .00 | .00 | 28 | 43 | 22 | 6.6 | .23 | .00 |
| 7 | .07 | .22 | 9.0 | .00 | .00 | .00 | 29 | 47 | 20 | 6.9 | .13 | .00 |
| 8 | .07 | .22 | 8.0 | .00 | .00 | .00 | 18 | 46 | 36 | 4.8 | .02 | .00 |
| 9 | .07 | .22 | 7.5 | .00 | .00 | .00 | 16 | 44 | 37 | 4.2 | .01 | .00 |
| 10 | .07 | .22 | 7.0 | .00 | .00 | .00 | 16 | 32 | 33 | 4.5 | .00 | .00 |
| 11 | .04 | .22 | 7.0 | .00 | .00 | .00 | 21 | 33 | 29 | 4.5 | .00 | .00 |
| 12 | .03 | .24 | 7.0 | .00 | .00 | .00 | 34 | 37 | 23 | 3.9 | .00 | .00 |
| 13 | .03 | .24 | 6.5 | .00 | .00 | .00 | 38 | 32 | 24 | 3.5 | .00 | .00 |
| 14 | .03 | .50 | 6.5 | .00 | .00 | .00 | 42 | 38 | 24 | 2.8 | .00 | .00 |
| 15 | .04 | 1.0 | 6.0 | .00 | .00 | .00 | 40 | 36 | 23 | 3.1 | .00 | .00 |
| 16 | .04 | 15 | 5.5 | .00 | .00 | .00 | 31 | 23 | 23 | 3.4 | .00 | .00 |
| 17 | .04 | 35 | 5.5 | .00 | .00 | .00 | 26 | 10 | 19 | 3.2 | .00 | .00 |
| 18 | .03 | 28 | 5.0 | .00 | .00 | .00 | 24 | 13 | 19 | 3.3 | .00 | .00 |
| 19 | .03 | 27 | 4.5 | .00 | .00 | .00 | 25 | 26 | 19 | 2.4 | .00 | .00 |
| 20 | .04 | 26 | 4.0 | .00 | .00 | .50 | 25 | 31 | 15 | 1.7 | .00 | .01 |
| 21 | .07 | 26 | 3.5 | .00 | .20 | 2.0 | 26 | 31 | 17 | 1.6 | .00 | .01 |
| 22 | .07 | 22 | 3.0 | .00 | .50 | 4.0 | 26 | 26 | 14 | 1.3 | .00 | .01 |
| 23 | .10 | 20 | 2.5 | .00 | 1.0 | 6.0 | 25 | 31 | 13 | 1.2 | .00 | .01 |
| 24 | .10 | 19 | 2.0 | .00 | 1.4 | 9.0 | 23 | 22 | 15 | 1.8 | .00 | .01 |
| 25 | .10 | 17 | 1.5 | .00 | 1.2 | 7.0 | 24 | 31 | 13 | 1.5 | .00 | .06 |
| 26 | .09 | 16 | 1.0 | .00 | 1.0 | 4.9 | 44 | 31 | 9.6 | 1.1 | .00 | .11 |
| 27 | .09 | 16 | .50 | .00 | .70 | 4.5 | 121 | 27 | 14 | .80 | .00 | .10 |
| 28 | .10 | 15 | .00 | .00 | .50 | 5.8 | 104 | 27 | 13 | .60 | .00 | .09 |
| 29 | .10 | 15 | .00 | .00 | .30 | 3.2 | 76 | 23 | 11 | .54 | .00 | .08 |
| 30 | .10 | 15 | .00 | .00 | --- | 3.1 | 41 | 14 | 8.2 | .60 | .00 | .06 |
| 31 | .11 | --- | .00 | .00 | --- | 2.9 | --- | 9.3 | --- | .67 | .00 | --- |
| TOTAL | 2.83 | 316.04 | 179.00 | .00 | 6.80 | 52.90 | 976.4 | 947.3 | 575.8 | 97.61 | 2.39 | .55 |
| MEAN | .09 | 10.5 | 5.77 | .00 | .23 | 1.71 | 32.5 | 30.6 | 19.2 | 3.15 | .08 | .02 |
| MAX | .33 | 35 | 14 | .00 | 1.4 | 9.0 | 121 | 47 | 37 | 6.9 | .47 | .11 |
| MIN | .03 | .11 | .00 | .00 | .00 | .00 | 2.9 | 9.3 | 8.2 | .54 | .00 | .00 |
| AC-FT | 5.6 | 627 | 355 | .00 | 13 | 105 | 1940 | 1880 | 1140 | 194 | 4.7 | 1.1 |
| CAL YR 1983 | TOTAL | 13295.26 | MEAN | 36.4 | MAX | 190 | MIN | .00 | AC-FT | 26370 | | |
| WTR YR 1984 | TOTAL | 3157.62 | MEAN | 8.63 | MAX | 121 | MIN | .00 | AC-FT | 6260 | | |

RED RIVER OF THE NORTH BASIN

65

05056400 BIG COULEE NEAR CHURCHS FERRY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1958, 1961 to current year.

PERIOD OF DAILY RECORDS.--

WATER TEMPERATURES: October 1983 to September 1984.

SPECIFIC CONDUCTANCE: October 1983 to September 1984.

INSTRUMENTATION.--Water quality monitor since October 1983.

REMARKS.--Interruptions in the record were due to instrument malfunction. No flow Dec. 28 - Feb. 20, Mar. 1-19, and Aug. 9 - Sept. 19.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum recorded, 29.5°C July 13; minimum recorded 2.0°C Oct. 24.

SPECIFIC CONDUCTANCE: Maximum recorded, 2,840 micromhos Oct. 19; minimum recorded, 560 micromhos Apr. 7.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 06... | 1025 | .07 | 1680 | -- | 8.0 | 7.5 | -- | -- | -- | -- | -- | |
| NOV 16... | 1025 | 5.9 | 1710 | -- | 1.0 | .5 | -- | -- | -- | -- | -- | |
| FEB 24... | 1445 | 1.5 | 1460 | -- | -3.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 27... | 0915 | 4.4 | 840 | -- | 1.5 | .5 | -- | -- | -- | -- | -- | |
| APR 04... | 1330 | 14 | -- | -- | 12.0 | .5 | -- | -- | -- | -- | -- | |
| 16... | 1600 | 31 | 762 | 8.6 | 14.0 | 12.0 | 280 | 114 | 53 | 36 | 57 | |
| MAY 16... | 1520 | 21 | 960 | 7.8 | 31.0 | 19.0 | -- | -- | -- | -- | -- | |
| JUN 19... | 1715 | 20 | 1070 | 8.0 | -- | 23.0 | -- | -- | -- | -- | -- | |
| AUG 07... | 1405 | .09 | 1480 | 9.0 | 33.0 | 29.0 | 540 | 179 | 93 | 75 | 160 | |
| SEP 20... | 1430 | E.01 | 2000 | 9.4 | 8.0 | 15.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 16... | 29 | 2 | 17 | 200 | .000 | 170 | .8 | 200 | 26 | .10 | 10 | 539 |
| AUG 07... | 37 | 3 | 38 | 440 | .000 | 360 | .7 | 450 | 61 | .20 | 26 | 1160 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 16... | 500 | .73 | 45 | 3 | 50 | 30 | 0 | 70 | 30 | .6 | 0 | 220 |
| AUG 07... | 1100 | 1.6 | .28 | 18 | 190 | 20 | 0 | 110 | 170 | .0 | 0 | 430 |

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|----------|-----|------|-------|-----|------|-------|-----|------|-----|-----|------|
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
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| 18 | | | | | | | | | | | | |
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| 20 | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | |
| MONTH | | | | | | | | | | | | |

RED RIVER OF THE NORTH BASIN

67

05056400 BIG COULEE NEAR CHURCHS FERRY, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|------|------|------|------|------|------|--------|------|------|-----------|------|------|
| | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | --- | --- | --- | 26.0 | 19.5 | 22.5 | 26.0 | 22.0 | 24.0 | --- | --- | --- |
| 2 | --- | --- | --- | 26.5 | 20.5 | 23.5 | 29.5 | 22.5 | 25.5 | --- | --- | --- |
| 3 | --- | --- | --- | 23.5 | 20.0 | 21.5 | 26.5 | 22.0 | 24.0 | --- | --- | --- |
| 4 | --- | --- | --- | 24.5 | 18.0 | 21.0 | 23.5 | 19.0 | 21.0 | --- | --- | --- |
| 5 | --- | --- | --- | 24.0 | 19.0 | 21.5 | 26.5 | 8.5 | 20.5 | --- | --- | --- |
| 6 | --- | --- | --- | 24.5 | 16.5 | 20.5 | 25.0 | 12.0 | 22.5 | --- | --- | --- |
| 7 | --- | --- | --- | 21.0 | 16.5 | 18.0 | --- | --- | --- | --- | --- | --- |
| 8 | --- | --- | --- | 26.0 | 16.5 | 21.0 | 25.0 | 18.5 | 22.5 | --- | --- | --- |
| 9 | --- | --- | --- | 27.0 | 20.5 | 23.5 | 24.0 | 15.5 | 20.0 | --- | --- | --- |
| 10 | --- | --- | --- | 24.5 | 20.5 | 22.5 | --- | --- | --- | --- | --- | --- |
| 11 | --- | --- | --- | 28.0 | 20.0 | 24.0 | --- | --- | --- | --- | --- | --- |
| 12 | --- | --- | --- | 28.0 | 22.0 | 25.0 | --- | --- | --- | --- | --- | --- |
| 13 | --- | --- | --- | 29.5 | 22.5 | 25.5 | --- | --- | --- | --- | --- | --- |
| 14 | --- | --- | --- | 26.0 | 22.5 | 24.5 | --- | --- | --- | --- | --- | --- |
| 15 | --- | --- | --- | 25.5 | 19.0 | 22.5 | --- | --- | --- | --- | --- | --- |
| 16 | --- | --- | --- | 24.0 | 21.5 | 22.5 | --- | --- | --- | --- | --- | --- |
| 17 | --- | --- | --- | 26.0 | 18.0 | 21.5 | --- | --- | --- | --- | --- | --- |
| 18 | --- | --- | --- | 26.5 | 20.0 | 23.0 | --- | --- | --- | --- | --- | --- |
| 19 | --- | --- | --- | 26.5 | 21.5 | 24.0 | --- | --- | --- | --- | --- | --- |
| 20 | 25.0 | 19.5 | 22.0 | 25.5 | 21.0 | 23.5 | --- | --- | --- | 15.5 | 12.0 | 14.0 |
| 21 | 27.5 | 21.0 | 24.0 | 25.5 | 21.5 | 23.0 | --- | --- | --- | 15.5 | 10.5 | 13.0 |
| 22 | 26.0 | 21.5 | 23.5 | 25.0 | 23.0 | 24.0 | --- | --- | --- | 14.0 | 7.0 | 11.5 |
| 23 | 22.5 | 18.0 | 20.5 | 23.5 | 20.0 | 22.0 | --- | --- | --- | 6.5 | 3.0 | 4.5 |
| 24 | 26.0 | 17.5 | 22.0 | 23.5 | 20.0 | 21.5 | --- | --- | --- | 4.5 | 3.5 | 4.0 |
| 25 | 27.5 | 20.5 | 24.0 | 25.0 | 21.0 | 22.5 | --- | --- | --- | 5.0 | 2.0 | 3.5 |
| 26 | 24.5 | 20.5 | 22.5 | 24.5 | 20.0 | 21.5 | --- | --- | --- | 9.0 | 2.5 | 5.5 |
| 27 | 25.5 | 19.0 | 22.5 | 27.5 | 21.0 | 24.0 | --- | --- | --- | 7.0 | 4.0 | 5.5 |
| 28 | 28.0 | 21.0 | 24.5 | 27.0 | 21.5 | 24.5 | --- | --- | --- | 11.0 | 2.0 | 6.0 |
| 29 | 27.0 | 21.0 | 24.0 | 27.0 | 20.5 | 23.5 | --- | --- | --- | 11.0 | 3.5 | 7.0 |
| 30 | 26.0 | 19.0 | 22.5 | 26.0 | 21.5 | 23.0 | --- | --- | --- | 12.5 | 5.5 | 8.5 |
| 31 | --- | --- | --- | 27.0 | 23.5 | 24.5 | --- | --- | --- | --- | --- | --- |
| MONTH | 28.0 | 17.5 | 23.0 | 29.5 | 16.5 | 23.0 | 29.5 | 8.5 | 22.5 | 15.5 | 2.0 | 7.5 |
| YEAR | 29.5 | 2.0 | 15.5 | --- | --- | --- | --- | --- | --- | --- | --- | --- |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|------|------|----------|------|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | 2560 | 2390 | 2490 | 2610 | 2460 | 2560 | --- | --- | --- | --- | --- | --- |
| 2 | 2610 | 2320 | 2510 | 2630 | 2570 | 2600 | --- | --- | --- | --- | --- | --- |
| 3 | 2430 | 2210 | 2340 | 2640 | 2620 | 2630 | --- | --- | --- | --- | --- | --- |
| 4 | 2360 | 2260 | 2320 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5 | 2320 | 2210 | 2270 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 7 | 2390 | 2260 | 2330 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 2360 | 2280 | 2330 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9 | 2460 | 2310 | 2380 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 10 | 2480 | 2430 | 2460 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 11 | 2580 | 2460 | 2520 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 12 | 2620 | 2500 | 2580 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 13 | 2640 | 2570 | 2610 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14 | 2690 | 2540 | 2630 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 15 | 2700 | 2540 | 2630 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 16 | 2710 | 2520 | 2620 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 17 | 2690 | 2540 | 2630 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 18 | 2800 | 2610 | 2730 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 19 | 2840 | 2670 | 2760 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 20 | 2780 | 2660 | 2740 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 2790 | 2680 | 2740 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 22 | 2770 | 2660 | 2740 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 23 | 2750 | 2580 | 2660 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 24 | 2670 | 2520 | 2580 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 25 | 2620 | 2490 | 2560 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 26 | 2650 | 2540 | 2590 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 27 | 2570 | 2490 | 2530 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 28 | 2620 | 2470 | 2550 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 29 | 2610 | 2480 | 2550 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 30 | 2600 | 2510 | 2570 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 31 | 2620 | 2550 | 2590 | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MONTH | 2840 | 2210 | 2540 | 2640 | 2460 | 2600 | --- | --- | --- | --- | --- | --- |

05056400 BIG COULEE NEAR CHURCHS FERRY, ND--CONTINUED

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|----------|-----|------|-------|-----|------|-------|-----|------|------|------|------|
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1180 | 910 | 1010 |
| 2 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1000 | 950 | 979 |
| 3 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1030 | 940 | 973 |
| 4 | --- | --- | --- | --- | --- | --- | 1010 | 820 | 944 | 1030 | 830 | 939 |
| 5 | --- | --- | --- | --- | --- | --- | 810 | 620 | 710 | 860 | 820 | 840 |
| 6 | --- | --- | --- | --- | --- | --- | 610 | 570 | 580 | 850 | 840 | 844 |
| 7 | --- | --- | --- | --- | --- | --- | 640 | 560 | 594 | 850 | 800 | 834 |
| 8 | --- | --- | --- | --- | --- | --- | 740 | 660 | 715 | 880 | 790 | 833 |
| 9 | --- | --- | --- | --- | --- | --- | 720 | 680 | 692 | 890 | 860 | 873 |
| 10 | --- | --- | --- | --- | --- | --- | 690 | 620 | 643 | 930 | 890 | 912 |
| 11 | --- | --- | --- | --- | --- | --- | 650 | 590 | 611 | 930 | 880 | 903 |
| 12 | --- | --- | --- | --- | --- | --- | 750 | 650 | 713 | 910 | 890 | 895 |
| 13 | --- | --- | --- | --- | --- | --- | 740 | 660 | 706 | 920 | 910 | 912 |
| 14 | --- | --- | --- | --- | --- | --- | 680 | 620 | 640 | 920 | 880 | 900 |
| 15 | --- | --- | --- | --- | --- | --- | 750 | 650 | 706 | 920 | 910 | 913 |
| 16 | --- | --- | --- | --- | --- | --- | 790 | 750 | 764 | 990 | 920 | 955 |
| 17 | --- | --- | --- | --- | --- | --- | 830 | 790 | 810 | 1060 | 980 | 1040 |
| 18 | --- | --- | --- | --- | --- | --- | 810 | 750 | 783 | 1050 | 970 | 1010 |
| 19 | --- | --- | --- | --- | --- | --- | 810 | 740 | 765 | 980 | 930 | 954 |
| 20 | --- | --- | --- | --- | --- | --- | 800 | 760 | 779 | 950 | 920 | 937 |
| 21 | --- | --- | --- | --- | --- | --- | 820 | 770 | 792 | 970 | 940 | 953 |
| 22 | --- | --- | --- | --- | --- | --- | 800 | 770 | 788 | 960 | 950 | 959 |
| 23 | --- | --- | --- | --- | --- | --- | 800 | 750 | 783 | 970 | 940 | 950 |
| 24 | --- | --- | --- | --- | --- | --- | 820 | 760 | 794 | 980 | 950 | 967 |
| 25 | --- | --- | --- | --- | --- | --- | 840 | 760 | 808 | 970 | 940 | 957 |
| 26 | --- | --- | --- | --- | --- | --- | 840 | 790 | 821 | 980 | 940 | 956 |
| 27 | --- | --- | --- | 1020 | 910 | 968 | 800 | 770 | 783 | 1010 | 980 | 990 |
| 28 | --- | --- | --- | 1040 | 930 | 985 | 850 | 780 | 807 | 1000 | 970 | 985 |
| 29 | --- | --- | --- | --- | --- | --- | 950 | 860 | 915 | 1040 | 1000 | 1020 |
| 30 | --- | --- | --- | --- | --- | --- | 1110 | 940 | 1010 | 1070 | 1030 | 1050 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1090 | 1040 | 1070 |
| MONTH | | | | 1040 | 910 | 977 | 1110 | 560 | 758 | 1180 | 790 | 946 |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---------------|--------------|------------|--------------|------|------|------|------|--------|------|------|-----------|------|
| | | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | |
| 1 | 1060 | 1020 | 1040 | 1180 | 1150 | 1160 | 1380 | 1320 | 1360 | --- | --- | --- |
| 2 | 1040 | 1020 | 1030 | 1190 | 1150 | 1170 | 1430 | 1360 | 1390 | --- | --- | --- |
| 3 | 1070 | 1020 | 1040 | 1170 | 1120 | 1150 | 1440 | 1370 | 1420 | --- | --- | --- |
| 4 | 1060 | 1000 | 1040 | 1170 | 1140 | 1160 | 1460 | 1370 | 1420 | --- | --- | --- |
| 5 | 1030 | 1010 | 1020 | 1180 | 1140 | 1160 | 1480 | 1390 | 1450 | --- | --- | --- |
| 6 | 1020 | 980 | 1010 | 1200 | 1160 | 1180 | 1530 | 1390 | 1450 | --- | --- | --- |
| 7 | 1030 | 1010 | 1020 | 1180 | 1170 | 1180 | 1580 | 1400 | 1500 | --- | --- | --- |
| 8 | 1040 | 910 | 985 | 1230 | 1170 | 1200 | 1630 | 1510 | 1570 | --- | --- | --- |
| 9 | 1100 | 970 | 1030 | 1260 | 1210 | 1240 | 1690 | 1580 | 1630 | --- | --- | --- |
| 10 | 1080 | 960 | 1010 | 1240 | 1190 | 1210 | --- | --- | --- | --- | --- | --- |
| 11 | 1000 | 920 | 967 | 1250 | 1210 | 1230 | --- | --- | --- | --- | --- | --- |
| 12 | 1080 | 1000 | 1030 | 1270 | 1220 | 1250 | --- | --- | --- | --- | --- | --- |
| 13 | 1070 | 1010 | 1030 | 1300 | 1220 | 1270 | --- | --- | --- | --- | --- | --- |
| 14 | 1050 | 1010 | 1030 | 1320 | 1260 | 1290 | --- | --- | --- | --- | --- | --- |
| 15 | 1080 | 1040 | 1050 | 1330 | 1290 | 1300 | --- | --- | --- | --- | --- | --- |
| 16 | 1090 | 1050 | 1070 | 1330 | 1300 | 1320 | --- | --- | --- | --- | --- | --- |
| 17 | 1080 | 1050 | 1060 | 1320 | 1280 | 1300 | --- | --- | --- | --- | --- | --- |
| 18 | 1070 | 1040 | 1060 | 1340 | 1280 | 1300 | --- | --- | --- | --- | --- | --- |
| 19 | 1070 | 1050 | 1060 | 1370 | 1310 | 1330 | --- | --- | --- | --- | --- | --- |
| 20 | 1100 | 1060 | 1080 | 1380 | 1320 | 1350 | --- | --- | --- | 2170 | 1880 | 2010 |
| 21 | 1100 | 1060 | 1080 | 1370 | 1330 | 1350 | --- | --- | --- | 2050 | 1690 | 1900 |
| 22 | 1100 | 1060 | 1090 | 1360 | 1310 | 1330 | --- | --- | --- | 1770 | 1450 | 1640 |
| 23 | 1100 | 1070 | 1080 | 1340 | 1300 | 1320 | --- | --- | --- | 1650 | 1420 | 1520 |
| 24 | 1110 | 1060 | 1080 | 1360 | 1320 | 1330 | --- | --- | --- | 1780 | 1280 | 1500 |
| 25 | 1120 | 1070 | 1100 | 1380 | 1320 | 1350 | --- | --- | --- | 1790 | 1330 | 1500 |
| 26 | 1100 | 1060 | 1090 | 1410 | 1320 | 1350 | --- | --- | --- | 1560 | 1280 | 1430 |
| 27 | 1120 | 1090 | 1100 | 1420 | 1330 | 1390 | --- | --- | --- | 1490 | 1220 | 1320 |
| 28 | 1110 | 1090 | 1100 | 1430 | 1380 | 1410 | --- | --- | --- | 1510 | 1220 | 1350 |
| 29 | 1140 | 1100 | 1120 | 1490 | 1390 | 1440 | --- | --- | --- | 1550 | 1240 | 1360 |
| 30 | 1180 | 1120 | 1150 | 1490 | 1400 | 1450 | --- | --- | --- | 1560 | 1290 | 1440 |
| 31 | | | | 1400 | 1340 | 1370 | --- | --- | --- | --- | --- | --- |
| MONTH YEAR | 1180 2840 | 910 560 | 1060 1370 | 1490 | 1120 | 1290 | 1690 | 1320 | 1470 | 2170 | 1220 | 1540 |

RED RIVER OF THE NORTH BASIN

69

05056405 BIG COULEE AT GRAHAM IS INLET NEAR FORT TOTTEN, ND

LOCATION.--Lat 48°02'25", long 99°02'50", in SW¼ sec.29, T.153 N., R.65 W., Ramsey County, Hydrologic Unit 09020201, at bridge on county highway, 5 mi northwest of Ft. Totten.

PERIOD OF RECORD.--Water years 1966 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | TEMPER- ATURE, AIR (DEG C) (00020) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | |
|--------------|------|--|--|---|---|--|--|---|---|--|--|---|
| | | | | | | | | | | | | |
| NOV 02... | 1640 | 5.0 | 735 | 2570 | 9.0 | 6.8 | 13.8 | 118 | 25 | 600 | 215 | |
| MAY 15... | -- | 17.0 | 730 | 2500 | 8.6 | 14.5 | 10.6 | 110 | 75 | 530 | 78 | |
| DATE | | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| NOV 02... | 76 | 100 | 380 | 7 | 52 | 387 | 750 | 170 | .20 | 17 | 1810 | |
| MAY 15... | 69 | 88 | 330 | 6 | 48 | 457 | 720 | 160 | .20 | 14 | 1750 | |
| DATE | | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) |
| NOV 02... | 1800 | <.10 | .280 | 20 | 12 | <100 | 380 | <1 | 10 | <1 | 1 | |
| MAY 15... | 1700 | <.10 | .170 | -- | -- | -- | 330 | -- | -- | -- | -- | |
| DATE | | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | |
| NOV 02... | | 40 | <1 | 200 | 10 | <.1 | <1 | 3 | 320 | 4 | 10 | |

RED RIVER OF THE NORTH BASIN
05056410 CHANNEL A NEAR PENN, ND

LOCATION.--Lat 48°10'00", long 98°58'47", in SE1/4SW1/4SW1/4 sec.11, T.154 N., R.65 W., Ramsey County, Hydrologic Unit 09020201, on west bank of Channel A between Highway 2 and the Railroad bridge and 6.8 mi southeast of Penn, N.D. on Highway 2, or 8.9 mi northwest of Devils Lake, N.D. on Highway 2.

DRAINAGE AREA.--930 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to September 1984.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Flow regulated by gate control on Dry Lake (station 05056241) 3.0 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 168 ft³/s June 24, 1984, gage height, 39.48 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 168 ft³/s, June 24, 1984; gage height, 39.48 ft; no flow for several days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|------|-------|-------|-------|--------|---------|-------|------|--------|
| 1 | .00 | .00 | 8.0 | .00 | .30 | .80 | 17 | 21 | .18 | .27 | .25 | .19 |
| 2 | .00 | .00 | 7.5 | .00 | .50 | .60 | 21 | 122 | .23 | .23 | .23 | .23 |
| 3 | .00 | .00 | 7.0 | .05 | .60 | .40 | 25 | 82 | .28 | .23 | .23 | .22 |
| 4 | .00 | .00 | 6.5 | .15 | .60 | .30 | 25 | 2.6 | .83 | .23 | .23 | .14 |
| 5 | .00 | .00 | 6.0 | .25 | .50 | .20 | 24 | 1.7 | .89 | .15 | .14 | .14 |
| 6 | .00 | .00 | 5.5 | .10 | .50 | .10 | 23 | 1.3 | .49 | .21 | .14 | .05 |
| 7 | .00 | .00 | 5.0 | .05 | .50 | .05 | 20 | .93 | .35 | .21 | .14 | .13 |
| 8 | .00 | .00 | 4.5 | .00 | 1.5 | .02 | 26 | .70 | 1.5 | .44 | .14 | .20 |
| 9 | .00 | .50 | 4.0 | .00 | 2.0 | .02 | 25 | .58 | .81 | .34 | .02 | .26 |
| 10 | .00 | 2.2 | 3.5 | .00 | 2.5 | .02 | 24 | .54 | .37 | .27 | .02 | .15 |
| 11 | .00 | 1.5 | 3.0 | .00 | 3.0 | .02 | 3.6 | .43 | .31 | .23 | .14 | .14 |
| 12 | .00 | 1.5 | 2.5 | .00 | 2.5 | .02 | 4.0 | .30 | 3.8 | .23 | .02 | .07 |
| 13 | .00 | 1.5 | 2.0 | .00 | 3.0 | .02 | 3.6 | .30 | 9.2 | .23 | .14 | .07 |
| 14 | .00 | 4.2 | 1.5 | .00 | 3.5 | .02 | 3.2 | .29 | 9.1 | .23 | .14 | .04 |
| 15 | .00 | 20 | 1.0 | .00 | 4.0 | .02 | 2.7 | .20 | 8.4 | .23 | .02 | .04 |
| 16 | .00 | 12 | .50 | .00 | 4.5 | .02 | 2.7 | .11 | 8.9 | .16 | .14 | .04 |
| 17 | .00 | 9.2 | .20 | .00 | 4.0 | .02 | 3.0 | .30 | 9.8 | .19 | .14 | .04 |
| 18 | .00 | 17 | .05 | .00 | 4.0 | .20 | 3.2 | .20 | 28 | .26 | .14 | .07 |
| 19 | .00 | 20 | .00 | .00 | 5.0 | .50 | 3.2 | .11 | 138 | .34 | .11 | 2.9 |
| 20 | .00 | 19 | .00 | .00 | 7.5 | 1.0 | 3.2 | .18 | 146 | .34 | .13 | 26 |
| 21 | .00 | 18 | .00 | .00 | 10 | 2.0 | 3.2 | .26 | 97 | .34 | .24 | 15 |
| 22 | .00 | 17 | .00 | .00 | 7.0 | 4.0 | 3.2 | .27 | 77 | .31 | .14 | 14 |
| 23 | .00 | 16 | .00 | .00 | 4.0 | 7.5 | 3.1 | .22 | 100 | .23 | .14 | 23 |
| 24 | .00 | 15 | .00 | .00 | 2.5 | 10 | 2.5 | .30 | 162 | .23 | .14 | 28 |
| 25 | .00 | 14 | .00 | .00 | 2.0 | 7.5 | 1.9 | .10 | 148 | .27 | .14 | 22 |
| 26 | .00 | 13 | .00 | .00 | 1.8 | 7.9 | 3.8 | .25 | 77 | .34 | .14 | 14 |
| 27 | .00 | 12 | .00 | .05 | 1.5 | 4.8 | 10 | .30 | .82 | .34 | .14 | 16 |
| 28 | .00 | 11 | .00 | .10 | 1.0 | 7.3 | 23 | .25 | .54 | .28 | .12 | 18 |
| 29 | .00 | 10 | .00 | .20 | .90 | 7.7 | 17 | .18 | .36 | .17 | .05 | 15 |
| 30 | .00 | 9.0 | .00 | .25 | --- | 15 | 16 | .15 | .29 | .28 | .02 | 12 |
| 31 | .00 | --- | .00 | .27 | --- | 18 | --- | .20 | --- | .34 | .06 | --- |
| TOTAL | .00 | 243.60 | 68.25 | 1.47 | 81.20 | 96.05 | 346.1 | 238.25 | 1030.45 | 8.15 | 3.99 | 208.12 |
| MEAN | .00 | 8.12 | 2.20 | .05 | 2.80 | 3.10 | 11.5 | 7.69 | 34.3 | .26 | .13 | 6.94 |
| MAX | .00 | 20 | 8.0 | .27 | 10 | 18 | 26 | 122 | 162 | .44 | .25 | 28 |
| MIN | .00 | .00 | .00 | .00 | .30 | .02 | 1.9 | .10 | .18 | .15 | .02 | .04 |
| AC-FT | .00 | 483 | 135 | 2.9 | 161 | 191 | 686 | 473 | 2040 | 16 | 7.9 | 413 |
| WTR YR 1984 | TOTAL | 2325.63 | | MEAN | 6.35 | MAX | 162 | MIN | .00 | AC-FT | 4610 | |

RED RIVER OF THE NORTH BASIN

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05056410 CHANNEL A NEAR PENN, ND--CONTINUED

PERIOD OF RECORD.--October 1983 to September 1984.

PERIOD OF DAILY RECORDS.--

WATER TEMPERATURES: October 1983 to September 1984.

SPECIFIC CONDUCTANCE: October 1983 to September 1984.

INSTRUMENTATION.--Water quality monitor since October 1983.

REMARKS.--Interruptions in the record were due to instrument malfunction. No. flow Oct. 1 - Nov. 8, Dec. 19 - Jan. 2, and Jan. 8-26.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum recorded, 290.0°C June 16; minimum recorded, 0.0°C several days during winter months.

SPECIFIC CONDUCTANCE: Maximum recorded, 2,880 micromhos June 9; minimum recorded 230 micromhos Apr. 16.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| NOV 16... | 1405 | 12 | 950 | -- | 1.0 | 2.5 | -- | -- | -- | -- | -- | |
| FEB 24... | 1635 | 2.3 | 1120 | -- | -4.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 06... | 1445 | .09 | 2530 | -- | -13.0 | 1.5 | -- | -- | -- | -- | -- | |
| 27... | 1610 | 4.4 | 1220 | -- | 1.5 | .5 | -- | -- | -- | -- | -- | |
| APR 04... | 0920 | 29 | 505 | -- | 3.0 | .0 | -- | -- | -- | -- | -- | |
| 17... | 1305 | 2.5 | 1230 | -- | 14.0 | 12.0 | -- | -- | -- | -- | -- | |
| MAY 16... | 1130 | .04 | 2050 | 7.7 | 19.0 | 13.0 | 690 | 513 | 120 | 95 | 210 | |
| JUN 19... | 1145 | 139 | 825 | 8.3 | 14.0 | 19.0 | -- | -- | -- | -- | -- | |
| AUG 07... | 1145 | E.02 | 2220 | 9.4 | 27.5 | 24.5 | -- | -- | -- | -- | -- | |
| SEP 20... | 0955 | 26 | 1150 | 8.7 | 15.0 | 14.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAY 16... | 39 | 4 | 20 | 220 | .000 | 180 | 6.9 | 880 | 36 | .10 | 6.0 | 1530 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAY 16... | 1500 | 2.1 | .17 | 3 | 200 | 30 | 0 | 150 | 240 | .7 | 0 | 800 |

RED RIVER OF THE NORTH BASIN

05056410 CHANNEL A NEAR PENN, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|-----|------|----------|-----|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
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| 30 | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | |
| MONTH | | | | | | | | | | | | |

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|----------|-----|------|-------|-----|------|-------|------|------|------|------|------|
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | | | | | | | --- | --- | --- | --- | --- | --- |
| 2 | | | | | | | --- | --- | --- | 12.0 | 5.0 | 8.5 |
| 3 | | | | | | | .0 | .0 | .0 | 12.5 | 8.0 | 10.0 |
| 4 | | | | | | | 3.0 | .0 | 1.0 | 14.5 | 7.0 | 10.0 |
| 5 | | | | | | | 9.0 | 1.5 | 5.0 | 14.5 | 5.0 | 9.5 |
| 6 | | | | | | | 9.5 | 2.5 | 6.0 | 11.5 | 7.0 | 9.5 |
| 7 | | | | | | | 8.5 | 5.5 | 7.0 | 8.0 | 4.0 | 6.0 |
| 8 | | | | | | | 7.0 | 5.0 | 6.0 | 11.5 | 3.5 | 7.5 |
| 9 | | | | | | | 7.5 | 4.0 | 6.0 | 13.0 | 7.0 | 10.0 |
| 10 | | | | | | | 7.0 | 5.0 | 6.0 | 16.5 | 8.0 | 12.0 |
| 11 | | | | | | | 7.5 | 6.0 | 6.5 | 13.5 | 9.0 | 11.5 |
| 12 | | | | | | | 6.0 | 5.0 | 5.5 | 15.0 | 9.0 | 11.5 |
| 13 | | | | | | | 9.5 | 4.0 | 6.5 | 16.0 | 9.0 | 12.5 |
| 14 | | | | | | | 9.5 | 4.0 | 6.5 | 18.5 | 11.0 | 14.5 |
| 15 | | | | | | | 12.5 | 2.0 | 7.0 | 17.0 | 12.0 | 14.5 |
| 16 | | | | | | | 17.0 | 1.5 | 10.0 | 22.5 | 12.0 | 17.0 |
| 17 | | | | | | | 16.5 | 6.5 | 11.5 | 20.0 | 15.0 | 17.5 |
| 18 | | | | | | | 17.0 | 8.0 | 12.0 | 19.0 | 12.0 | 15.5 |
| 19 | | | | | | | 17.0 | 9.0 | 13.0 | 21.0 | 14.0 | 17.0 |
| 20 | | | | | | | 18.5 | 10.5 | 14.0 | 17.0 | 13.0 | 15.0 |
| 21 | | | | | | | 19.5 | 11.0 | 15.0 | 16.0 | 13.0 | 14.5 |
| 22 | | | | | | | 19.0 | 10.5 | 15.0 | 16.0 | 11.0 | 13.5 |
| 23 | | | | | | | 19.0 | 11.5 | 15.5 | 18.5 | 10.5 | 14.5 |
| 24 | | | | | | | 15.0 | 12.0 | 13.5 | 18.0 | 13.0 | 15.5 |
| 25 | | | | | | | 13.0 | 9.0 | 11.5 | 13.0 | 9.0 | 11.5 |
| 26 | | | | | | | --- | --- | --- | 19.0 | 9.0 | 13.5 |
| 27 | | | | | | | --- | --- | --- | 20.0 | 12.5 | 16.5 |
| 28 | | | | | | | --- | --- | --- | 21.0 | 13.5 | 17.0 |
| 29 | | | | | | | --- | --- | --- | 19.5 | 14.0 | 16.5 |
| 30 | | | | | | | --- | --- | --- | 21.5 | 12.5 | 17.0 |
| 31 | | | | | | | --- | --- | --- | 23.5 | 17.0 | 19.5 |
| MONTH | | | | | | | 19.5 | .0 | 8.5 | 23.5 | 3.5 | 13.5 |

RED RIVER OF THE NORTH BASIN

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05056410 CHANNEL A NEAR PENN, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|------|------|------|------|------|------|--------|------|------|-----------|------|------|
| | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 18.0 | 15.0 | 16.5 | 23.5 | 19.0 | 21.5 | 26.0 | 22.0 | 23.5 | 16.0 | 13.5 | 15.0 |
| 2 | 19.0 | 13.0 | 16.0 | 25.5 | 20.0 | 22.5 | 26.0 | 22.0 | 24.0 | 17.5 | 14.0 | 15.5 |
| 3 | 22.5 | 14.0 | 18.0 | 23.0 | 19.5 | 21.0 | 26.0 | 22.0 | 24.0 | 17.5 | 13.0 | 15.0 |
| 4 | 19.0 | 15.0 | 17.0 | 25.0 | 18.0 | 21.0 | 26.0 | 23.0 | 24.0 | 18.5 | 12.0 | 14.5 |
| 5 | 16.5 | 14.0 | 15.0 | 22.0 | 19.0 | 20.5 | 27.5 | 22.5 | 25.0 | 16.0 | 13.0 | 14.5 |
| 6 | 17.0 | 14.0 | 16.0 | 24.0 | 17.0 | 20.0 | 28.5 | 23.0 | 26.0 | 17.0 | 13.0 | 14.5 |
| 7 | 22.0 | 15.0 | 17.5 | 19.0 | 16.0 | 17.0 | 28.5 | 24.0 | 26.0 | 17.5 | 14.0 | 15.5 |
| 8 | 19.0 | 16.0 | 17.0 | 24.5 | 16.0 | 19.5 | 25.0 | 22.0 | 23.5 | 15.5 | 13.0 | 14.0 |
| 9 | 16.5 | 14.0 | 15.0 | 25.5 | 19.0 | 22.0 | 23.0 | 19.0 | 21.0 | 15.0 | 13.0 | 14.0 |
| 10 | 21.0 | 11.0 | 15.5 | 23.0 | 20.0 | 21.5 | 25.5 | 19.0 | 22.0 | 14.0 | 12.0 | 13.0 |
| 11 | 18.5 | 15.0 | 16.0 | 26.5 | 20.0 | 23.0 | 24.5 | 20.0 | 22.0 | 14.5 | 11.0 | 13.0 |
| 12 | 21.5 | 15.0 | 17.0 | 26.0 | 21.0 | 23.5 | 26.5 | 20.5 | 23.0 | 15.0 | 12.0 | 13.0 |
| 13 | 25.0 | 14.0 | 19.0 | 28.5 | 21.5 | 24.5 | 27.0 | 22.0 | 24.5 | 14.0 | 11.0 | 12.5 |
| 14 | 21.0 | 15.0 | 17.0 | 25.5 | 22.0 | 24.0 | 26.0 | 23.0 | 24.0 | 15.0 | 11.0 | 13.0 |
| 15 | 24.0 | 15.0 | 19.0 | 24.0 | 20.0 | 22.0 | 25.5 | 20.0 | 22.5 | 15.5 | 10.0 | 12.5 |
| 16 | 29.0 | 19.0 | 23.5 | 23.0 | 20.0 | 21.5 | 23.5 | 20.0 | 22.0 | 15.5 | 10.5 | 13.0 |
| 17 | 25.5 | 20.0 | 23.0 | 24.5 | 18.0 | 21.0 | 25.0 | 20.0 | 22.0 | 18.5 | 12.0 | 15.0 |
| 18 | 26.5 | 17.5 | 21.5 | 24.5 | 19.0 | 22.0 | 25.0 | 20.0 | 22.5 | 20.0 | 13.5 | 16.0 |
| 19 | 22.5 | 19.0 | 20.5 | 26.0 | 21.0 | 23.5 | 23.5 | 20.0 | 21.5 | 19.0 | 14.5 | 16.5 |
| 20 | 23.5 | 19.0 | 20.5 | 24.5 | 21.0 | 23.0 | 22.0 | 20.0 | 21.0 | 16.0 | 12.0 | 14.0 |
| 21 | 26.0 | 20.0 | 22.5 | 24.0 | 21.0 | 22.0 | 21.0 | 18.0 | 19.5 | 15.0 | 12.0 | 13.0 |
| 22 | 25.0 | 20.5 | 22.5 | 24.5 | 22.0 | 23.0 | 22.0 | 16.0 | 18.5 | 14.0 | 8.5 | 12.0 |
| 23 | 21.0 | 17.5 | 19.5 | 22.0 | 20.0 | 21.5 | 20.5 | 16.0 | 18.0 | 8.5 | 4.0 | 6.5 |
| 24 | 23.5 | 17.0 | 20.0 | 23.5 | 20.0 | 21.0 | 21.5 | 17.0 | 19.0 | 4.5 | 3.0 | 3.5 |
| 25 | 24.0 | 19.0 | 21.5 | 24.0 | 20.0 | 21.5 | 24.5 | 18.0 | 21.0 | 4.0 | 2.0 | 3.0 |
| 26 | 23.5 | 20.0 | 21.5 | 25.0 | 19.0 | 22.0 | 24.0 | 20.0 | 21.5 | 6.5 | 2.0 | 4.0 |
| 27 | 22.0 | 17.0 | 19.5 | 25.5 | 20.0 | 23.0 | 22.5 | 19.0 | 20.5 | 5.5 | 3.0 | 4.0 |
| 28 | 25.5 | 20.0 | 22.5 | 25.5 | 21.0 | 23.0 | 21.0 | 18.0 | 19.5 | 7.5 | 3.0 | 5.0 |
| 29 | 26.0 | 21.0 | 23.5 | 24.5 | 21.0 | 22.5 | 19.0 | 16.0 | 17.5 | 9.0 | 4.0 | 6.0 |
| 30 | 24.5 | 18.5 | 21.5 | 25.0 | 21.0 | 23.0 | 17.5 | 13.0 | 15.5 | 9.5 | 4.0 | 6.5 |
| 31 | --- | --- | --- | 26.5 | 22.0 | 24.0 | 17.5 | 14.0 | 15.5 | --- | --- | --- |
| MONTH | 29.0 | 11.0 | 19.0 | 28.5 | 16.0 | 22.0 | 28.5 | 13.0 | 21.5 | 20.0 | 2.0 | 11.5 |
| YEAR | 29.0 | .0 | 16.5 | | | | | | | | | |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-----|---------|-----|------|----------|-----|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | | | | | | | | | | | | |
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| 30 | | | | | | | | | | | | |
| 31 | | | | | | | | | | | | |

MONTH

05056500 DEVILS LAKE NEAR DEVILS LAKE, ND

LOCATION.--Lat 48°04'00", long 98°56'07", in SW¼ sec.18, T.153 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, at Lakewood, on east bank of Creel Bay, 4.5 mi southwest of city of Devils Lake. Creel Bay, which is 0.5 mi wide, is an arm of Devils Lake and extends 2 mi to the north of the lake.

DRAINAGE AREA.--3,130 mi², approximately, of which about 1,000 mi² is probably noncontributing.

PERIOD OF RECORD.--1867, 1879, 1883, 1887, 1890, 1896 (one gage height for each year), 1901-63 (fragmentary), 1964 to current year.

REVISED RECORDS.--WSP 1913: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft National Geodetic Vertical Datum of 1929; gage readings have been reduced to elevations NGVD. June 23, 1950, to June 6, 1963, nonrecording gage at present site and datum. See WSP 1913 for history of changes prior to June 23, 1950. Prior to October 1979 only monthend elevations were published.

REMARKS.--Elevation at gage frequently affected by wind.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation observed, 1,438.40 ft in 1867, present datum; minimum observed, 1,400.87 ft Oct. 24, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD.--The lake level was about elevation 1,446 ft about 1830 and lower thereafter, according to the tree growth noted 1885-89. Reference is Geological Survey monograph, volume XXV, The Glacial History of Lake Agassiz by Warren Upham.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,427.95 ft Apr. 28; minimum, 1,426.18 ft Sept. 21.

MONTHEND ELEVATION, IN FEET, AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | | | | | | |
|--------------|----------|--------------|----------|--------------|----------|--------------|----------|
| Oct. 31..... | 1,427.07 | Jan. 31..... | 1,427.16 | Apr. 30..... | 1,427.72 | July 31..... | 1,427.17 |
| Nov. 30..... | 1,427.04 | Feb. 29..... | 1,427.18 | May 31..... | 1,427.50 | Aug. 31..... | 1,426.51 |
| Dec. 31..... | 1,427.06 | Mar. 31..... | 1,427.44 | June 30..... | 1,427.51 | Sept.30..... | 1,426.20 |

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 27.19 | 27.09 | 27.04 | 27.08 | 27.16 | 27.22 | 27.44 | 27.70 | 27.50 | 27.50 | 27.18 | 26.51 |
| 2 | 27.20 | 27.02 | 27.04 | 27.08 | 27.16 | 27.22 | 27.44 | 27.71 | 27.50 | 27.51 | 27.17 | 26.54 |
| 3 | 27.22 | 27.01 | 27.04 | 27.10 | 27.16 | 27.23 | 27.45 | 27.72 | 27.46 | 27.48 | 27.15 | 26.53 |
| 4 | 27.22 | 27.05 | 27.05 | 27.09 | 27.14 | 27.23 | 27.46 | 27.73 | 27.44 | 27.47 | 27.14 | 26.51 |
| 5 | 27.28 | 27.13 | 27.05 | 27.10 | 27.12 | 27.22 | 27.47 | 27.73 | 27.52 | 27.43 | 27.14 | 26.50 |
| 6 | 27.23 | 27.05 | 27.05 | 27.09 | 27.14 | 27.21 | 27.48 | 27.73 | 27.52 | 27.41 | 27.14 | 26.46 |
| 7 | 27.19 | 27.10 | 27.05 | 27.09 | 27.14 | 27.22 | 27.49 | 27.74 | 27.52 | 27.40 | 27.12 | 26.51 |
| 8 | 27.21 | 27.07 | 27.03 | 27.07 | 27.15 | 27.23 | 27.47 | 27.71 | 27.61 | 27.51 | 27.12 | 26.49 |
| 9 | 27.18 | 27.05 | 27.04 | 27.08 | 27.16 | 27.23 | 27.48 | 27.71 | 27.59 | 27.50 | 27.04 | 26.44 |
| 10 | 27.21 | 27.05 | 27.04 | 27.06 | 27.16 | 27.24 | 27.49 | 27.78 | 27.60 | 27.48 | 26.99 | 26.44 |
| 11 | 27.23 | 27.03 | 27.05 | 27.08 | 27.16 | 27.23 | 27.52 | 27.73 | 27.58 | 27.47 | 26.99 | 26.42 |
| 12 | 27.19 | 27.03 | 27.05 | 27.09 | 27.16 | 27.24 | 27.58 | 27.68 | 27.60 | 27.46 | 26.98 | 26.43 |
| 13 | 27.18 | 27.07 | 27.08 | 27.10 | 27.17 | 27.25 | 27.61 | 27.70 | 27.60 | 27.44 | 26.99 | 26.43 |
| 14 | 27.16 | 27.06 | 27.07 | 27.10 | 27.18 | 27.25 | 27.62 | 27.69 | 27.58 | 27.47 | 26.97 | 26.41 |
| 15 | 27.11 | 27.05 | 27.05 | 27.09 | 27.19 | 27.24 | 27.63 | 27.65 | 27.60 | 27.40 | 26.93 | 26.41 |
| 16 | 27.18 | 27.04 | 27.05 | 27.10 | 27.17 | 27.24 | 27.64 | 27.71 | 27.62 | 27.37 | 26.91 | 26.44 |
| 17 | 27.15 | 27.05 | 27.05 | 27.08 | 27.17 | 27.26 | 27.63 | 27.83 | 27.64 | 27.34 | 26.89 | 26.42 |
| 18 | 27.07 | 27.07 | 27.04 | 27.08 | 27.17 | 27.27 | 27.61 | 27.72 | 27.60 | 27.34 | 26.87 | 26.39 |
| 19 | 27.09 | 27.06 | 27.04 | 27.08 | 27.17 | 27.28 | 27.62 | 27.63 | 27.56 | 27.31 | 26.86 | 26.39 |
| 20 | 27.11 | 27.09 | 27.05 | 27.08 | 27.18 | 27.28 | 27.62 | 27.62 | 27.57 | 27.29 | 26.85 | 26.34 |
| 21 | 27.11 | 27.07 | 27.05 | 27.10 | 27.18 | 27.28 | 27.62 | 27.70 | 27.59 | 27.28 | 26.84 | 26.30 |
| 22 | 27.12 | 27.06 | 27.04 | 27.11 | 27.19 | 27.28 | 27.62 | 27.67 | 27.63 | 27.31 | 26.77 | 26.48 |
| 23 | 27.11 | 27.06 | 27.04 | 27.12 | 27.19 | 27.29 | 27.62 | 27.60 | 27.62 | 27.28 | 26.76 | 26.29 |
| 24 | 27.17 | 27.05 | 27.04 | 27.13 | 27.19 | 27.30 | 27.66 | 27.69 | 27.56 | 27.26 | 26.75 | 26.24 |
| 25 | 27.16 | 27.02 | 27.06 | 27.11 | 27.20 | 27.31 | 27.61 | 27.54 | 27.61 | 27.24 | 26.75 | 26.26 |
| 26 | 27.14 | 27.00 | 27.07 | 27.13 | 27.20 | 27.33 | 27.52 | 27.56 | 27.57 | 27.24 | 26.75 | 26.25 |
| 27 | 27.14 | 27.02 | 27.07 | 27.13 | 27.20 | 27.36 | 27.63 | 27.54 | 27.53 | 27.23 | 26.73 | 26.24 |
| 28 | 27.14 | 27.03 | 27.06 | 27.16 | 27.20 | 27.38 | 27.89 | 27.53 | 27.53 | 27.22 | 26.72 | 26.24 |
| 29 | 27.09 | 27.03 | 27.06 | 27.16 | 27.19 | 27.39 | 27.72 | 27.53 | 27.53 | 27.19 | 26.69 | 26.23 |
| 30 | 27.08 | 27.04 | 27.07 | 27.16 | --- | 27.42 | 27.71 | 27.56 | 27.52 | 27.19 | 26.67 | 26.21 |
| 31 | 27.08 | --- | 27.07 | 27.17 | --- | 27.43 | --- | 27.52 | --- | 27.20 | 26.54 | --- |
| MEAN | 27.16 | 27.05 | 27.05 | 27.10 | 27.17 | 27.28 | 27.58 | 27.67 | 27.56 | 27.36 | 26.92 | 26.39 |
| MAX | 27.28 | 27.13 | 27.08 | 27.17 | 27.20 | 27.43 | 27.89 | 27.83 | 27.64 | 27.51 | 27.18 | 26.54 |
| MIN | 27.07 | 27.00 | 27.03 | 27.06 | 27.12 | 27.21 | 27.44 | 27.52 | 27.44 | 27.19 | 26.54 | 26.21 |
| CAL YR 1983 | MEAN | 27.33 | MAX | 28.10 | MIN | 26.68 | | | | | | |
| WTR YR 1984 | MEAN | 27.19 | MAX | 27.89 | MIN | 26.21 | | | | | | |

RED RIVER OF THE NORTH BASIN

05057000 SHEYENNE RIVER NEAR COOPERSTOWN, ND

LOCATION.--Lat 47°26'01", long 98°01'43", in NE1/4NE1/4SE1/4 sec.27, T.146 N., R.58 W., Griggs County, Hydrologic Unit 09020203, on right bank 150 ft downstream from county bridge, and 5 mi east of Cooperstown.

DRAINAGE AREA.--6,470 mi², approximately, of which about 5,200 mi² is probably noncontributing, includes 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1944 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area. WDR ND-80-1: Gage datum.

GAGE.--Water-stage recorder. Datum of gage is 1,271.76 ft National Geodetic Vertical Datum of 1929, Coast and Geodetic Survey benchmark. Prior to Aug. 3, 1950, nonrecording gage at site 150 ft upstream at same datum.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--40 years, 108 ft³/s, 78,250 acre-ft/yr; median of yearly mean discharges, 86 ft³/s, 62,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,830 ft³/s Apr. 17, 1950, gage height, 18.69 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,850 ft³/s Apr. 3, gage height 15.13 ft, only peak above base of 200 ft³/s; maximum gage height, 15.79 ft Mar. 30, backwater from ice; minimum daily discharge, .10 ft³/s Sept. 22-23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|------|------|-------|-------|-------|------|-------|--------|-------|
| 1 | 48 | 46 | 45 | 29 | 19 | 58 | 1500 | 412 | 138 | 76 | 16 | 2.0 |
| 2 | 49 | 47 | 45 | 29 | 18 | 63 | 1720 | 417 | 131 | 75 | 15 | 2.2 |
| 3 | 49 | 46 | 44 | 29 | 17 | 84 | 1840 | 422 | 125 | 74 | 14 | 1.6 |
| 4 | 49 | 44 | 44 | 29 | 16 | 120 | 1730 | 420 | 123 | 72 | 14 | .67 |
| 5 | 47 | 45 | 43 | 29 | 16 | 140 | 1560 | 410 | 122 | 70 | 14 | 3.7 |
| 6 | 47 | 47 | 42 | 29 | 15 | 141 | 1380 | 398 | 120 | 64 | 11 | 1.8 |
| 7 | 46 | 48 | 41 | 29 | 14 | 143 | 1200 | 389 | 120 | 60 | 11 | 1.4 |
| 8 | 46 | 48 | 41 | 28 | 14 | 158 | 1070 | 385 | 124 | 55 | 15 | 1.4 |
| 9 | 45 | 48 | 40 | 28 | 13 | 172 | 953 | 388 | 131 | 55 | 14 | 1.7 |
| 10 | 45 | 47 | 40 | 28 | 12 | 185 | 816 | 395 | 133 | 52 | 15 | 1.6 |
| 11 | 45 | 44 | 40 | 27 | 11 | 181 | 672 | 409 | 137 | 49 | 16 | 1.4 |
| 12 | 48 | 43 | 39 | 26 | 11 | 166 | 588 | 423 | 140 | 46 | 15 | 1.4 |
| 13 | 48 | 42 | 38 | 26 | 10 | 150 | 563 | 429 | 138 | 44 | 13 | 1.3 |
| 14 | 48 | 51 | 38 | 25 | 10 | 136 | 541 | 427 | 134 | 42 | 10 | .93 |
| 15 | 48 | 47 | 37 | 25 | 10 | 123 | 528 | 414 | 132 | 38 | 8.2 | .93 |
| 16 | 48 | 46 | 37 | 25 | 10 | 113 | 519 | 393 | 131 | 37 | 7.4 | .59 |
| 17 | 49 | 47 | 36 | 25 | 10 | 106 | 507 | 375 | 125 | 35 | 7.1 | .45 |
| 18 | 51 | 52 | 35 | 24 | 10 | 98 | 495 | 351 | 119 | 32 | 5.9 | .45 |
| 19 | 51 | 52 | 35 | 24 | 10 | 91 | 460 | 323 | 115 | 30 | 5.4 | .27 |
| 20 | 52 | 52 | 35 | 24 | 10 | 87 | 458 | 299 | 109 | 29 | 6.8 | .33 |
| 21 | 53 | 52 | 35 | 24 | 12 | 85 | 439 | 281 | 102 | 27 | 6.8 | .33 |
| 22 | 55 | 37 | 34 | 24 | 14 | 90 | 429 | 262 | 99 | 26 | 5.6 | .10 |
| 23 | 55 | 40 | 34 | 24 | 16 | 114 | 414 | 249 | 93 | 25 | 4.7 | .10 |
| 24 | 54 | 41 | 33 | 24 | 18 | 361 | 404 | 236 | 90 | 25 | 4.7 | .15 |
| 25 | 53 | 51 | 33 | 23 | 20 | 724 | 392 | 221 | 91 | 22 | 4.5 | .33 |
| 26 | 52 | 46 | 32 | 23 | 25 | 809 | 381 | 203 | 94 | 21 | 3.1 | .33 |
| 27 | 52 | 46 | 32 | 23 | 30 | 871 | 381 | 190 | 92 | 21 | 4.3 | .33 |
| 28 | 51 | 46 | 32 | 23 | 40 | 1050 | 390 | 181 | 89 | 20 | 2.8 | .33 |
| 29 | 50 | 46 | 31 | 22 | 50 | 1260 | 394 | 170 | 81 | 17 | 3.1 | .33 |
| 30 | 47 | 46 | 30 | 21 | --- | 1550 | 403 | 158 | 73 | 15 | 2.0 | .52 |
| 31 | 47 | --- | 30 | 20 | --- | 1560 | --- | 148 | --- | 14 | 2.0 | --- |
| TOTAL | 1528 | 1393 | 1151 | 789 | 481 | 10989 | 23127 | 10178 | 3451 | 1268 | 277.4 | 28.97 |
| MEAN | 49.3 | 46.4 | 37.1 | 25.5 | 16.6 | 354 | 771 | 328 | 115 | 40.9 | 8.95 | .97 |
| MAX | 55 | 52 | 45 | 29 | 50 | 1560 | 1840 | 429 | 140 | 76 | 16 | 3.7 |
| MIN | 45 | 37 | 30 | 20 | 10 | 58 | 381 | 148 | 73 | 14 | 2.0 | .10 |
| AC-FT | 3030 | 2760 | 2280 | 1560 | 954 | 21800 | 45870 | 20190 | 6850 | 2520 | 550 | 57 |
| CAL YR 1983 | TOTAL | 76446.0 | | MEAN | 209 | MAX | 1600 | MIN | 8.0 | AC-FT | 151600 | |
| WTR YR 1984 | TOTAL | 54661.37 | | MEAN | 149 | MAX | 1840 | MIN | .10 | AC-FT | 108400 | |

05057000 SHEYENNE RIVER NEAR COOPERSTOWN, ND--CONTINUED

PERIOD OF RECORD.--Water year 1960 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-----------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 07... | 1230 | 46 | 860 | 8.2 | 7.0 | 10.0 | 340 | 48 | 73 | 39 | 74 |
| NOV 17... | 1350 | 47 | 890 | -- | 1.0 | 3.0 | -- | -- | -- | -- | -- |
| JAN 17... | 1500 | 25 | 1880 | -- | -18.0 | .0 | -- | -- | -- | -- | -- |
| MAR 01... | 1450 | 57 | 870 | -- | .0 | .0 | -- | -- | -- | -- | -- |
| MAR 27... | 1510 | 900 | 295 | 7.4 | 1.0 | 3.0 | 99 | 17 | 24 | 9.5 | 19 |
| APR 03... | 1245 | 1790 | 400 | -- | 9.5 | 5.5 | -- | -- | -- | -- | -- |
| MAY 09... | 1235 | 400 | 945 | -- | 17.0 | 11.0 | -- | -- | -- | -- | -- |
| JUN 22... | 1500 | 93 | 1030 | -- | 20.0 | 25.0 | -- | -- | -- | -- | -- |
| AUG 13... | 1725 | 12 | 910 | -- | 30.0 | 24.0 | -- | -- | -- | -- | -- |
| SEP 26... | 1235 | .40 | 910 | 8.6 | -- | 8.0 | 330 | 6 | 71 | 37 | 92 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|-----------|------------------------------|--|--|---|--|--|--|--|--|---|
| OCT 07... | 31 | 2 | 14 | 340 | 10 | 300 | 3.4 | 170 | 15 | .20 |
| MAR 27... | 27 | .9 | 10 | 100 | .000 | 80 | 6.3 | 51 | 9.3 | .10 |
| SEP 26... | 37 | 2 | 12 | 400 | .000 | 320 | 1.8 | 190 | 19 | .30 |

| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (MG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|-----------|--|---|---|--|--|--|---|---|---|---|
| OCT 07... | 19 | 608 | 590 | .83 | 76 | .16 | .170 | 3 | 65 | 120 |
| MAR 27... | 9.6 | 202 | 180 | .27 | 491 | -- | -- | 1 | -- | 50 |
| SEP 26... | 22 | 660 | 640 | .90 | .71 | <.10 | .070 | 4 | 73 | 180 |

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|-----------|---|---|---|---|---|---|--|---|---|
| OCT 07... | 1 | 20 | 30 | 50 | 250 | .1 | 0 | 350 | 4 |
| MAR 27... | -- | 120 | 0 | 20 | 230 | .3 | 0 | 97 | -- |
| SEP 26... | 2 | 0 | 0 | 72 | 530 | .0 | 1 | 350 | 11 |

RED RIVER OF THE NORTH BASIN

05057200 BALDHILL CREEK NEAR DAZEY, ND

LOCATION.--Lat 47°13'45", long 98°07'28", in NW1/4SE1/4SW1/4 sec.2, T.143 N., R.59 W., Barnes County, Hydrologic Unit 09020203, on left bank 500 ft upstream from bridge on county highway, 4.5 mi northeast of Dazey, and 14 mi upstream from mouth.

DRAINAGE AREA.--691 mi², of which about 340 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1956 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Prior to Nov. 9, 1956, nonrecording gage 500 ft downstream at same datum.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--28 years, 15.7 ft³/s, 11,370 acre-ft/yr; median of yearly mean discharges, 13 ft³/s, 9,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 9,000 ft³/s Apr. 19, 1979 on basis of contracted opening measurement of peak flow at site 4.5 mi downstream, gage height, 17.78 ft, from floodmark; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 755 ft³/s Mar. 27, gage height, 9.16 ft, backwater from ice; no flow from Aug. 28 to Sept. 1.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|------|-------|-------|-------|-------|------|
| 1 | 3.9 | 3.3 | 3.5 | .82 | 2.1 | 4.7 | 238 | 40 | 8.2 | 2.6 | .10 | .00 |
| 2 | 4.1 | 3.4 | 3.2 | .82 | 2.2 | 4.2 | 181 | 42 | 7.9 | 2.2 | .09 | .01 |
| 3 | 3.8 | 3.4 | 3.0 | .85 | 2.4 | 4.2 | 150 | 41 | 7.6 | 1.6 | .08 | .01 |
| 4 | 3.4 | 3.8 | 2.8 | 1.2 | 3.3 | 4.2 | 118 | 40 | 7.6 | 1.2 | .16 | .01 |
| 5 | 3.9 | 4.3 | 2.9 | 1.6 | 3.0 | 4.2 | 98 | 40 | 8.0 | 1.3 | .23 | .01 |
| 6 | 3.4 | 4.2 | 2.9 | 1.9 | 2.1 | 4.0 | 85 | 38 | 7.7 | 1.0 | .30 | .01 |
| 7 | 3.5 | 3.9 | 2.6 | 2.1 | 2.1 | 4.0 | 70 | 34 | 7.4 | .88 | .33 | .01 |
| 8 | 3.1 | 3.7 | 2.5 | 2.6 | 2.0 | 4.0 | 59 | 32 | 7.4 | .79 | .29 | .01 |
| 9 | 2.8 | 3.8 | 2.2 | 2.8 | 2.0 | 3.8 | 54 | 30 | 7.0 | .74 | .16 | .01 |
| 10 | 3.5 | 3.8 | 2.1 | 3.0 | 2.0 | 3.8 | 48 | 28 | 6.2 | .75 | .11 | .01 |
| 11 | 3.5 | 3.7 | 2.1 | 2.9 | 2.0 | 3.6 | 47 | 27 | 5.4 | .80 | .07 | .01 |
| 12 | 4.3 | 4.0 | 2.1 | 2.6 | 2.0 | 3.6 | 46 | 26 | 4.8 | .59 | .05 | .01 |
| 13 | 4.3 | 4.5 | 2.0 | 2.5 | 2.0 | 3.6 | 46 | 25 | 4.2 | .42 | .04 | .02 |
| 14 | 3.9 | 4.5 | 2.0 | 2.5 | 2.1 | 3.6 | 46 | 24 | 3.8 | .90 | .03 | .04 |
| 15 | 4.0 | 4.2 | 2.0 | 2.3 | 2.0 | 3.4 | 46 | 22 | 3.4 | .68 | .03 | .05 |
| 16 | 4.0 | 3.9 | 2.0 | 2.3 | 2.0 | 3.4 | 45 | 21 | 3.2 | .41 | .03 | .07 |
| 17 | 3.4 | 3.7 | 1.9 | 2.3 | 2.0 | 3.4 | 44 | 20 | 3.0 | .34 | .03 | .10 |
| 18 | 3.5 | 4.3 | 1.6 | 2.1 | 2.1 | 3.2 | 37 | 19 | 2.8 | .31 | .03 | .11 |
| 19 | 3.7 | 4.9 | 1.5 | 2.1 | 2.1 | 3.2 | 32 | 18 | 3.0 | .26 | .03 | .12 |
| 20 | 3.9 | 4.9 | 1.3 | 2.0 | 2.2 | 3.6 | 31 | 16 | 5.0 | .24 | .03 | .13 |
| 21 | 3.9 | 4.9 | 1.2 | 1.8 | 2.9 | 5.1 | 29 | 18 | 7.0 | .21 | .03 | .15 |
| 22 | 4.0 | 4.4 | 1.2 | 1.8 | 4.3 | 9.5 | 27 | 18 | 9.0 | .19 | .03 | .19 |
| 23 | 3.3 | 4.7 | 1.1 | 1.6 | 13 | 45 | 23 | 18 | 8.2 | .18 | .02 | .19 |
| 24 | 3.4 | 4.7 | .93 | 1.6 | 19 | 510 | 22 | 17 | 6.3 | .17 | .02 | .20 |
| 25 | 3.3 | 4.4 | .87 | 1.5 | 11 | 570 | 22 | 15 | 4.9 | .16 | .02 | .20 |
| 26 | 3.2 | 3.9 | .87 | 1.5 | 12 | 690 | 22 | 14 | 4.0 | .17 | .01 | .21 |
| 27 | 3.0 | 3.8 | .85 | 1.4 | 7.4 | 720 | 26 | 12 | 3.0 | .21 | .01 | .22 |
| 28 | 3.5 | 4.0 | .85 | 1.4 | 5.5 | 680 | 38 | 11 | 2.5 | .17 | .00 | .22 |
| 29 | 3.2 | 3.7 | .82 | 1.6 | 5.2 | 430 | 43 | 9.9 | 1.8 | .13 | .00 | .24 |
| 30 | 3.2 | 3.6 | .82 | 1.8 | --- | 390 | 40 | 9.0 | 1.3 | .11 | .00 | .24 |
| 31 | 3.1 | --- | .82 | 2.0 | --- | 317 | --- | 8.5 | --- | .09 | .00 | --- |
| TOTAL | 111.0 | 122.3 | 56.53 | 59.29 | 124.0 | 4442.3 | 1813 | 733.4 | 161.6 | 19.80 | 2.36 | 2.81 |
| MEAN | 3.58 | 4.08 | 1.82 | 1.91 | 4.28 | 143 | 60.4 | 23.7 | 5.39 | .64 | .08 | .09 |
| MAX | 4.3 | 4.9 | 3.5 | 3.0 | 19 | 720 | 238 | 42 | 9.0 | 2.6 | .33 | .24 |
| MIN | 2.8 | 3.3 | .82 | .82 | 2.0 | 3.2 | 22 | 8.5 | 1.3 | .09 | .00 | .00 |
| AC-FT | 220 | 243 | 112 | 118 | 246 | 8810 | 3600 | 1450 | 321 | 39 | 4.7 | 5.6 |
| CAL YR 1983 | TOTAL | 8763.63 | | MEAN | 24.0 | MAX | 530 | MIN | .82 | AC-FT | 17380 | |
| WTR YR 1984 | TOTAL | 7648.39 | | MEAN | 20.9 | MAX | 720 | MIN | .00 | AC-FT | 15170 | |

RED RIVER OF THE NORTH BASIN

79

05057200 BALDHILL CREEK NEAR DAZEY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | | |
|------------------------------|---|--|--|---|--|--|--|--|---|---|--|---|
| DATE | TIME | MAR 27... AUG 14... | 1040 0830 | 740 .03 | 228 900 | 8.0 8.4 | 3.0 23.0 | 97 300 | 15 26 | 23 38 | 9.5 49 | 7.0 100 |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L AS SIO2) (70300) |
| | | MAR 27... AUG 14... | 12 41 | .3 3 | 9.9 15 | 100 330 | .000 .000 | 82 270 | 1.6 2.1 | 29 210 | 5.4 34 | .10 .30 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 27... AUG 14... | 140 610 | .21 .83 | 316 .05 | 1 4 | 50 230 | 150 10 | 0 0 | 20 87 | 190 40 | .3 .1 | 0 0 | 140 340 |

RED RIVER OF THE NORTH BASIN

05057500 LAKE ASHTABULA AT BALDHILL DAM, ND

LOCATION.--Lat 47°02'00", long 98°05'00", in NW¼ sec.18, T.141 N., R.58 W., Barnes County, Hydrologic Unit 09020203, at Baldhill Dam on Sheyenne River, and 8 mi northwest of Valley City.

DRAINAGE AREA.--7,470 mi², approximately, of which about 5,560 mi² is probably noncontributing, including 3,800 mi² in closed basins.

PERIOD OF RECORD.--July 1949 to current year.

REVISED RECORDS.--WSP 1238: 1950(M). WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth-fill dam, 1,650 ft long; storage began on July 30, 1949; dam completed September 1949. Usable capacity, 69,100 acre-ft between invert of outlet conduit, elevation, 1,238.0 ft, and normal pool level, elevation, 1,266.0 ft. Dead storage below elevation 1,238.0 ft, 1,500 acre-ft. Maximum pool elevation, 1,273.2 ft, capacity, 116,500 acre-ft. Low flows are controlled by 2 sluice gates 3 ft in diameter. The spillway crest is 120 ft long at elevation 1,252.0 ft, surmounted by 3 taintor gates, each 15 ft high and 40 ft long. The reservoir is operated for flood control and to increase low-water flow.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 91,400 acre-ft May 14, 1950, elevation, 1,269.46 ft; minimum since reservoir first reached spillway level, 6,660 acre-ft Aug. 11-14, 1950, elevation, 1,245.13 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 72,766 acre-ft Apr. 27, elevation, 1,266.38 ft; minimum, 45,725 acre-ft Mar. 23, elevation, 1,261.05 ft.

MONTHEND ELEVATION AND CONTENTS AT 0800, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 1,266.32 | 72,424 | -- |
| Oct. 31----- | 1,265.62 | 68,472 | -3,952 |
| Nov. 30----- | 1,264.59 | 61,925 | -6,547 |
| Dec. 31----- | 1,263.05 | 54,650 | -7,275 |
| CAL YR 1983----- | -- | -- | -3,675 |
| Jan. 31----- | 1,262.12 | 50,540 | -4,110 |
| Feb. 28----- | 1,261.58 | 48,110 | -2,430 |
| Mar. 31----- | 1,264.84 | 63,800 | +15,690 |
| Apr. 30----- | 1,266.21 | 71,797 | +7,997 |
| May 31----- | 1,265.97 | 70,432 | -1,365 |
| June 30----- | 1,266.22 | 71,854 | +1,422 |
| July 31----- | 1,265.77 | 69,312 | -2,542 |
| Aug. 31----- | 1,265.11 | 65,616 | -3,696 |
| Sept. 30----- | 1,264.40 | 60,500 | -5,116 |
| WTR YR 1984----- | -- | -- | -11,914 |

RED RIVER OF THE NORTH BASIN

81

05058000 SHEYENNE RIVER BELOW BALDHILL DAM, ND

LOCATION.--Lat 47°01'50", long 98°05'50", in NW¼ sec.18, T.141 N., R.58 W., Barnes County, Hydrologic Unit 09020204, on right bank 600 ft downstream from Baldhill Dam, 8 mi northwest of Valley City, and at mile 270.5.

DRAINAGE AREA.--7,470 mi², approximately, of which about 5,560 mi² is probably noncontributing, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1949 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,200.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Flow completely regulated by Lake Ashtabula (station 05057500). Records 1955 to 1972 include releases at Baldhill Dam to the fish-rearing ponds of the Fish and Wildlife Service. Small diversions are still made but not published.

AVERAGE DISCHARGE (UNADJUSTED).--35 years, 128 ft³/s, 92,740 acre-ft/yr; median of yearly mean discharges, 96 ft³/s, 69,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,740 ft³/s Apr. 24, 1979, gage height, 36.26 ft; no flow at times in 1950, 1952-53, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,790 ft³/s Apr. 3, gage height, 29.50 ft; minimum daily, 17 ft³/s Aug. 4, 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-------|------|------|------|-------|-------|-------|-------|--------|------|------|
| 1 | 52 | 141 | 139 | 130 | 65 | 64 | 1390 | 570 | 68 | 66 | 22 | 56 |
| 2 | 52 | 141 | 138 | 130 | 64 | 64 | 1590 | 569 | 52 | 63 | 21 | 56 |
| 3 | 66 | 141 | 138 | 130 | 64 | 64 | 1740 | 570 | 52 | 62 | 19 | 56 |
| 4 | 81 | 141 | 137 | 135 | 64 | 64 | 1780 | 486 | 52 | 63 | 17 | 56 |
| 5 | 82 | 141 | 137 | 130 | 64 | 64 | 1770 | 429 | 52 | 62 | 17 | 56 |
| 6 | 83 | 141 | 137 | 130 | 64 | 64 | 1760 | 432 | 97 | 61 | 19 | 56 |
| 7 | 83 | 141 | 136 | 55 | 64 | 64 | 1670 | 434 | 144 | 60 | 19 | 56 |
| 8 | 83 | 141 | 136 | 72 | 64 | 64 | 1490 | 430 | 237 | 59 | 19 | 56 |
| 9 | 83 | 141 | 135 | 69 | 64 | 64 | 1360 | 429 | 303 | 38 | 21 | 56 |
| 10 | 83 | 143 | 135 | 66 | 64 | 64 | 1200 | 431 | 305 | 22 | 21 | 55 |
| 11 | 83 | 143 | 135 | 66 | 64 | 64 | 1090 | 347 | 305 | 22 | 20 | 55 |
| 12 | 83 | 141 | 135 | 66 | 64 | 64 | 862 | 286 | 306 | 23 | 21 | 55 |
| 13 | 83 | 141 | 134 | 66 | 64 | 80 | 760 | 287 | 182 | 23 | 21 | 55 |
| 14 | 83 | 141 | 134 | 66 | 64 | 90 | 731 | 286 | 76 | 22 | 21 | 41 |
| 15 | 83 | 141 | 134 | 66 | 64 | 140 | 665 | 286 | 50 | 22 | 21 | 30 |
| 16 | 83 | 141 | 134 | 66 | 64 | 276 | 637 | 316 | 50 | 22 | 21 | 29 |
| 17 | 84 | 138 | 133 | 66 | 64 | 300 | 623 | 334 | 49 | 22 | 47 | 29 |
| 18 | 137 | 138 | 133 | 66 | 64 | 292 | 516 | 340 | 49 | 23 | 60 | 29 |
| 19 | 138 | 138 | 133 | 66 | 64 | 290 | 441 | 348 | 50 | 23 | 55 | 29 |
| 20 | 138 | 138 | 132 | 66 | 64 | 300 | 438 | 341 | 50 | 28 | 55 | 28 |
| 21 | 140 | 140 | 132 | 66 | 64 | 300 | 429 | 350 | 50 | 30 | 55 | 28 |
| 22 | 141 | 141 | 132 | 66 | 64 | 305 | 433 | 362 | 61 | 27 | 55 | 29 |
| 23 | 141 | 140 | 132 | 66 | 64 | 310 | 439 | 369 | 82 | 25 | 55 | 29 |
| 24 | 141 | 140 | 131 | 66 | 64 | 304 | 433 | 371 | 82 | 24 | 55 | 29 |
| 25 | 141 | 140 | 131 | 65 | 64 | 305 | 431 | 341 | 79 | 23 | 56 | 27 |
| 26 | 141 | 140 | 131 | 65 | 64 | 305 | 442 | 316 | 117 | 21 | 56 | 29 |
| 27 | 141 | 140 | 130 | 65 | 64 | 336 | 515 | 290 | 124 | 21 | 56 | 29 |
| 28 | 141 | 140 | 130 | 65 | 64 | 435 | 571 | 212 | 131 | 21 | 56 | 30 |
| 29 | 141 | 140 | 130 | 65 | 64 | 695 | 571 | 134 | 96 | 20 | 56 | 30 |
| 30 | 141 | 139 | 130 | 65 | --- | 979 | 572 | 92 | 66 | 19 | 56 | 30 |
| 31 | 141 | --- | 130 | 65 | --- | 1150 | --- | 93 | --- | 20 | 56 | --- |
| TOTAL | 3293 | 4212 | 4144 | 2426 | 1857 | 7960 | 27349 | 10881 | 3417 | 1037 | 1149 | 1229 |
| MEAN | 106 | 140 | 134 | 78.3 | 64.0 | 257 | 912 | 351 | 114 | 33.5 | 37.1 | 41.0 |
| MAX | 141 | 143 | 139 | 135 | 65 | 1150 | 1780 | 570 | 306 | 66 | 60 | 56 |
| MIN | 52 | 138 | 130 | 55 | 64 | 64 | 429 | 92 | 49 | 19 | 17 | 27 |
| AC-FT | 6530 | 8350 | 8220 | 4810 | 3680 | 15790 | 54250 | 21580 | 6780 | 2060 | 2280 | 2440 |
| CAL YR 1983 | TOTAL | 95673 | MEAN | 262 | MAX | 1870 | MIN | 11 | AC-FT | 189800 | | |
| WTR YR 1984 | TOTAL | 68954 | MEAN | 188 | MAX | 1780 | MIN | 17 | AC-FT | 136800 | | |

RED RIVER OF THE NORTH BASIN

05058000 SHEYENNE RIVER BELOW BALDHILL DAM, ND--CONTINUED

PERIOD OF RECORD.--Water years 1959 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-----------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 05... | 0955 | 81 | 685 | -- | 11.0 | 12.0 | -- | -- | -- | -- | -- |
| NOV 22... | 1135 | 146 | 815 | -- | -1.5 | 3.0 | -- | -- | -- | -- | -- |
| JAN 03... | 1410 | 130 | 860 | -- | 2.0 | 3.0 | -- | -- | -- | -- | -- |
| FEB 14... | 1345 | 64 | 1010 | -- | 2.0 | 4.5 | -- | -- | -- | -- | -- |
| MAR 29... | 1245 | 778 | 880 | 8.6 | 6.0 | 3.0 | 300 | 0 | 63 | 35 | 83 |
| MAY 08... | 1045 | 433 | 570 | -- | 8.0 | 9.0 | -- | -- | -- | -- | -- |
| JUN 25... | 1230 | 83 | 625 | -- | 28.0 | 22.0 | -- | -- | -- | -- | -- |
| JUL 31... | 1515 | 22 | 630 | 8.7 | 31.0 | 25.0 | 240 | 13 | 50 | 28 | 64 |
| AUG 28... | 1035 | 58 | 723 | -- | 29.0 | 23.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|-----------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| MAR 29... | 36 | 2 | 16 | 390 | .000 | 320 | 1.6 | 140 | 13 | .20 | 8.6 | 564 |
| JUL 31... | 35 | 2 | 11 | 280 | .000 | 230 | .9 | 130 | 12 | .20 | 9.3 | 461 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|-----------|--|--|--|---|---|---|---|---|---|---|--|---|
| MAR 29... | 550 | .77 | 1180 | 4 | 20 | 20 | -- | 84 | 540 | .0 | 0 | 320 |
| JUL 31... | 440 | .63 | 27 | 5 | 110 | 20 | 0 | 60 | 240 | .2 | 0 | 260 |

RED RIVER OF THE NORTH BASIN

83

05058500 SHEYENNE RIVER AT VALLEY CITY, ND

LOCATION.--Lat 46°54'50", long 98°00'30", in SE1/4NW1/4 sec.28, T.140 N., R.58 W., Barnes County, on left bank 100 ft downstream from College Dam in Valley City, and at mile 253.0.

DRAINAGE AREA.--7,810 mi², approximately, of which about 5,700 mi² is probably noncontributing, includes 3,800 mi² in closed basins.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--March to August 1919, March to June 1938, August 1938 to September 1975; October 1979 to current year (gage heights and annual maximum discharge since 1979). Records for July 1938, published in WSP 855, have been found to be unreliable and should not be used.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,199.27 ft National Geodetic Vertical Datum of 1929. March to August 1919, nonrecording gage at site 0.5 mi upstream at different datum. March to Oct. 13, 1938, nonrecording gage at present site and datum.

REMARKS.--Flow regulated by Lake Ashtabula 13 mi upstream (see station 05057500). Small diversions above station for municipal supply.

AVERAGE DISCHARGE (UNADJUSTED).--37 years (1938-75), 124 ft³/s, 89,840 acre-ft/yr; median of yearly mean discharges, 97 ft³/s, 70,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,580 ft³/s Apr. 28, 1948, gage height, 17.51 ft; maximum gage height, 17.62 ft Apr. 19, 1969; no flow during several periods in 1938-41.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,950 ft³/s Apr. 6, gage height, 10.43 ft; minimum not determined.

REVISIONS (WATER YEARS).--WSP 1388: 1939 (M). WSP 1728: Drainage area.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|------|------|------|------|-------|------|------|------|------|------|
| 1 | 3.25 | 3.83 | 3.94 | --- | 3.52 | 3.36 | 8.35 | 5.96 | 3.23 | 3.24 | 2.85 | 3.07 |
| 2 | 3.22 | 3.83 | 3.94 | --- | 3.50 | 3.36 | 9.04 | 5.96 | 3.13 | 3.13 | 2.85 | 3.09 |
| 3 | 3.29 | 3.83 | 3.95 | 4.31 | 3.45 | 3.35 | 9.79 | 5.96 | 3.08 | 3.08 | 2.85 | 3.09 |
| 4 | 3.35 | 3.83 | 3.95 | 4.29 | 3.46 | 3.35 | 10.23 | 5.91 | 3.11 | 3.07 | 2.88 | 3.08 |
| 5 | 3.43 | 3.84 | 3.94 | 4.27 | 3.35 | 3.34 | 10.25 | 5.52 | 3.11 | 3.08 | 2.88 | 3.08 |
| 6 | 3.41 | 3.84 | 3.93 | 3.96 | 3.62 | 3.34 | 10.38 | 5.35 | 3.23 | 3.07 | 2.88 | 3.07 |
| 7 | 3.44 | 3.83 | 3.93 | 3.57 | 3.57 | 3.33 | 10.25 | 5.34 | 3.72 | 3.07 | 2.87 | 3.09 |
| 8 | 3.44 | 3.83 | 3.93 | 3.46 | 3.56 | 3.33 | 9.88 | 5.32 | 3.83 | 3.06 | 2.86 | 3.09 |
| 9 | 3.43 | 3.83 | 3.93 | 3.47 | 3.66 | 3.34 | 9.05 | 5.31 | 4.50 | 3.07 | 2.86 | 3.10 |
| 10 | 3.45 | 3.84 | 3.93 | 3.42 | 3.63 | 3.33 | 8.55 | 5.31 | 4.65 | 3.01 | 2.84 | 3.10 |
| 11 | 3.46 | 3.84 | 3.94 | 3.51 | 3.52 | 3.33 | 7.73 | 5.11 | 4.80 | 2.92 | 2.84 | 3.10 |
| 12 | 3.45 | 3.84 | 3.94 | 3.50 | 3.50 | 3.32 | 7.51 | 4.62 | 4.68 | 2.87 | 2.83 | 3.09 |
| 13 | 3.44 | 3.84 | 3.94 | 3.47 | 3.46 | 3.34 | 6.85 | 4.27 | 4.57 | 2.86 | 2.83 | 3.09 |
| 14 | 3.43 | 3.84 | 3.94 | 3.50 | 3.41 | 3.51 | 6.74 | 4.30 | 3.27 | 2.86 | 2.83 | 3.09 |
| 15 | 3.45 | 3.83 | 3.94 | 3.52 | 3.40 | 3.53 | 6.51 | 4.43 | 3.14 | 2.85 | 2.84 | 3.06 |
| 16 | 3.47 | 3.83 | 3.94 | 3.55 | 3.42 | 4.43 | 6.30 | 4.47 | 3.17 | 2.88 | 2.84 | 2.99 |
| 17 | 3.47 | 3.82 | --- | 3.50 | 3.39 | 5.29 | 6.13 | 4.79 | 3.17 | 2.89 | 2.85 | 2.96 |
| 18 | 3.73 | 3.82 | --- | 3.56 | 3.39 | 5.10 | 5.91 | 4.83 | 3.16 | 2.88 | 2.93 | 2.95 |
| 19 | 3.83 | 3.83 | --- | 3.60 | 3.39 | 5.02 | 5.36 | 4.79 | 3.17 | 2.87 | 3.05 | 2.94 |
| 20 | 3.84 | 3.84 | --- | 3.58 | 3.36 | 5.02 | 5.35 | 4.80 | 3.16 | 2.87 | 3.06 | 2.93 |
| 21 | 3.83 | 3.82 | --- | 3.66 | 3.37 | 4.96 | 5.35 | 4.85 | 3.16 | 2.87 | 3.07 | 2.92 |
| 22 | 3.83 | 3.84 | --- | 3.68 | 3.39 | 5.00 | 5.35 | 4.90 | 3.19 | 2.91 | 3.07 | 2.92 |
| 23 | 3.82 | 3.88 | --- | 3.68 | 3.42 | 5.41 | 5.34 | 4.93 | 3.27 | 2.91 | 3.07 | 2.92 |
| 24 | 3.84 | 3.89 | --- | 3.65 | 3.39 | 6.31 | 5.36 | 4.94 | 3.36 | 2.90 | 3.06 | 2.94 |
| 25 | 3.92 | 3.90 | --- | 3.66 | 3.37 | 6.51 | 5.36 | 4.93 | 3.36 | 2.90 | 3.06 | 2.94 |
| 26 | 3.94 | 3.92 | --- | 3.66 | 3.37 | 6.70 | 5.39 | 4.73 | 3.36 | 2.89 | 3.06 | 2.94 |
| 27 | 3.84 | 3.93 | --- | 3.61 | 3.37 | 6.95 | 5.53 | 4.67 | 3.41 | 2.88 | 3.07 | 2.93 |
| 28 | 3.83 | 3.91 | --- | 3.57 | 3.36 | 7.02 | 5.91 | 3.89 | 3.41 | 2.87 | 3.07 | 2.93 |
| 29 | 3.82 | 3.85 | --- | 3.60 | 3.36 | 7.20 | 5.96 | 3.90 | 3.39 | 2.86 | 3.07 | 2.93 |
| 30 | 3.83 | 3.93 | --- | 3.59 | --- | 7.32 | 5.96 | 3.34 | 3.18 | 2.85 | 3.07 | 2.93 |
| 31 | 3.83 | --- | --- | 3.56 | --- | 7.28 | --- | 3.16 | --- | 2.86 | 3.06 | --- |
| MEAN | 3.60 | 3.85 | --- | --- | 3.45 | 4.71 | 7.19 | 4.86 | 3.50 | 2.95 | 2.94 | 3.01 |
| MAX | 3.94 | 3.93 | --- | --- | 3.66 | 7.32 | 10.38 | 5.96 | 4.80 | 3.24 | 3.07 | 3.10 |
| MIN | 3.22 | 3.82 | --- | --- | 3.35 | 3.32 | 5.34 | 3.16 | 3.08 | 2.85 | 2.83 | 2.92 |

RED RIVER OF THE NORTH BASIN

05058700 SHEYENNE RIVER AT LISBON, ND

LOCATION.--Lat 46°26'49", long 97°40'44", on line between secs.1 and 2, T.134 N., R.56 W., Ransom County, Hydrologic Unit 09020204, on left bank 150 ft downstream from dam at State Fish Hatchery at north edge of city of Lisbon, 3 mi upstream from Timber Coulee, and at mile 162.1.

DRAINAGE AREA.--8,190 mi², approximately, of which about 5,700 mi² is probably noncontributing, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1956 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,066.46 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter periods, which are fair. Flow regulated by Lake Ashtabula (station 05057500) 108.5 mi upstream.

AVERAGE DISCHARGE.--28 years, 159 ft³/s, 115,200 acre-ft/yr; median of yearly mean discharges, 162 ft³/s, 117,370 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,270 ft³/s July 1, 1975, gage height, 19.04 ft; no flow Sept. 19-21, Oct. 23, 24, 1956, Aug. 16, 1961.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,000 ft³/s Apr. 6, gage height, 9.79 ft; maximum gage height, 11.71 ft, Mar. 27, backwater from ice. Minimum daily, 7.5 ft³/s Aug. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|------|-------|-------|-------|------|-------|--------|------|
| 1 | 67 | 135 | 132 | 150 | 71 | 80 | 1200 | 652 | 131 | 95 | 15 | 30 |
| 2 | 69 | 138 | 130 | 168 | 69 | 78 | 1500 | 646 | 83 | 96 | 12 | 31 |
| 3 | 66 | 139 | 142 | 187 | 64 | 76 | 1490 | 655 | 62 | 76 | 12 | 32 |
| 4 | 67 | 140 | 145 | 187 | 64 | 76 | 1450 | 653 | 73 | 73 | 14 | 32 |
| 5 | 64 | 140 | 145 | 187 | 63 | 76 | 1850 | 651 | 75 | 59 | 15 | 34 |
| 6 | 59 | 139 | 145 | 170 | 62 | 84 | 1980 | 627 | 72 | 50 | 16 | 36 |
| 7 | 70 | 140 | 145 | 165 | 62 | 81 | 1990 | 520 | 72 | 45 | 18 | 30 |
| 8 | 86 | 141 | 145 | 160 | 60 | 76 | 1980 | 467 | 71 | 44 | 16 | 35 |
| 9 | 85 | 139 | 142 | 122 | 59 | 76 | 1960 | 439 | 94 | 44 | 13 | 36 |
| 10 | 91 | 139 | 140 | 105 | 58 | 76 | 1840 | 426 | 136 | 45 | 13 | 38 |
| 11 | 94 | 138 | 140 | 81 | 68 | 76 | 1640 | 416 | 205 | 43 | 12 | 40 |
| 12 | 93 | 142 | 140 | 77 | 70 | 77 | 1510 | 414 | 261 | 42 | 12 | 50 |
| 13 | 95 | 145 | 140 | 79 | 77 | 77 | 1290 | 382 | 287 | 41 | 11 | 54 |
| 14 | 100 | 144 | 140 | 82 | 88 | 73 | 1150 | 291 | 267 | 37 | 9.7 | 53 |
| 15 | 101 | 143 | 140 | 91 | 87 | 68 | 946 | 246 | 253 | 25 | 9.5 | 48 |
| 16 | 99 | 143 | 140 | 88 | 89 | 72 | 867 | 215 | 166 | 22 | 8.6 | 44 |
| 17 | 96 | 141 | 140 | 88 | 81 | 75 | 785 | 236 | 86 | 22 | 8.9 | 41 |
| 18 | 100 | 141 | 140 | 94 | 76 | 82 | 758 | 239 | 60 | 18 | 8.2 | 43 |
| 19 | 104 | 143 | 140 | 92 | 75 | 104 | 746 | 278 | 61 | 16 | 7.5 | 40 |
| 20 | 109 | 145 | 139 | 90 | 74 | 240 | 662 | 303 | 62 | 15 | 8.2 | 28 |
| 21 | 140 | 144 | 135 | 92 | 78 | 400 | 512 | 301 | 62 | 16 | 9.6 | 22 |
| 22 | 146 | 146 | 128 | 91 | 90 | 405 | 482 | 303 | 66 | 18 | 9.0 | 20 |
| 23 | 148 | 142 | 128 | 90 | 96 | 500 | 466 | 302 | 64 | 17 | 15 | 17 |
| 24 | 147 | 110 | 128 | 87 | 92 | 740 | 453 | 313 | 62 | 16 | 30 | 19 |
| 25 | 145 | 108 | 128 | 86 | 90 | 1060 | 445 | 319 | 62 | 15 | 31 | 19 |
| 26 | 145 | 108 | 128 | 83 | 89 | 1520 | 462 | 323 | 71 | 15 | 31 | 20 |
| 27 | 145 | 131 | 128 | 82 | 89 | 1750 | 501 | 321 | 81 | 16 | 31 | 20 |
| 28 | 165 | 135 | 128 | 81 | 83 | 1610 | 556 | 290 | 80 | 16 | 30 | 19 |
| 29 | 148 | 142 | 128 | 79 | 81 | 1110 | 628 | 266 | 81 | 16 | 29 | 21 |
| 30 | 135 | 138 | 128 | 79 | --- | 1050 | 662 | 192 | 88 | 15 | 27 | 22 |
| 31 | 134 | --- | 128 | 78 | --- | 1020 | --- | 158 | --- | 16 | 25 | --- |
| TOTAL | 3313 | 4119 | 4225 | 3391 | 2205 | 12888 | 32761 | 11844 | 3294 | 1084 | 507.2 | 974 |
| MEAN | 107 | 137 | 136 | 109 | 76.0 | 416 | 1092 | 382 | 110 | 35.0 | 16.4 | 32.5 |
| MAX | 165 | 146 | 145 | 187 | 96 | 1750 | 1990 | 655 | 287 | 96 | 31 | 54 |
| MIN | 59 | 108 | 128 | 77 | 58 | 68 | 445 | 158 | 60 | 15 | 7.5 | 17 |
| AC-FT | 6570 | 8170 | 8380 | 6730 | 4370 | 25560 | 64980 | 23490 | 6530 | 2150 | 1010 | 1930 |
| CAL YR 1983 | TOTAL | 103591 | | MEAN | 284 | MAX | 2330 | MIN | 10 | AC-FT | 205500 | |
| WTR YR 1984 | TOTAL | 80605.2 | | MEAN | 220 | MAX | 1990 | MIN | 7.5 | AC-FT | 159900 | |

RED RIVER OF THE NORTH BASIN

85

05058700 SHEYENNE RIVER AT LISBON, ND---CONTINUED

PERIOD OF RECORD.--Water years 1956 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | | | |
|--|-----------|--|--|--|---|--|--|--|---|---|--|--|
| | DATE | TIME | | | | | | | | | | |
| | OCT 04... | 1350 | 66 | 775 | 7.4 | 12.5 | 12.0 | 10 | 9.9 | 96 | | |
| | NOV 21... | 1600 | 143 | 780 | 8.3 | .0 | 2.0 | 15 | 13.0 | 98 | | |
| | JAN 18... | 1055 | 95 | 960 | 8.0 | -1 .4 | 1.0 | 5 | 12.4 | 85 | | |
| | FEB 14... | 0920 | 89 | 945 | 7.8 | - .9 | .5 | 5 | 13.0 | 90 | | |
| | MAR 29... | 0905 | 1180 | 420 | 7.8 | 4.0 | 1.0 | 120 | 11.2 | 82 | | |
| | MAY 08... | 1645 | 467 | 640 | 8.2 | 10.0 | 11.0 | 70 | 9.1 | 85 | | |
| | JUN 26... | 0840 | 68 | 682 | 8.3 | 22.0 | 22.0 | 60 | 6.6 | 79 | | |
| | JUL 24... | 1545 | 16 | 740 | 8.3 | 25.0 | 25.0 | 45 | -- | -- | | |
| | AUG 29... | 1250 | 29 | 972 | 8.5 | 25.5 | 24.0 | 45 | 7.3 | 90 | | |
| | | | | | | | | | | | | |
| | DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
| | OCT 04... | 240 | 17 | 54 | 26 | 70 | 37 | 2 | 10 | 225 | 17 | 130 |
| | NOV 21... | 240 | 0 | 50 | 27 | 70 | 38 | 2 | 11 | 267 | 2.6 | 120 |
| | JAN 18... | 300 | 0 | 65 | 34 | 92 | 38 | 2 | 14 | 317 | 6.1 | 160 |
| | FEB 14... | 320 | 0 | 70 | 35 | 84 | 35 | 2 | 13 | 330 | 10 | 170 |
| | MAR 29... | 130 | 7 | 32 | 13 | 27 | 29 | 1 | 9.5 | 127 | 3.9 | 69 |
| | MAY 08... | 210 | 17 | 48 | 22 | 47 | 32 | 1 | 9.0 | 194 | 2.4 | 120 |
| | JUN 26... | 260 | 43 | 59 | 28 | 63 | 33 | 2 | 9.9 | 220 | 2.1 | 150 |
| | JUL 24... | 270 | 44 | 62 | 28 | 71 | 35 | 2 | 12 | 226 | 2.2 | 170 |
| | AUG 29... | 300 | 62 | 66 | 34 | 93 | 38 | 2 | 21 | 243 | 1.5 | 220 |
| | | | | | | | | | | | | |
| | DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| | OCT 04... | 23 | .20 | 5.4 | 453 | 450 | .62 | 81 | .22 | .050 | 170 | |
| | NOV 21... | 15 | .20 | .8 | 473 | 450 | .64 | 183 | <.10 | .160 | 150 | |
| | JAN 18... | 27 | .30 | 11 | 612 | 590 | .83 | 157 | .44 | .180 | 220 | |
| | FEB 14... | 23 | .20 | 18 | 606 | 610 | .82 | 146 | .58 | .180 | 180 | |
| | MAR 29... | 9.5 | .10 | 10 | 263 | 250 | .36 | 838 | 1.2 | .350 | 70 | |
| | MAY 08... | 14 | .20 | 5.9 | 381 | 380 | .52 | 480 | <.10 | .150 | 90 | |
| | JUN 26... | 18 | .20 | 11 | 471 | 470 | .64 | 86 | .27 | .340 | 160 | |
| | JUL 24... | 25 | .30 | 17 | 527 | 520 | .72 | 23 | <.10 | .080 | 260 | |
| | AUG 29... | 47 | .30 | 15 | 668 | 640 | .91 | 52 | <.10 | .070 | 270 | |

RED RIVER OF THE NORTH BASIN

05059000 SHEYENNE RIVER NEAR KINDRED, ND
(National stream-quality accounting network station)

LOCATION.--Lat 46°37'35", long 97°00'05", in NE1/4NW1/4 sec.5, T.136 N., R.50 W., Richland County, Hydrologic Unit 09020204, on right bank 25 ft downstream from Burlington Northern Railway bridge, 1.5 mi southeast of Kindred, and at mile 68.1.

DRAINAGE AREA.--8,800 mi², approximately, of which about 5,780 mi² is probably noncontributing, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1949 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 925.55 ft National Geodetic Vertical Datum of 1929. July 1949 to Sept. 30, 1962, nonrecording gage at same site and datum.

REMARKS.--Records good, except for winter period which are fair. Flow regulated to a large degree by Lake Ashtabula (station 05057500) 202 mi upstream and several small reservoirs.

AVERAGE DISCHARGE.--35 years, 201 ft³/s, 145,600 acre-ft/yr; median of yearly mean discharges, 167 ft³/s, 121,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,690 ft³/s Apr. 15, 1969, gage height, 21.03 ft; maximum gage height, 21.66 ft July 6, 1975; minimum daily discharge, 13 ft³/s Nov. 13, 1955, Aug. 22-24, 1959.

EXTREMES OUTSIDE PERIOD OF RECORD.--Spring flood in 1947 or 1948 reached a stage of 22.1 ft, from floodmarks, discharge about 3,600 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,810 ft³/s Apr. 11, gage height, 11.51 ft; minimum daily discharge, 21 ft³/s Aug. 19, 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|------|------|------|-------|-------|-------|-------|--------|------|------|
| 1 | 57 | 152 | 148 | 150 | 95 | 135 | 1630 | 602 | 305 | 138 | 37 | 41 |
| 2 | 67 | 152 | 150 | 158 | 95 | 128 | 1610 | 629 | 258 | 142 | 36 | 47 |
| 3 | 70 | 146 | 157 | 165 | 92 | 125 | 1600 | 634 | 236 | 146 | 35 | 50 |
| 4 | 75 | 144 | 153 | 170 | 90 | 122 | 1660 | 628 | 218 | 147 | 35 | 50 |
| 5 | 76 | 144 | 148 | 175 | 88 | 120 | 1720 | 626 | 202 | 142 | 34 | 49 |
| 6 | 77 | 146 | 146 | 180 | 86 | 118 | 1630 | 632 | 190 | 136 | 39 | 48 |
| 7 | 79 | 146 | 158 | 180 | 84 | 115 | 1670 | 635 | 206 | 126 | 37 | 47 |
| 8 | 76 | 150 | 160 | 175 | 82 | 112 | 1740 | 629 | 237 | 122 | 36 | 42 |
| 9 | 76 | 150 | 160 | 170 | 85 | 110 | 1790 | 575 | 209 | 114 | 34 | 46 |
| 10 | 74 | 150 | 160 | 165 | 85 | 108 | 1800 | 524 | 186 | 106 | 30 | 53 |
| 11 | 76 | 146 | 160 | 160 | 85 | 105 | 1800 | 500 | 173 | 98 | 27 | 52 |
| 12 | 76 | 146 | 160 | 155 | 85 | 100 | 1780 | 482 | 178 | 90 | 29 | 55 |
| 13 | 84 | 146 | 158 | 155 | 85 | 100 | 1700 | 479 | 210 | 84 | 30 | 60 |
| 14 | 92 | 146 | 155 | 150 | 85 | 100 | 1570 | 473 | 265 | 80 | 28 | 61 |
| 15 | 95 | 148 | 155 | 145 | 85 | 100 | 1390 | 466 | 304 | 78 | 27 | 64 |
| 16 | 104 | 148 | 155 | 140 | 85 | 100 | 1230 | 419 | 318 | 78 | 23 | 67 |
| 17 | 112 | 148 | 155 | 135 | 85 | 100 | 1080 | 406 | 317 | 77 | 24 | 68 |
| 18 | 114 | 149 | 155 | 130 | 85 | 98 | 969 | 320 | 299 | 72 | 23 | 68 |
| 19 | 116 | 150 | 155 | 125 | 90 | 95 | 896 | 302 | 237 | 71 | 21 | 66 |
| 20 | 116 | 151 | 155 | 120 | 95 | 90 | 823 | 305 | 191 | 66 | 21 | 61 |
| 21 | 116 | 152 | 155 | 115 | 95 | 90 | 762 | 316 | 163 | 63 | 26 | 60 |
| 22 | 116 | 152 | 155 | 110 | 95 | 90 | 715 | 356 | 163 | 58 | 26 | 59 |
| 23 | 114 | 152 | 155 | 112 | 105 | 128 | 624 | 360 | 160 | 49 | 24 | 58 |
| 24 | 123 | 151 | 153 | 115 | 110 | 415 | 571 | 356 | 154 | 48 | 25 | 59 |
| 25 | 137 | 150 | 150 | 112 | 115 | 800 | 549 | 352 | 150 | 46 | 25 | 56 |
| 26 | 144 | 149 | 145 | 110 | 120 | 890 | 537 | 352 | 144 | 45 | 24 | 54 |
| 27 | 144 | 147 | 145 | 110 | 130 | 1220 | 542 | 359 | 140 | 44 | 24 | 55 |
| 28 | 146 | 150 | 145 | 105 | 135 | 1430 | 559 | 367 | 138 | 41 | 23 | 52 |
| 29 | 142 | 152 | 145 | 100 | 140 | 1680 | 564 | 368 | 140 | 40 | 32 | 50 |
| 30 | 138 | 150 | 145 | 98 | --- | 1740 | 565 | 359 | 140 | 40 | 41 | 48 |
| 31 | 138 | --- | 145 | 95 | --- | 1680 | --- | 335 | --- | 38 | 37 | --- |
| TOTAL | 3170 | 4463 | 4741 | 4285 | 2792 | 12344 | 36076 | 14146 | 6231 | 2625 | 913 | 1646 |
| MEAN | 102 | 149 | 153 | 138 | 96.3 | 398 | 1203 | 456 | 208 | 84.7 | 29.5 | 54.9 |
| MAX | 146 | 152 | 160 | 180 | 140 | 1740 | 1800 | 635 | 318 | 147 | 41 | 68 |
| MIN | 57 | 144 | 145 | 95 | 82 | 90 | 537 | 302 | 138 | 38 | 21 | 41 |
| AC-FT | 6290 | 8850 | 9400 | 8500 | 5540 | 24480 | 71560 | 28060 | 12360 | 5210 | 1810 | 3260 |
| CAL YR 1983 | TOTAL | 114217 | MEAN | 313 | MAX | 2040 | MIN | 26 | AC-FT | 226500 | | |
| WTR YR 1984 | TOTAL | 93432 | MEAN | 255 | MAX | 1800 | MIN | 21 | AC-FT | 185300 | | |

05059000 SHEYENNE RIVER NEAR KINDRED, ND--CONTINUED
(National stream-quality accounting network station)

PERIOD OF RECORD---Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-----------|--|------|--|--|--|---|--|--|---|--|---|
| DATE | | TIME | | | | | | | | | |
| OCT 17... | | 1300 | | 112 | 770 | 8.3 | 11.0 | 6.0 | 12 | 13.0 | 107 |
| JAN 13... | | 1015 | | 153 | 915 | 8.1 | - .8 | .0 | 9.5 | 9.2 | 69 |
| FEB 29... | | 1040 | | 140 | 695 | 7.9 | - .4 | .0 | 5.7 | 7.7 | 54 |
| MAY 17... | | 1315 | | 394 | 648 | E7.4 | 23.0 | 18.0 | 35 | 9.1 | 100 |
| JUN 27... | | 0940 | | 139 | 755 | 8.2 | 26.0 | 21.0 | 28 | 6.2 | 72 |
| SEP 04... | | 1415 | | 52 | 922 | 7.7 | 24.5 | 15.5 | 18 | 8.4 | 86 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|----|
| OCT 17... | 280 | 18 | 66 | 27 | 68 | | 34 | 2 | 10 | 259 | 2.5 | 120 | 27 |
| JAN 13... | 300 | 0 | 65 | 33 | 81 | | 36 | 2 | 14 | 322 | 4.9 | 140 | 20 |
| FEB 29... | 300 | 9 | 69 | 30 | 68 | | 32 | 2 | 13 | 288 | 7.0 | 150 | 23 |
| MAY 17... | 280 | 55 | 63 | 30 | 66 | | 33 | 2 | 9.8 | 227 | -- | 120 | 15 |
| JUN 27... | 300 | 39 | 73 | 28 | 55 | | 28 | 1 | 8.2 | 259 | 3.1 | 130 | 19 |
| SEP 04... | 330 | 54 | 79 | 31 | 69 | | 31 | 2 | 9.7 | 272 | 10 | 180 | 31 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|-----------|---|--|---|--|--|--|--|--|---|--|---|
| OCT 17... | .20 | 11 | 479 | 490 | .65 | 145 | <.10 | .06 | 1.4 | .200 | .61 |
| JAN 13... | .20 | 12 | 570 | 560 | .78 | 235 | .43 | .30 | 1.6 | .160 | .49 |
| FEB 29... | .20 | 18 | 547 | 550 | .74 | 207 | .76 | .23 | 1.2 | .190 | .58 |
| MAY 17... | .20 | 10 | 419 | 450 | .57 | 446 | <.10 | .08 | 5.0 | .300 | .92 |
| JUN 27... | .30 | 15 | 496 | 480 | .67 | 186 | .14 | .12 | 1.3 | .250 | -- |
| SEP 04... | .30 | 21 | 594 | 580 | .81 | 83 | <.10 | .03 | -- | -- | -- |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|-----------|---|---|--|--|---|---|---|--|---|---|---|
| OCT 17... | .150 | .120 | .37 | <10 | 3 | 110 | <1 | <1 | <3 | 3 | 14 |
| JAN 13... | .150 | .150 | .46 | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB 29... | .150 | .070 | .21 | 20 | 3 | 73 | 27 | <1 | <3 | 3 | 44 |
| MAY 17... | .080 | .040 | .12 | <10 | 2 | 200 | <1 | <1 | <3 | 2 | 12 |
| JUN 27... | .180 | .200 | .61 | -- | -- | -- | -- | -- | -- | -- | -- |
| SEP 04... | .030 | .040 | .12 | <10 | 5 | 150 | <1 | <1 | <3 | <1 | 4 |

RED RIVER OF THE NORTH BASIN

05059000 SHEYENNE RIVER NEAR KINDRED, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|---------------------|---|---|---|---|--|---|--|---|---|---|---|
| OCT 17... | 2 | 56 | 39 | <.1 | <10 | 7 | <1 | <1 | 300 | <6 | 14 |
| FEB 29... | 350 | 61 | 50 | <.1 | <10 | 1 | <1 | <1 | 310 | <6 | 11 |
| MAY 17... | 3 | 53 | 6 | <.1 | <10 | 2 | <1 | <1 | 300 | <6 | 17 |
| JUN SEP 04... | 5 | 64 | 24 | <.1 | <10 | 10 | <1 | <1 | 390 | <6 | 12 |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) |
|--------------|------|--|--|--|--|
| OCT 17... | 1300 | 112 | 25 | 7.6 | 89 |
| JAN 13... | 1015 | 153 | 23 | 9.5 | 97 |
| FEB 29... | 1040 | 140 | 10 | 3.8 | 92 |
| MAY 17... | 1315 | 394 | 166 | 177 | 92 |
| JUN 27... | 0940 | 139 | 105 | 39 | 92 |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| FEB | | | | | | | |
| 29... | 1130 | 4.00 | 3.3 | .0 | 699 | 7.9 | 7.7 |
| 29... | 1133 | 8.00 | 3.3 | .0 | 689 | 7.8 | 7.8 |
| 29... | 1136 | 12.0 | 3.3 | .0 | 693 | 7.9 | 7.6 |
| 29... | 1139 | 14.0 | 3.3 | .0 | 693 | 7.9 | 7.7 |
| 29... | 1142 | 18.0 | 3.3 | .0 | 694 | 8.0 | 7.6 |
| 29... | 1145 | 19.5 | 3.3 | .0 | 695 | 8.0 | 7.8 |
| 29... | 1148 | 21.0 | 3.3 | .0 | 695 | 8.0 | 7.7 |
| 29... | 1151 | 25.0 | 3.3 | .0 | 696 | 7.9 | 7.7 |
| 29... | 1154 | 29.0 | 3.3 | .0 | 697 | 7.9 | 7.6 |
| 29... | 1157 | 33.0 | 3.3 | .0 | 698 | 7.9 | 7.5 |
| MAY | | | | | | | |
| 17... | 1330 | 6.00 | 1.6 | 18.4 | 638 | -- | 9.0 |
| 17... | 1332 | 6.00 | 3.3 | 18.2 | 643 | -- | 9.1 |
| 17... | 1334 | 9.00 | 1.6 | 18.2 | 644 | -- | 9.2 |
| 17... | 1336 | 9.00 | 3.3 | 18.2 | 644 | -- | 9.2 |
| 17... | 1338 | 12.0 | 1.6 | 18.2 | 646 | -- | 9.2 |
| 17... | 1341 | 12.0 | 3.3 | 18.2 | 645 | -- | 9.2 |
| 17... | 1343 | 15.0 | 1.6 | 18.2 | 647 | -- | 9.2 |
| 17... | 1345 | 15.0 | 3.3 | 18.2 | 647 | -- | 9.1 |
| 17... | 1347 | 18.0 | 1.6 | 18.2 | 647 | -- | 9.1 |
| 17... | 1350 | 18.0 | 3.3 | 18.2 | 647 | -- | 9.2 |
| 17... | 1352 | 21.0 | 1.6 | 18.2 | 648 | -- | 9.2 |
| 17... | 1354 | 21.0 | 3.3 | 18.2 | 647 | -- | 9.1 |
| 17... | 1356 | 21.0 | 6.6 | 18.2 | 647 | -- | 9.1 |
| 17... | 1358 | 24.0 | 1.6 | 18.2 | 648 | -- | 9.2 |

05059000 SHEYENNE RIVER NEAR KINDRED, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|--|
| MAY | | | | | | |
| 17... | 1400 | 24.0 | 3.3 | 18.2 | 648 | 9.1 |
| 17... | 1402 | 24.0 | 6.6 | 18.2 | 648 | 9.0 |
| 17... | 1405 | 27.0 | 1.6 | 18.2 | 648 | 9.2 |
| 17... | 1407 | 27.0 | 3.3 | 18.2 | 648 | 9.1 |
| 17... | 1410 | 27.0 | 6.6 | 18.2 | 648 | 9.0 |
| 17... | 1412 | 30.0 | 1.6 | 18.2 | 648 | 9.1 |
| 17... | 1414 | 30.0 | 3.3 | 18.2 | 648 | 9.1 |
| 17... | 1416 | 30.0 | 6.6 | 18.2 | 648 | 9.1 |
| 17... | 1418 | 33.0 | 1.6 | 18.2 | 648 | 9.2 |
| 17... | 1420 | 33.0 | 3.3 | 18.2 | 648 | 9.1 |
| 17... | 1422 | 33.0 | 6.6 | 18.2 | 648 | 9.1 |
| 17... | 1424 | 36.0 | 1.6 | 18.2 | 649 | 9.1 |
| 17... | 1426 | 36.0 | 3.3 | 18.2 | 648 | 9.0 |
| 17... | 1429 | 39.0 | 1.6 | 18.2 | 648 | 9.1 |
| 17... | 1433 | 39.0 | 3.3 | 18.2 | 648 | 9.0 |
| 17... | 1435 | 42.0 | 1.6 | 18.2 | 649 | 9.1 |
| 17... | 1437 | 42.0 | 3.3 | 18.2 | 648 | 9.1 |
| 17... | 1440 | 45.0 | 1.6 | 18.2 | 649 | 9.0 |

RED RIVER OF THE NORTH BASIN

05059400 SHEYENNE RIVER NEAR HORACE, ND

LOCATION.--Lat 46°48'13", long 96°54'13", in NW¼NW¼ sec.5, T.138 N., R.49 W., Cass County, Hydrologic Unit 09020204, at bridge on county road 3 mi north and 0.1 mi east of Horace.

DRAINAGE AREA.--8,850 mi², approximately, of which about 5,780 mi² is probably noncontributing, including 3,800 mi² in closed basins.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--October 1979 to current year (gage heights and annual maximum discharge).

GAGE.--Water-stage recorder. Datum of gage is 888.94 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Flow regulated to a large degree by Lake Ashtabula (station 05057500) 241 mi upstream. Above 3,000 ft³/s overflow occurs upstream between Kindred and Horace. This overflow bypasses the station by flowing into the Maple River to the west and into the Wild Rice River to the east.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,070 ft³/s Apr. 12, 1984, determined from a hydrographic comparison with stations 05059000, Sheyenne River near Kindred, ND and 05059500, Sheyenne River at West Fargo, ND; maximum recorded gage height, 21.31 ft Mar. 22, 1983, ice jam; minimum not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,070 ft³/s Apr. 12, gage height, 17.01 ft; minimum not determined.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|------|------|------|-------|-------|-------|------|------|------|------|
| 1 | 5.01 | 6.62 | 6.82 | 7.55 | 7.07 | 8.09 | 19.89 | 10.60 | --- | 6.00 | 4.55 | 4.49 |
| 2 | 5.15 | 6.69 | 6.84 | 7.58 | 7.07 | 7.94 | 19.79 | 10.83 | --- | 6.03 | 4.51 | 4.50 |
| 3 | 5.30 | 6.62 | 7.03 | 7.60 | 7.07 | 7.83 | 19.42 | 11.01 | --- | 6.04 | 4.49 | 4.57 |
| 4 | 5.36 | 6.56 | 7.19 | 7.61 | 7.07 | 7.76 | 17.81 | 11.03 | 7.57 | 6.10 | 4.49 | 4.62 |
| 5 | 5.43 | 6.54 | 7.16 | 7.63 | 6.70 | 7.67 | 16.87 | 11.01 | --- | 6.14 | 4.49 | 4.39 |
| 6 | 5.42 | 6.56 | 7.10 | 7.64 | 6.91 | 7.60 | 16.65 | 11.02 | --- | 6.11 | 4.47 | 4.17 |
| 7 | 5.43 | 6.60 | 7.14 | 7.65 | 7.18 | 7.55 | 16.35 | 11.07 | --- | 6.01 | 4.47 | 4.58 |
| 8 | 5.42 | 6.61 | 7.25 | 7.68 | 7.26 | 7.51 | 16.46 | 11.09 | --- | 5.88 | 4.51 | 4.69 |
| 9 | 5.40 | 6.61 | 7.30 | 7.73 | 7.25 | 7.47 | 16.72 | 11.09 | --- | 5.79 | 4.48 | 4.65 |
| 10 | 5.39 | 6.60 | 7.31 | 7.78 | 7.22 | 7.43 | 16.91 | 10.82 | --- | 5.71 | 4.44 | 4.62 |
| 11 | 5.39 | 6.58 | 7.30 | 7.80 | 7.21 | 7.38 | 16.97 | 10.33 | 7.17 | 5.60 | 4.42 | 4.72 |
| 12 | 5.42 | 6.58 | 7.25 | 7.76 | 7.20 | 7.34 | 17.00 | 10.15 | --- | 5.49 | 4.38 | 4.74 |
| 13 | 5.61 | 6.58 | 7.28 | 7.59 | 7.15 | 7.32 | 16.86 | 10.06 | 6.71 | 5.34 | 4.37 | 4.79 |
| 14 | 5.69 | 6.58 | 7.30 | 7.26 | 7.10 | 7.32 | 16.47 | 9.99 | 7.11 | 5.24 | 4.39 | 4.84 |
| 15 | 5.76 | 6.60 | 7.36 | 6.98 | 7.14 | 7.32 | 15.89 | 9.94 | 7.80 | 5.16 | 4.40 | 4.88 |
| 16 | 5.87 | 6.62 | --- | 6.84 | 7.29 | 7.32 | 15.11 | 9.83 | 8.32 | 5.15 | 4.37 | 4.92 |
| 17 | 5.89 | 6.64 | --- | 6.78 | 7.41 | 7.37 | 14.29 | 9.36 | 8.51 | 5.16 | 4.33 | 4.99 |
| 18 | 5.94 | 6.65 | --- | --- | 7.57 | 7.41 | 13.49 | --- | 8.51 | 5.16 | 4.29 | 5.01 |
| 19 | 6.00 | 6.65 | --- | --- | 7.82 | 7.44 | 12.95 | --- | 8.29 | 5.09 | 4.27 | 5.00 |
| 20 | 6.02 | 6.67 | --- | --- | 8.06 | 7.47 | 12.52 | --- | 7.63 | 5.06 | 4.25 | 4.97 |
| 21 | 6.02 | 6.67 | --- | 6.82 | 8.11 | 7.49 | 12.12 | 8.47 | 6.95 | 5.01 | 4.25 | 4.92 |
| 22 | 6.02 | 6.67 | --- | 6.75 | 8.07 | 7.53 | 11.78 | --- | 6.53 | 4.99 | 4.24 | 4.85 |
| 23 | 6.03 | 6.73 | --- | 6.72 | 7.97 | 7.64 | 11.45 | --- | 6.42 | 4.91 | 4.26 | 4.83 |
| 24 | 6.04 | 6.53 | --- | 6.75 | 7.90 | 8.05 | 10.95 | --- | 6.39 | 4.69 | 4.26 | 4.85 |
| 25 | 6.24 | 6.38 | 7.28 | 6.79 | 7.90 | 9.41 | 10.57 | --- | 6.28 | 4.72 | 4.24 | 4.87 |
| 26 | 6.51 | 6.68 | 7.31 | 6.87 | 7.98 | 12.80 | 10.44 | --- | 6.20 | 4.66 | 4.24 | 4.85 |
| 27 | 6.55 | 6.52 | 7.32 | 6.92 | 8.02 | 14.36 | 10.39 | --- | 6.12 | 4.64 | 4.24 | 4.80 |
| 28 | 6.55 | 6.55 | 7.36 | 6.97 | 8.06 | 15.88 | 10.40 | 8.87 | 6.02 | 4.62 | 4.20 | 4.77 |
| 29 | 6.55 | 6.78 | 7.31 | 7.01 | 8.13 | 16.92 | 10.51 | --- | 5.96 | 4.60 | 4.16 | 4.77 |
| 30 | 6.54 | 6.91 | 7.45 | 7.05 | --- | 17.94 | 10.56 | --- | 5.94 | 4.52 | 4.19 | 4.73 |
| 31 | 6.53 | --- | 7.52 | 7.07 | --- | 19.07 | --- | --- | --- | 4.59 | 4.41 | --- |
| MEAN | 5.82 | 6.62 | --- | --- | 7.48 | 9.28 | 14.59 | --- | --- | 5.30 | 4.36 | 4.75 |
| MAX | 6.55 | 6.91 | --- | --- | 8.13 | 19.07 | 19.89 | --- | --- | 6.14 | 4.55 | 5.01 |
| MIN | 5.01 | 6.38 | --- | --- | 6.70 | 7.32 | 10.39 | --- | --- | 4.52 | 4.16 | 4.17 |

RED RIVER OF THE NORTH BASIN
05059400 SHEYENNE RIVER NEAR HORACE, ND

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WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | |
|--------------|-------------------|---|---|--|---|---|--|---|---|--|---|---|
| APR 03... | 0940 | 2060 | 400 | 7.5 | 3.5 | .5 | 140 | 0 | 34 | 13 | 25 | |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINEITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
| APR 03... | 26 | 1 | 10 | 140 | 8.4 | 66 | 7.4 | .10 | 9.9 | 250 | 250 | .34 |
| DATE | DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | |
| APR 03... | 1390 | 3 | 70 | 70 | 0 | 20 | 210 | .0 | 2 | 0 | 100 | |

RED RIVER OF THE NORTH BASIN

05059500 SHEYENNE RIVER AT WEST FARGO, ND

LOCATION.--Lat 46°53'28", long 96°54'24", in SE1/4SE1/4 sec.31, T.140 N., R.49 W., Cass County, Hydrologic Unit 09020204, on right bank at downstream side of county highway bridge, 1 mi north of West Fargo, 3 mi upstream from Maple River, and at mile 24.5.

DRAINAGE AREA.--8,870 mi², approximately, of which about 5,780 mi² is probably noncontributing, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to November 1902 (gage heights only), April 1903 to October 1905, March to August 1919, September 1929 to current year. Published as "at or near Haggart" 1902-7, 1919. Records for March to November 1902 and November 1905 to June 1907, published in WSP 100, 171, 207, and 245, have been found to be unreliable and should not be used. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1388: 1904(M). WSP 1728: Drainage area. See also "PERIOD OF RECORD."

GAGE.--Water-stage recorder. Datum of gage is 877.19 ft National Geodetic Vertical Datum of 1929. June 27, 1933, to September 1969 on left bank about 600 ft downstream on unimproved channel at same datum. See WSP 1728 or 1913 for history of changes prior to June 27, 1933.

REMARKS.--Records fair. Flow regulated to a large degree by Lake Ashtabula (station 05057500) 246 mi upstream. Above 3,000 ft³/s overflow that occurs upstream from the gaging station Sheyenne River near Horace (station 05059400) bypasses this station by flowing into the Maple River drainage to the west or into the Wild Rice River drainage to the east. This overflow is not included in the flow for this station. During some years, flow is diverted from just above the station into the Red River of the North in order to maintain adequate supply for municipal uses. Figures of daily discharge do not include this diversion.

AVERAGE DISCHARGE (ADJUSTED).--57 years (water years 1904-5, 1930-84), 178 ft³/s, 129,000 acre-ft/yr; median of yearly mean discharges, 149 ft³/s, 108,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,480 ft³/s Apr. 21, 1979, gage height, 22.12 ft, backwater from Red and/or Maple Rivers; maximum gage height, 22.25 ft July 5, 1975, backwater from Red and/or Maple Rivers; minimum daily, 1.0 ft³/s Sept. 23, 1976, caused by diversion to Red River of the North.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,070 ft³/s Apr. 12, gage height, 15.60 ft; maximum gage height, 20.20 ft Apr. 1, backwater from ice; minimum daily, 20 ft³/s Aug. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|------|------|------|-------|-------|-------|-------|-------|--------|------|
| 1 | 61 | 206 | 130 | 155 | 105 | 155 | 1220 | 673 | 404 | 128 | 42 | 34 |
| 2 | 64 | 219 | 125 | 157 | 104 | 148 | 1360 | 704 | 375 | 128 | 38 | 36 |
| 3 | 74 | 214 | 130 | 165 | 101 | 142 | 1470 | 737 | 315 | 126 | 36 | 34 |
| 4 | 79 | 206 | 140 | 172 | 95 | 138 | 1660 | 745 | 272 | 145 | 36 | 40 |
| 5 | 84 | 202 | 142 | 170 | 87 | 132 | 1880 | 739 | 252 | 137 | 36 | 41 |
| 6 | 86 | 202 | 136 | 175 | 81 | 130 | 1960 | 740 | 239 | 132 | 35 | 24 |
| 7 | 86 | 207 | 135 | 175 | 80 | 128 | 2020 | 743 | 229 | 129 | 33 | 26 |
| 8 | 86 | 210 | 140 | 178 | 80 | 126 | 1970 | 745 | 518 | 160 | 37 | 43 |
| 9 | 84 | 211 | 145 | 180 | 81 | 122 | 2010 | 741 | 568 | 202 | 36 | 44 |
| 10 | 84 | 210 | 150 | 182 | 82 | 120 | 2050 | 697 | 346 | 104 | 34 | 37 |
| 11 | 84 | 207 | 145 | 185 | 82 | 118 | 2030 | 640 | 238 | 101 | 32 | 42 |
| 12 | 83 | 206 | 144 | 177 | 83 | 116 | 2040 | 609 | 201 | 89 | 31 | 50 |
| 13 | 91 | 207 | 140 | 175 | 83 | 115 | 2030 | 592 | 186 | 79 | 30 | 47 |
| 14 | 104 | 207 | 135 | 155 | 87 | 110 | 1940 | 573 | 210 | 72 | 30 | 50 |
| 15 | 113 | 208 | 146 | 132 | 96 | 109 | 1820 | 543 | 277 | 70 | 31 | 53 |
| 16 | 126 | 211 | 145 | 124 | 108 | 108 | 1650 | 514 | 346 | 67 | 30 | 55 |
| 17 | 126 | 213 | 142 | 121 | 112 | 108 | 1450 | 485 | 371 | 69 | 29 | 59 |
| 18 | 130 | 212 | 143 | 120 | 119 | 108 | 1260 | 460 | 368 | 67 | 26 | 61 |
| 19 | 142 | 204 | 142 | 120 | 128 | 108 | 1140 | 401 | 364 | 65 | 25 | 61 |
| 20 | 143 | 190 | 148 | 120 | 145 | 115 | 1060 | 367 | 295 | 62 | 24 | 59 |
| 21 | 143 | 190 | 146 | 118 | 155 | 118 | 979 | 371 | 218 | 61 | 25 | 57 |
| 22 | 142 | 178 | 140 | 117 | 157 | 122 | 911 | 374 | 176 | 116 | 23 | 54 |
| 23 | 141 | 172 | 138 | 114 | 150 | 130 | 848 | 408 | 157 | 113 | 23 | 53 |
| 24 | 147 | 163 | 138 | 111 | 142 | 150 | 773 | 431 | 155 | 111 | 24 | 55 |
| 25 | 154 | 161 | 142 | 111 | 140 | 210 | 698 | 427 | 147 | 117 | 23 | 55 |
| 26 | 193 | 175 | 140 | 113 | 144 | 385 | 672 | 424 | 140 | 46 | 23 | 54 |
| 27 | 202 | 185 | 139 | 112 | 150 | 650 | 662 | 422 | 136 | 46 | 23 | 52 |
| 28 | 203 | 178 | 145 | 110 | 152 | 920 | 654 | 426 | 129 | 47 | 22 | 50 |
| 29 | 203 | 162 | 147 | 110 | 155 | 1080 | 662 | 435 | 129 | 46 | 21 | 49 |
| 30 | 202 | 150 | 149 | 109 | --- | 1140 | 671 | 440 | 129 | 42 | 20 | 48 |
| 31 | 202 | --- | 150 | 107 | --- | 1170 | --- | 434 | --- | 42 | 23 | --- |
| TOTAL | 3862 | 5866 | 4377 | 4370 | 3284 | 8531 | 41550 | 17040 | 7890 | 2919 | 901 | 1423 |
| MEAN | 125 | 196 | 141 | 141 | 113 | 275 | 1385 | 550 | 263 | 94.2 | 29.1 | 47.4 |
| MAX | 203 | 219 | 150 | 185 | 157 | 1170 | 2050 | 745 | 568 | 202 | 42 | 61 |
| MIN | 61 | 150 | 125 | 107 | 80 | 108 | 654 | 367 | 129 | 42 | 20 | 24 |
| AC-FT | 7660 | 11640 | 8680 | 8670 | 6510 | 16920 | 82410 | 33800 | 15650 | 5790 | 1790 | 2820 |
| CAL YR 1983 | TOTAL | 123290 | | MEAN | 338 | MAX | 2060 | MIN | 35 | AC-FT | 244500 | |
| WTR YR 1984 | TOTAL | 102013 | | MEAN | 279 | MAX | 2050 | MIN | 20 | AC-FT | 202300 | |

RED RIVER OF THE NORTH BASIN

93

05059500 SHEYENNE RIVER AT WEST FARGO, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 06... | 1605 | 86 | 1010 | -- | 12.5 | 11.0 | -- | -- | -- | -- | -- | |
| NOV 17... | 1535 | 214 | 1080 | -- | 1.0 | 2.0 | -- | -- | -- | -- | -- | |
| JAN 13... | 1345 | 175 | 1700 | -- | -8.5 | .0 | -- | -- | -- | -- | -- | |
| FEB 16... | 1525 | 108 | 995 | -- | 2.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 30... | 1355 | 1170 | 475 | 7.6 | 7.0 | 3.0 | 160 | 1 | 38 | 16 | 33 | |
| APR 05... | 1410 | 1880 | 860 | -- | 14.5 | 3.5 | -- | -- | -- | -- | -- | |
| APR 13... | 1145 | 2030 | 555 | -- | 7.5 | 3.0 | -- | -- | -- | -- | -- | |
| MAY 18... | 1230 | 463 | 698 | -- | 26.5 | 17.5 | -- | -- | -- | -- | -- | |
| JUN 26... | 1535 | 135 | 825 | -- | 23.0 | 22.5 | -- | -- | -- | -- | -- | |
| JUL 27... | 1345 | 44 | 905 | 8.3 | 30.5 | 27.0 | 350 | 89 | 84 | 33 | 61 | |
| AUG 28... | 1410 | 22 | 815 | -- | 40.0 | 26.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 29 | 1 | 10 | 200 | .000 | 160 | 7.8 | 69 | 7.8 | .20 | 9.1 | 286 |
| JUL 27... | 27 | 1 | 9.6 | 310 | .000 | 260 | 2.5 | 140 | 28 | .30 | 22 | 570 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 280 | .39 | 903 | 1 | 120 | 100 | 4 | 34 | 200 | .0 | 0 | 140 |
| JUL 27... | 530 | .78 | 68 | 8 | 160 | 10 | 1 | 60 | 50 | .2 | 0 | 420 |

RED RIVER OF THE NORTH BASIN

05059600 MAPLE RIVER NEAR HOPE, ND

LOCATION.--Lat 47°19'30", long 97°47'25", in NW1/4NW1/4 sec.4, T.144 N., R.56 W., Steele County, Hydrologic Unit 09020205, 100 ft downstream from box culvert on State Highway 38, 500 ft east of the intersection of State Highway 32 and 38, and 3 mi west of Hope.

DRAINAGE AREA.--20.2 mi², of which about 2.8 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1964 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Datum of gage is 1,296.62 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--18 years (water years 1965-82), 2.82 ft³/s, 2,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 900 ft³/s Apr. 18, 1979, gage height, 5.86 ft, backwater from ice; no flow for many months each year.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 300 ft³/s Mar. 24, gage height, 4.81 ft, backwater from ice; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|--------|-------|-------|-----|-----|-----|-----|
| 1 | | | | | | .00 | 35 | 4.0 | .00 | .00 | .00 | .00 |
| 2 | | | | | | .00 | 28 | 3.2 | .00 | .00 | .00 | .00 |
| 3 | | | | | | .00 | 22 | 2.6 | .00 | .00 | .00 | .00 |
| 4 | | | | | | .00 | 18 | 2.2 | .00 | .00 | .00 | .00 |
| 5 | | | | | | .00 | 15 | 2.1 | .00 | .00 | .00 | .00 |
| 6 | | | | | | .00 | 13 | 1.9 | .00 | .00 | .00 | .00 |
| 7 | | | | | | .00 | 10 | 1.8 | .00 | .00 | .00 | .00 |
| 8 | | | | | | .00 | 8.4 | 1.4 | .00 | .00 | .00 | .00 |
| 9 | | | | | | .00 | 7.0 | 1.1 | .00 | .00 | .00 | .00 |
| 10 | | | | | | .00 | 5.7 | 1.0 | .00 | .00 | .00 | .00 |
| 11 | | | | | | .00 | 5.4 | .88 | .00 | .00 | .00 | .00 |
| 12 | | | | | | .00 | 6.3 | .73 | .00 | .00 | .00 | .00 |
| 13 | | | | | | .00 | 8.9 | .64 | .00 | .00 | .00 | .00 |
| 14 | | | | | | .00 | 12 | .57 | .00 | .00 | .00 | .00 |
| 15 | | | | | | .00 | 9.2 | .48 | .00 | .00 | .00 | .00 |
| 16 | | | | | | .00 | 6.5 | .39 | .00 | .00 | .00 | .00 |
| 17 | | | | | | .00 | 4.7 | .28 | .00 | .00 | .00 | .00 |
| 18 | | | | | | .00 | 3.6 | .16 | .00 | .00 | .00 | .00 |
| 19 | | | | | | .00 | 2.8 | .08 | .00 | .00 | .00 | .00 |
| 20 | | | | | | .00 | 2.3 | .04 | .00 | .00 | .00 | .00 |
| 21 | | | | | | .00 | 1.9 | .04 | .00 | .00 | .00 | .00 |
| 22 | | | | | | .10 | 1.5 | .02 | .00 | .00 | .00 | .00 |
| 23 | | | | | | 2.0 | 1.4 | .00 | .00 | .00 | .00 | .00 |
| 24 | | | | | | 175 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 25 | | | | | | 200 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 26 | | | | | | 115 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 27 | | | | | | 85 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 28 | | | | | | 70 | 1.5 | .00 | .00 | .00 | .00 | .00 |
| 29 | | | | | | 60 | 2.0 | .00 | .00 | .00 | .00 | .00 |
| 30 | | | | | | 50 | 3.0 | .00 | .00 | .00 | .00 | .00 |
| 31 | | | | | | 40 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | | | | | | 797.10 | 239.9 | 25.61 | .00 | .00 | .00 | .00 |
| MEAN | | | | | | 25.7 | 8.00 | .83 | .00 | .00 | .00 | .00 |
| MAX | | | | | | 200 | 35 | 4.0 | .00 | .00 | .00 | .00 |
| MIN | | | | | | .00 | 1.2 | .00 | .00 | .00 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

95

05059600 MAPLE RIVER NEAR HOPE, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| MAR 28... | 1025 | 76 | 455 | 7.6 | 1.0 | 2.5 | 180 | 73 | 41 | 18 | 26 | |
| MAY 08... | 1405 | 1.3 | 2120 | -- | 8.0 | 9.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 28... | 23 | .9 | 8.5 | 130 | .000 | 100 | 5.0 | 100 | 13 | .10 | 15 | 289 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 28... | 280 | .39 | 59 | 2 | 40 | 110 | 0 | 30 | 50 | .4 | 0 | 120 |

RED RIVER OF THE NORTH BASIN

05059700 MAPLE RIVER NEAR ENDERLIN, ND

LOCATION.--Lat 46°37'18", long 97°34'25", on west line sec.2, T.136 N., R.55 W., Ransom County, Hydrologic Unit 09020205, on left bank 25 ft downstream from county highway bridge, 1 mi downstream from South Branch, and 1.2 mi east of Enderlin.

DRAINAGE AREA.--843 mi², of which about 47 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1956 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,056.72 ft National Geodetic Vertical Datum of 1929. Sept. 21, 1956 to June 9, 1969, recording gage on right bank at same datum. Prior to Sept. 20, 1956, nonrecording gage at site 25 ft upstream at same datum.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--28 years, 38.1 ft³/s, 27,600 acre-ft/yr; median of yearly mean discharges, 26 ft³/s, 18,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,610 ft³/s June 30, 1975, gage height, 15.41 ft; minimum daily, 0.1 ft³/s Dec. 7-9, 1963.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 2,590 ft³/s Mar. 28, gage height 10.95 ft, backwater from ice; minimum daily discharge, 1.2 ft³/s Sept. 1-6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------------|---------|-------|------|------|------|--------|-------|-------|-------|-------|-------|------|
| 1 | 2.6 | 4.3 | 2.8 | 2.4 | 2.0 | 3.2 | 1180 | 76 | 3.6 | 3.1 | 2.3 | 1.2 |
| 2 | 2.0 | 4.2 | 2.8 | 2.4 | 2.0 | 2.9 | 994 | 69 | 3.4 | 2.8 | 2.5 | 1.2 |
| 3 | 2.0 | 4.2 | 2.8 | 2.4 | 2.0 | 2.9 | 844 | 62 | 3.3 | 2.6 | 2.5 | 1.2 |
| 4 | 2.0 | 4.2 | 2.8 | 2.4 | 1.9 | 2.8 | 720 | 56 | 3.4 | 2.7 | 2.6 | 1.2 |
| 5 | 1.7 | 4.4 | 2.7 | 2.4 | 1.9 | 2.4 | 621 | 54 | 4.0 | 2.9 | 2.8 | 1.2 |
| 6 | 1.6 | 4.1 | 2.7 | 2.3 | 1.9 | 2.3 | 539 | 52 | 5.9 | 3.1 | 2.6 | 1.2 |
| 7 | 1.7 | 4.9 | 2.7 | 2.3 | 1.9 | 2.2 | 478 | 48 | 5.8 | 3.0 | 2.6 | 1.3 |
| 8 | 1.9 | 4.5 | 2.7 | 2.3 | 1.9 | 2.1 | 406 | 46 | 5.7 | 3.0 | 2.5 | 1.3 |
| 9 | 2.8 | 3.0 | 2.7 | 2.2 | 1.9 | 2.0 | 347 | 43 | 5.7 | 2.7 | 2.4 | 1.3 |
| 10 | 2.0 | 2.8 | 2.7 | 2.2 | 1.9 | 2.0 | 311 | 41 | 5.3 | 2.4 | 1.8 | 1.3 |
| 11 | 2.0 | 2.8 | 2.7 | 2.2 | 1.9 | 2.0 | 271 | 37 | 5.1 | 2.6 | 2.2 | 1.3 |
| 12 | 2.3 | 2.8 | 2.6 | 2.2 | 1.9 | 2.0 | 246 | 32 | 5.0 | 3.6 | 1.8 | 1.3 |
| 13 | 2.5 | 3.1 | 2.6 | 2.2 | 2.4 | 2.0 | 247 | 29 | 4.6 | 3.6 | 1.8 | 1.3 |
| 14 | 2.6 | 3.2 | 2.6 | 2.2 | 2.4 | 2.0 | 253 | 25 | 4.4 | 3.5 | 1.6 | 1.3 |
| 15 | 2.6 | 3.0 | 2.6 | 2.2 | 2.3 | 2.0 | 253 | 21 | 4.4 | 3.0 | 1.7 | 1.3 |
| 16 | 3.0 | 2.6 | 2.6 | 2.2 | 2.4 | 2.0 | 238 | 19 | 4.3 | 3.1 | 1.6 | 1.3 |
| 17 | 2.9 | 3.8 | 2.6 | 2.1 | 2.3 | 1.9 | 212 | 16 | 3.9 | 3.2 | 1.6 | 1.3 |
| 18 | 2.7 | 5.1 | 2.6 | 2.1 | 2.3 | 1.9 | 183 | 14 | 3.5 | 4.3 | 1.5 | 1.3 |
| 19 | 2.7 | 5.2 | 2.6 | 2.1 | 2.4 | 2.2 | 153 | 12 | 3.6 | 3.3 | 1.4 | 1.3 |
| 20 | 2.7 | 5.6 | 2.6 | 2.0 | 2.5 | 4.0 | 127 | 11 | 3.7 | 3.0 | 1.5 | 1.3 |
| 21 | 2.5 | 5.3 | 2.5 | 2.0 | 2.7 | 15 | 106 | 11 | 3.1 | 2.8 | 1.6 | 1.3 |
| 22 | 2.5 | 4.9 | 2.5 | 2.0 | 3.5 | 20 | 91 | 10 | 3.4 | 3.1 | 1.5 | 1.3 |
| 23 | 2.5 | 3.4 | 2.5 | 2.0 | 5.0 | 50 | 81 | 9.1 | 3.1 | 2.8 | 1.6 | 1.3 |
| 24 | 2.5 | 3.2 | 2.5 | 2.0 | 7.5 | 282 | 72 | 7.8 | 2.8 | 2.7 | 1.6 | 1.3 |
| 25 | 4.0 | 3.2 | 2.5 | 2.0 | 5.7 | 512 | 66 | 6.8 | 3.7 | 2.7 | 1.9 | 1.3 |
| 26 | 4.4 | 3.0 | 2.5 | 2.0 | 4.5 | 697 | 63 | 6.3 | 4.0 | 2.7 | 1.4 | 1.3 |
| 27 | 4.5 | 3.1 | 2.5 | 2.0 | 3.9 | 1790 | 71 | 5.7 | 3.6 | 2.5 | 1.7 | 1.3 |
| 28 | 4.4 | 3.1 | 2.5 | 2.0 | 3.6 | 2070 | 83 | 4.9 | 3.5 | 2.7 | 1.5 | 1.3 |
| 29 | 4.6 | 2.9 | 2.5 | 2.0 | 3.4 | 1830 | 84 | 4.4 | 2.9 | 2.6 | 1.3 | 1.3 |
| 30 | 5.5 | 2.9 | 2.5 | 2.0 | --- | 1330 | 81 | 4.1 | 2.6 | 2.6 | 1.4 | 1.3 |
| 31 | 5.1 | --- | 2.5 | 2.0 | --- | 1270 | --- | 3.7 | --- | 2.7 | 1.7 | --- |
| TOTAL | 88.8 | 112.8 | 81.0 | 66.8 | 81.9 | 9912.8 | 9421 | 836.8 | 121.3 | 91.4 | 58.5 | 38.4 |
| MEAN | 2.86 | 3.76 | 2.61 | 2.15 | 2.82 | 320 | 314 | 27.0 | 4.04 | 2.95 | 1.89 | 1.28 |
| MAX | 5.5 | 5.6 | 2.8 | 2.4 | 7.5 | 2070 | 1180 | 76 | 5.9 | 4.3 | 2.8 | 1.3 |
| MIN | 1.6 | 2.6 | 2.5 | 2.0 | 1.9 | 1.9 | 63 | 3.7 | 2.6 | 2.4 | 1.3 | 1.2 |
| AC-FT | 176 | 224 | 161 | 132 | 162 | 19660 | 18690 | 1660 | 241 | 181 | 116 | 76 |
| CAL YR 1983 TOTAL | 31446.7 | | | MEAN | 86.2 | MAX | 2780 | MIN | 1.1 | AC-FT | 62370 | |
| WTR YR 1984 TOTAL | 20911.5 | | | MEAN | 57.1 | MAX | 2070 | MIN | 1.2 | AC-FT | 41480 | |

RED RIVER OF THE NORTH BASIN

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05059700 MAPLE RIVER NEAR ENDERLIN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 04... | 1155 | 2.0 | 650 | -- | 9.0 | 12.5 | -- | -- | -- | -- | -- | |
| NOV 22... | 0915 | 5.0 | 1450 | -- | -3.5 | 1.5 | -- | -- | -- | -- | -- | |
| JAN 03... | 1700 | 2.4 | 1750 | -- | 4.0 | 3.5 | -- | -- | -- | -- | -- | |
| FEB 13... | 1650 | 1.9 | 1900 | -- | .5 | 3.0 | -- | -- | -- | -- | -- | |
| MAR 23... | 1335 | 29 | 1900 | -- | 6.0 | 1.0 | -- | -- | -- | -- | -- | |
| MAR 28... | 1515 | 1980 | 415 | 7.8 | 6.0 | 1.0 | 130 | 49 | 33 | 12 | 15 | |
| MAY 09... | 1000 | 43 | 1550 | -- | 10.5 | 10.0 | -- | -- | -- | -- | -- | |
| JUN 25... | 1540 | 4.4 | 700 | -- | 35.0 | 24.0 | -- | -- | -- | -- | -- | |
| JUL 12... | 1245 | 3.5 | 1670 | -- | 36.0 | 23.0 | -- | -- | -- | -- | -- | |
| AUG 29... | 1025 | 1.2 | 1530 | 7.9 | 22.0 | 19.0 | 760 | 382 | 200 | 63 | 71 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 28... | 19 | .6 | 8.9 | 100 | .000 | 83 | 2.5 | 72 | 7.4 | .10 | 9.2 | 221 |
| AUG 29... | 17 | 1 | 12 | 460 | .000 | 380 | 9.2 | 450 | 53 | .20 | 26 | 1120 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 28... | 210 | .30 | 1180 | 1 | 60 | 110 | -- | 25 | 130 | .1 | 0 | 6 |
| AUG 29... | 1100 | 1.5 | 3.7 | 4 | 170 | 40 | 0 | 110 | 1000 | .0 | 1 | 940 |

RED RIVER OF THE NORTH BASIN

05060500 RUSH RIVER AT AMENIA, ND

LOCATION.--Lat 47°01'00", long 97°12'50", in SE1/4NW1/4 sec.24, T.141 N., R.52 W., Cass County, Hydrologic Unit 09020204, on left bank on downstream side of bridge on State Highway 18, 0.6 mi north of Amenia.

DRAINAGE AREA.--116 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1946 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 943 ft, from topographic map. See WSP 1913 for history of changes prior to June 10, 1961.

REMARKS.--Records good.

AVERAGE DISCHARGE.--38 years, 9.46 ft³/s, 6,850 acre-ft/yr; median of yearly mean discharges, 6.2 ft³/s, 4,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,490 ft³/s Apr. 19, 1979, gage height, 10.37 ft; maximum gage height, 12.15 ft Mar. 23, 1966, backwater from ice; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 27 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Mar. 25 | -- | 503 | a*10.26 | Apr. 13 | 2215 | 120 | 6.22 |
| Mar. 29 | -- | *987 | Ice jam | June 9 | 0900 | 98 | 6.33 |

No flow for several months.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|------|---------|--------|--------|--------|-------|-------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 197 | 17 | .01 | .17 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 194 | 14 | .01 | .77 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 147 | 10 | .00 | 10 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 110 | 9.3 | .00 | 11 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 83 | 8.5 | .01 | 6.0 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 58 | 8.8 | .34 | 2.0 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 41 | 10 | 60 | .47 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 31 | 9.9 | 75 | 1.1 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | 26 | 9.5 | 96 | 2.6 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | 23 | 9.1 | 81 | 1.4 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | 28 | 9.7 | 52 | .38 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 46 | 9.0 | 40 | .07 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 94 | 7.1 | 31 | .05 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | 102 | 5.5 | 27 | .01 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | 77 | 5.8 | 24 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | 58 | 2.1 | 23 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | 43 | .92 | 21 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | 32 | .57 | 19 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .04 | 23 | .46 | 18 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .25 | 19 | .30 | 17 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | 2.1 | 15 | .13 | 15 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | 5.9 | 13 | .16 | 11 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | 16 | 12 | .15 | 17 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | 74 | 9.8 | .11 | 11 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 362 | 8.5 | .08 | 5.1 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | 708 | 9.3 | .07 | 2.8 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | 738 | 13 | .05 | 2.2 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 800 | 18 | .05 | .57 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 796 | 24 | .04 | .11 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 488 | 21 | .04 | .14 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 211 | --- | .03 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 4201.29 | 1575.6 | 148.46 | 649.29 | 36.02 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 136 | 52.5 | 4.79 | 21.6 | 1.16 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 800 | 197 | .17 | .96 | .11 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | 8.5 | .03 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | 8330 | 3130 | 294 | 1290 | 71 | .00 | .00 |
| CAL YR 1983 | TOTAL | 3298.58 | | MEAN | 9.04 | MAX | 335 | MIN | .00 | AC-FT | 6540 | |
| WTR YR 1984 | TOTAL | 6610.66 | | MEAN | 18.1 | MAX | 800 | MIN | .00 | AC-FT | 13110 | |

RED RIVER OF THE NORTH BASIN
05060500 RUSH RIVER AT AMENIA, ND
WATER-QUALITY RECORDS

99

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|--------------|---|---|---|--|---|---|--|---|---|---|--|
| MAR 26... | 1535 | 731 | 225 | 7.7 | 5.0 | .5 | 100 | 26 | 27 | 8.5 | 8.0 |
| APR 02... | 1545 | 185 | 615 | -- | 11.0 | 6.0 | -- | -- | -- | -- | -- |
| MAY 09... | 1255 | 9.5 | 1780 | -- | 14.0 | 11.0 | -- | -- | -- | -- | -- |
| JUN 13... | 0850 | 31 | -- | -- | 16.0 | 18.0 | -- | -- | -- | -- | -- |
| JUL 10... | 1150 | 1.4 | 830 | -- | 23.5 | 22.0 | -- | -- | -- | -- | -- |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINEITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SiO2) | RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) |
| MAR 26... | 13 | .4 | 8.0 | 77 | 3.0 | 37 | 2.3 | .10 | 8.1 | 137 | 150 |
| DATE | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
| MAR 26... | .19 | 270 | 2 | 50 | 160 | 15 | 150 | .5 | 1 | 0 | 110 |

RED RIVER OF THE NORTH BASIN

05060510 (revised) CASS COUNTY DRAIN 52 NEAR AMENIA, ND

LOCATION.--Lat 46°58'41", long 97°11'52", in SE1/4SE1/4SE1/4 sec.36, T.141 N., R.52 W., Cass County, Hydrologic Unit 09020204, on left bank 40 ft upstream on county road 0.7 mi south and 1 mi east of Amenia.

DRAINAGE AREA.--13.5 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1980 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Altitude of gage is 943 ft, from topographic map.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 223 ft³/s Apr. 2, 1982, gage height, 4.58 ft; maximum gage height, 7.05 ft Mar. 25, 1984, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 199 ft³/s Mar. 26, gage height, 5.17 ft, backwater from ice; maximum gage height, 7.05 ft Mar. 25, backwater from ice. No flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|--------|-------|-----|-------|-----|-----|-----|
| 1 | | | | | | .00 | 9.0 | .08 | .00 | .00 | .00 | |
| 2 | | | | | | .00 | 7.3 | .02 | .00 | .00 | .00 | |
| 3 | | | | | | .00 | 5.4 | .00 | .00 | .00 | .00 | |
| 4 | | | | | | .00 | 3.9 | .00 | .00 | .00 | .00 | |
| 5 | | | | | | .00 | 3.9 | .00 | .00 | .00 | .00 | |
| 6 | | | | | | .00 | 3.5 | .00 | 1.0 | .00 | .00 | |
| 7 | | | | | | .00 | 2.6 | .00 | 13 | .00 | .00 | |
| 8 | | | | | | .00 | 1.6 | .00 | 19 | .00 | .00 | |
| 9 | | | | | | .00 | 1.2 | .00 | 14 | .00 | .00 | |
| 10 | | | | | | .00 | .88 | .00 | 3.6 | .00 | .00 | |
| 11 | | | | | | .00 | .78 | .00 | 1.0 | .00 | .00 | |
| 12 | | | | | | .00 | 1.3 | .00 | .54 | .00 | .00 | |
| 13 | | | | | | .00 | 2.4 | .00 | .56 | .00 | .00 | |
| 14 | | | | | | .00 | 1.1 | .00 | .18 | .00 | .00 | |
| 15 | | | | | | .00 | .62 | .00 | .06 | .00 | .00 | |
| 16 | | | | | | .00 | .38 | .00 | .02 | .00 | .00 | |
| 17 | | | | | | .00 | .35 | .00 | .00 | .00 | .00 | |
| 18 | | | | | | .00 | .32 | .00 | .00 | .00 | .00 | |
| 19 | | | | | | .00 | .28 | .00 | .00 | .00 | .00 | |
| 20 | | | | | | .00 | .25 | .00 | .00 | .00 | .00 | |
| 21 | | | | | | .00 | .22 | .00 | .00 | .00 | .00 | |
| 22 | | | | | | .00 | .20 | .00 | .00 | .00 | .00 | |
| 23 | | | | | | .00 | .18 | .00 | .00 | .00 | .00 | |
| 24 | | | | | | .00 | .15 | .00 | .00 | .00 | .00 | |
| 25 | | | | | | 39 | .15 | .00 | .00 | .00 | .00 | |
| 26 | | | | | | 154 | .20 | .00 | .00 | .00 | .00 | |
| 27 | | | | | | 150 | .25 | .00 | .00 | .00 | .00 | |
| 28 | | | | | | 110 | .30 | .00 | .00 | .00 | .00 | |
| 29 | | | | | | 54 | .36 | .00 | .00 | .00 | .00 | |
| 30 | | | | | | 18 | .29 | .00 | .00 | .00 | .00 | |
| 31 | | | | | | 14 | --- | .00 | --- | .00 | .23 | |
| TOTAL | | | | | | 539.00 | 49.36 | .10 | 52.96 | .00 | .23 | |
| MEAN | | | | | | 17.4 | 1.65 | .00 | 1.77 | .00 | .01 | |
| MAX | | | | | | 154 | 9.0 | .08 | 19 | .00 | .23 | |
| MIN | | | | | | .00 | .15 | .00 | .00 | .00 | .00 | |
| AC-FT | | | | | | 1070 | 98 | .2 | 105 | .00 | .5 | |

RED RIVER OF THE NORTH BASIN

101

05060510 CASS COUNTY DRAIN #52 NEAR AMENIA, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1981 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG °C) | TEMPER- ATURE (DEG °C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|--------------|---|---|---|---|---|---|--|---|---|--|---|
| MAR 26... | 1215 | 141 | 182 | 7.2 | 4.0 | 2.0 | 58 | 7 | 14 | 5.5 | 6.5 |
| 29... | 1615 | 46 | 295 | -- | 4.0 | 4.0 | -- | -- | -- | -- | -- |
| JUN 13... | 1000 | .58 | 890 | -- | 19.5 | 18.0 | -- | -- | -- | -- | -- |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) |
| MAR 26... | 18 | .4 | 5.7 | 51 | 6.2 | 1.7 | 6.7 | .10 | 11 | 102 | 82 |
| DATE | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
| MAR 26... | .14 | 39 | 4 | 30 | 170 | 12 | 20 | .7 | 1 | 0 | 36 |

RED RIVER OF THE NORTH BASIN

05060550 RUSH RIVER NEAR PROSPER, ND

LOCATION.--Lat 46°57'59", long 97°03'04", in NE1/4SE1/4 sec.1, T.140 N., R.51 W., Cass County, Hydrologic Unit 09020204, on right bank 30 ft upstream on county road 1.5 mi west and 0.2 mi north of Prosper.

DRAINAGE AREA.--170 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1980 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Altitude of gage is 908 ft, from topographic map.

REMARKS.--Records fair.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1610 ft³/s Mar. 29, 1984, gage height, 10.35 ft, maximum gage height, 10.36 ft Apr. 3, 1982, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1610 ft³/s Mar. 29, gage height, 10.35 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|---------|------|--------|--------|-------|-----|-----|
| 1 | | | | | | .00 | 177 | 17 | .52 | .84 | .00 | |
| 2 | | | | | | .00 | 146 | 14 | .38 | .72 | .00 | |
| 3 | | | | | | .00 | 115 | 12 | .30 | .53 | .00 | |
| 4 | | | | | | .00 | 89 | 10 | .23 | .43 | .00 | |
| 5 | | | | | | .00 | 67 | 8.1 | .22 | .81 | .00 | |
| 6 | | | | | | .00 | 51 | 8.7 | .50 | 4.2 | .00 | |
| 7 | | | | | | .00 | 35 | 8.2 | 2.7 | 4.6 | .00 | |
| 8 | | | | | | .00 | 25 | 8.1 | 128 | 2.6 | .00 | |
| 9 | | | | | | .00 | 19 | 8.3 | 133 | 1.3 | .00 | |
| 10 | | | | | | .00 | 15 | 8.3 | 110 | .93 | .00 | |
| 11 | | | | | | .00 | 14 | 7.6 | 90 | .74 | .00 | |
| 12 | | | | | | .00 | 21 | 7.0 | 66 | 1.0 | .00 | |
| 13 | | | | | | .00 | 55 | 7.3 | 52 | 1.0 | .00 | |
| 14 | | | | | | .00 | 100 | 6.9 | 42 | .84 | .00 | |
| 15 | | | | | | .00 | 83 | 5.9 | 35 | .65 | .00 | |
| 16 | | | | | | .00 | 66 | 4.9 | 30 | .52 | .00 | |
| 17 | | | | | | .00 | 49 | 4.8 | 24 | .50 | .00 | |
| 18 | | | | | | .00 | 36 | 4.0 | 21 | .39 | .00 | |
| 19 | | | | | | .00 | 26 | 2.9 | 17 | .31 | .00 | |
| 20 | | | | | | .00 | 20 | 2.2 | 16 | .17 | .00 | |
| 21 | | | | | | .00 | 17 | 1.9 | 15 | .07 | .00 | |
| 22 | | | | | | .00 | 15 | 1.8 | 12 | .01 | .00 | |
| 23 | | | | | | 10 | 13 | 1.9 | 11 | .00 | .00 | |
| 24 | | | | | | 125 | 13 | 2.0 | 7.5 | .00 | .00 | |
| 25 | | | | | | 250 | 11 | 1.6 | 8.6 | .00 | .00 | |
| 26 | | | | | | 506 | 10 | 1.6 | 7.0 | .00 | .00 | |
| 27 | | | | | | 685 | 10 | 1.4 | 3.5 | .00 | .00 | |
| 28 | | | | | | 855 | 11 | 1.3 | 2.0 | .00 | .00 | |
| 29 | | | | | | 783 | 14 | 1.2 | 1.5 | .00 | .00 | |
| 30 | | | | | | 460 | 18 | 1.1 | 1.2 | .00 | .00 | |
| 31 | | | | | | 273 | --- | .78 | --- | .00 | .00 | |
| TOTAL | | | | | | 3947.00 | 1341 | 172.78 | 838.15 | 23.16 | .00 | |
| MEAN | | | | | | 127 | 44.7 | 5.57 | 27.9 | .75 | .00 | |
| MAX | | | | | | 855 | 177 | 17 | 133 | 4.6 | .00 | |
| MIN | | | | | | .00 | 10 | .78 | .22 | .00 | .00 | |
| AC-FT | | | | | | 7830 | 2660 | 343 | 1660 | 46 | .00 | |

05060550 RUSH RIVER NEAR PROSPER, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1981 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|-------|---|---|---|---|---|---|--|---|---|--|--|
| MAR | | | | | | | | | | | |
| 27... | 1225 | 652 | 298 | 7.6 | 4.0 | 1.0 | 110 | 27 | 27 | 9.5 | 9.1 |
| 29... | 1435 | 679 | 365 | -- | 3.5 | 1.5 | -- | -- | -- | -- | -- |
| MAY | | | | | | | | | | | |
| 09... | 1505 | 8.5 | 1450 | -- | 15.5 | 14.0 | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | |
| 13... | 1125 | 52 | 650 | -- | 20.0 | 18.0 | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | |
| 11... | 1620 | .70 | 945 | -- | 32.5 | 26.0 | -- | -- | -- | -- | -- |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) |
| MAR | | | | | | | | | | | |
| 27... | 15 | .4 | 7.9 | 80 | 3.9 | 41 | 3.6 | .20 | 9.4 | 159 | 160 |
| DATE | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
| MAR | | | | | | | | | | | |
| 27... | .22 | 280 | 3 | 50 | 150 | 21 | 80 | .0 | 1 | 0 | 86 |

RED RIVER OF THE NORTH BASIN

05060570 LOWER BRANCH RUSH RIVER NEAR PROSPER, ND

LOCATION.--Lat 46°56'30", long 96°59'18", in NE1/4NE1/4SE1/4 sec.16, T.140 N., R.50 W., Cass County, Hydrologic Unit 09020204, on right bank 60 ft upstream on county road 1.5 mi east and 1.5 mi south of Prosper.

DRAINAGE AREA.--35.8 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1980 to current year; seasonal records only since 1982. Prior to October 1981, published as Lower Branch Rush River near Amenla.

GAGE.--Water-stage recorder. Altitude of gage is 900 ft, from topographic map.

REMARKS.--Records poor. Several observations of water temperature and specific conductance were made during the year and are published as miscellaneous water-quality data in the back of this report.

EXTREMES FOR PERIOD OF RECORD.--Maximum observed discharge, 1,300 ft³/s Mar. 27, 1984, gage height, 10.18 ft, backwater from ice; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum observed discharge, 1300 ft³/s Mar. 27, gage height, 10.18 ft, backwater from ice; no flow for most of the year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|---------|--------|------|--------|-----|-----|-----|
| 1 | | | | | | .00 | 63 | .98 | .00 | .00 | .00 | |
| 2 | | | | | | .00 | 47 | .87 | .00 | .00 | .00 | |
| 3 | | | | | | .00 | 19 | .73 | .00 | .00 | .00 | |
| 4 | | | | | | .00 | 7.2 | .63 | .00 | .00 | .00 | |
| 5 | | | | | | .00 | 5.1 | .56 | .00 | .00 | .00 | |
| 6 | | | | | | .00 | 3.9 | .56 | .00 | .00 | .00 | |
| 7 | | | | | | .00 | 3.0 | .61 | .13 | .00 | .00 | |
| 8 | | | | | | .00 | 2.5 | .59 | 46 | .00 | .00 | |
| 9 | | | | | | .00 | 2.2 | .41 | 55 | .00 | .00 | |
| 10 | | | | | | .00 | 2.0 | .32 | 42 | .00 | .00 | |
| 11 | | | | | | .00 | 2.0 | .24 | 32 | .00 | .00 | |
| 12 | | | | | | .00 | 2.9 | .17 | 25 | .00 | .00 | |
| 13 | | | | | | .00 | 3.7 | .14 | 20 | .00 | .00 | |
| 14 | | | | | | .00 | 3.9 | .11 | 15 | .00 | .00 | |
| 15 | | | | | | .00 | 4.4 | .08 | 11 | .00 | .00 | |
| 16 | | | | | | .00 | 4.3 | .05 | 6.0 | .00 | .00 | |
| 17 | | | | | | .00 | 3.0 | .02 | 3.0 | .00 | .00 | |
| 18 | | | | | | .00 | 2.2 | .00 | 1.5 | .00 | .00 | |
| 19 | | | | | | .00 | 1.6 | .00 | .85 | .00 | .00 | |
| 20 | | | | | | .00 | 1.1 | .00 | .61 | .00 | .00 | |
| 21 | | | | | | .00 | .85 | .00 | .41 | .00 | .00 | |
| 22 | | | | | | .00 | .69 | .00 | .32 | .00 | .00 | |
| 23 | | | | | | .00 | .61 | .00 | .24 | .00 | .00 | |
| 24 | | | | | | .00 | .58 | .00 | .18 | .00 | .00 | |
| 25 | | | | | | 10 | .56 | .00 | .13 | .00 | .00 | |
| 26 | | | | | | 340 | .64 | .00 | .09 | .00 | .00 | |
| 27 | | | | | | 1020 | .84 | .00 | .06 | .00 | .00 | |
| 28 | | | | | | 927 | 1.2 | .00 | .04 | .00 | .00 | |
| 29 | | | | | | 252 | 1.4 | .00 | .03 | .00 | .00 | |
| 30 | | | | | | 128 | 1.2 | .00 | .00 | .00 | .00 | |
| 31 | | | | | | 86 | --- | .00 | --- | .00 | .00 | |
| TOTAL | | | | | | 2763.00 | 192.57 | 7.07 | 259.59 | .00 | .00 | |
| MEAN | | | | | | 89.1 | 6.42 | .23 | 8.65 | .00 | .00 | |
| MAX | | | | | | 1020 | 63 | .98 | 55 | .00 | .00 | |
| MIN | | | | | | .00 | .56 | .00 | .00 | .00 | .00 | |
| AC-FT | | | | | | 5480 | 382 | 14 | 515 | .00 | .00 | |

05060570 LOWER BRANCH RUSH RIVER NEAR PROSPER, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1981 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|-----------|-------------------|---|---|--|---|---|--|---|---|--|---|
| MAR 27... | 0935 | 786 | 245 | 7.4 | 3.0 | .5 | 88 | 11 | 22 | 8.0 | 10 |
| MAR 29... | 1240 | 257 | 280 | -- | 4.0 | 1.0 | -- | -- | -- | -- | -- |
| MAY 09... | 1600 | .41 | 800 | -- | 16.0 | 14.0 | -- | -- | -- | -- | -- |
| JUN 13... | 1230 | 20 | 640 | -- | 20.0 | 18.5 | -- | -- | -- | -- | -- |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINEITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) |
| MAR 27... | 18 | .5 | 6.9 | 77 | 5.9 | 27 | 3.7 | .20 | 9.5 | 153 | 130 |
| DATE | AC-FT) | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
| MAR 27... | .21 | 325 | 3 | 60 | 170 | 23 | 30 | .0 | 1 | 0 | 47 |

RED RIVER OF THE NORTH BASIN

05062200 ELM RIVER NEAR KELSO, ND

LOCATION.--Lat 47°17'30", long 97°06'50", in sec.23, T.144 N., R.51 W., Traill County, Hydrologic Unit 09020107, on left bank 50 ft upstream from county road, 4.0 mi south and 3.4 mi west of Kelso.

DRAINAGE AREA.--199 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--December 1955 to September 1963, 1964-73 (annual maximum only), October 1980 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Altitude of gage is 893 ft, from topographic map. Prior to September 1963, gage located at site one mile upstream at datum of 887.60 ft National Geodetic Vertical Datum of 1929, Emerson-Crookston supplementary adjustment of 1941.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--9 years (water years 1956-63, 1981), 2.22 ft³/s, 1,610 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,000 ft³/s, occurred during March 1966; maximum gage height, 13.75 ft Mar. 6, 1983, from floodmark, backwater from ice; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 747 ft³/s Mar. 26, gage height, 13.72 ft, backwater from ice; no flow for most of the year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|---------|------|-------|--------|-------|-----|-----|
| 1 | | | | | | 1.3 | 300 | 25 | 4.7 | 2.5 | .00 | |
| 2 | | | | | | .50 | 200 | 23 | 4.5 | 2.8 | .00 | |
| 3 | | | | | | .45 | 150 | 18 | 4.3 | 2.5 | .00 | |
| 4 | | | | | | .40 | 100 | 16 | 10 | 1.9 | .00 | |
| 5 | | | | | | .20 | 90 | 14 | 50 | 1.6 | .00 | |
| 6 | | | | | | .15 | 80 | 13 | 160 | 1.4 | .00 | |
| 7 | | | | | | .10 | 70 | 12 | 280 | 1.7 | .00 | |
| 8 | | | | | | .10 | 60 | 10 | 350 | 1.0 | .00 | |
| 9 | | | | | | .10 | 50 | 8.7 | 429 | .34 | .00 | |
| 10 | | | | | | .10 | 45 | 7.8 | 239 | .22 | .00 | |
| 11 | | | | | | .10 | 40 | 7.2 | 106 | .17 | .00 | |
| 12 | | | | | | .08 | 35 | 6.7 | 61 | .13 | .00 | |
| 13 | | | | | | .08 | 35 | 6.1 | 42 | .11 | .00 | |
| 14 | | | | | | .16 | 35 | 5.3 | 31 | .12 | .00 | |
| 15 | | | | | | .20 | 32 | 4.9 | 24 | .07 | .00 | |
| 16 | | | | | | .22 | 28 | 4.9 | 44 | .00 | .00 | |
| 17 | | | | | | .30 | 26 | 5.1 | 377 | .00 | .00 | |
| 18 | | | | | | .40 | 23 | 5.0 | 280 | .00 | .00 | |
| 19 | | | | | | 1.1 | 21 | 4.9 | 136 | .00 | .00 | |
| 20 | | | | | | 5.7 | 18 | 4.9 | 63 | .00 | .00 | |
| 21 | | | | | | 15 | 16 | 4.9 | 36 | .00 | .00 | |
| 22 | | | | | | 50 | 14 | 5.0 | 25 | .00 | .00 | |
| 23 | | | | | | 120 | 12 | 5.0 | 19 | .00 | .00 | |
| 24 | | | | | | 200 | 12 | 5.1 | 14 | .00 | .00 | |
| 25 | | | | | | 400 | 14 | 5.0 | 8.6 | .00 | .00 | |
| 26 | | | | | | 730 | 20 | 5.0 | 8.1 | .00 | .00 | |
| 27 | | | | | | 700 | 25 | 5.0 | 5.8 | .00 | .00 | |
| 28 | | | | | | 720 | 30 | 4.9 | 4.9 | .00 | .00 | |
| 29 | | | | | | 650 | 30 | 4.9 | 3.7 | .00 | .00 | |
| 30 | | | | | | 550 | 28 | 4.9 | 2.6 | .00 | .00 | |
| 31 | | | | | | 400 | --- | 4.9 | --- | .00 | .00 | |
| TOTAL | | | | | | 4546.74 | 1639 | 257.1 | 2823.2 | 16.56 | .00 | |
| MEAN | | | | | | 147 | 54.6 | 8.29 | 94.1 | .53 | .00 | |
| MAX | | | | | | 730 | 300 | 25 | 429 | 2.8 | .00 | |
| MIN | | | | | | .08 | 12 | 4.9 | 2.6 | .00 | .00 | |
| AC-FT | | | | | | 9020 | 3250 | 510 | 5600 | 33 | .00 | |

RED RIVER OF THE NORTH BASIN

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05062200 ELM RIVER NEAR KELSO, ND--CONTINUED

PERIOD OF RECORD.--Water years 1981 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| MAR 02... | 1140 | .39 | 1530 | -- | -4.0 | .0 | -- | -- | -- | -- | -- | |
| 26... | 1730 | 705 | 305 | 7.8 | 5.0 | 3.0 | 120 | 36 | 28 | 11 | 13 | |
| MAY 07... | 1725 | 12 | 985 | -- | 16.0 | 11.0 | -- | -- | -- | -- | -- | |
| JUN 08... | 1535 | 206 | 400 | -- | 17.0 | 17.0 | -- | -- | -- | -- | -- | |
| 25... | 1700 | 8.6 | 780 | -- | 27.0 | 26.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 26... | 18 | .5 | 9.5 | 97 | .000 | 80 | 2.4 | 45 | 15 | .10 | 12 | 212 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 26... | 180 | .29 | 404 | 3 | 40 | 150 | 0 | 30 | 280 | .4 | 0 | 130 |

RED RIVER OF THE NORTH BASIN

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN

LOCATION.--Lat 47°21'10", long 96°50'50", on line between secs.24 and 25, T.145 N., R.49 W., Traill County, Hydrologic Unit 09020107, on left bank on upstream side of highway bridge, 0.5 mi west of Halstad, 2.5 mi downstream from Wild Rice River, and at mile 375.2.

DRAINAGE AREA.--21,800 mi², approximately, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1936 to June 1937 (no winter records), April 1942 to September 1960 (spring and summer months only), May 1961 to current year.

REVISED RECORDS.--WSP 1388: 1936, 1950. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 826.65 ft National Geodetic Vertical Datum of 1929. Prior to July 17, 1961, nonrecording gage at same site and datum.

REMARKS.--Records fair. Some regulation by many controlled lakes and reservoirs on tributaries.

AVERAGE DISCHARGE.--23 years (1961-84), 1,760 ft³/s, 1,275,000 acre-ft/yr; median of yearly mean discharges, 1,540 ft³/s, 1,116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 42,000 ft³/s Apr. 22, 1979, gage height, 39.00 ft; minimum observed, 5.4 ft³/s Oct. 8, 9, 12-14, 1936.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of about 38.5 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 21,900 ft³/s Apr. 1, gage height, 29.99 ft, backwater from ice; minimum daily, 148 ft³/s Sept. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-------|-------|-------|--------|--------|--------|--------|-------|---------|-------|
| 1 | 535 | 817 | 720 | 494 | 444 | 1500 | 21500 | 3000 | 1360 | 2950 | 897 | 378 |
| 2 | 590 | 811 | 710 | 505 | 441 | 1590 | 21800 | 2900 | 1360 | 2600 | 811 | 400 |
| 3 | 641 | 809 | 700 | 512 | 445 | 1690 | 21500 | 2820 | 1320 | 2360 | 752 | 421 |
| 4 | 638 | 807 | 700 | 515 | 446 | 1840 | 20800 | 2770 | 1240 | 2210 | 712 | 444 |
| 5 | 660 | 811 | 695 | 516 | 430 | 1940 | 19700 | 2750 | 1160 | 2100 | 668 | 439 |
| 6 | 676 | 788 | 690 | 519 | 415 | 1990 | 18300 | 2740 | 1200 | 2030 | 622 | 405 |
| 7 | 686 | 777 | 691 | 525 | 410 | 1940 | 16500 | 2690 | 1300 | 1960 | 604 | 372 |
| 8 | 693 | 785 | 692 | 529 | 400 | 1780 | 14500 | 2650 | 4610 | 1880 | 623 | 346 |
| 9 | 697 | 793 | 677 | 539 | 398 | 1590 | 12400 | 2610 | 10900 | 1820 | 620 | 320 |
| 10 | 699 | 789 | 668 | 550 | 387 | 1460 | 10200 | 2590 | 12800 | 1730 | 600 | 305 |
| 11 | 702 | 777 | 660 | 563 | 352 | 1300 | 8280 | 2540 | 13000 | 1650 | 589 | 304 |
| 12 | 686 | 769 | 651 | 575 | 340 | 1200 | 7050 | 2450 | 12600 | 1580 | 563 | 293 |
| 13 | 655 | 769 | 647 | 569 | 373 | 1080 | 6710 | 2370 | 12100 | 1490 | 541 | 286 |
| 14 | 649 | 775 | 636 | 570 | 419 | 1050 | 6690 | 2320 | 11200 | 1370 | 598 | 302 |
| 15 | 651 | 782 | 625 | 565 | 452 | 1040 | 6470 | 2250 | 10100 | 1280 | 649 | 312 |
| 16 | 671 | 777 | 616 | 560 | 477 | 1000 | 6290 | 2200 | 8550 | 1250 | 661 | 297 |
| 17 | 713 | 778 | 603 | 550 | 505 | 980 | 6080 | 2180 | 6950 | 1240 | 640 | 292 |
| 18 | 749 | 757 | 593 | 535 | 556 | 970 | 5720 | 2110 | 5590 | 1220 | 575 | 290 |
| 19 | 746 | 755 | 581 | 520 | 578 | 960 | 5260 | 2010 | 4890 | 1180 | 468 | 279 |
| 20 | 771 | 756 | 561 | 500 | 600 | 920 | 4830 | 1920 | 4570 | 1170 | 377 | 268 |
| 21 | 836 | 779 | 535 | 474 | 620 | 1000 | 4500 | 1840 | 4120 | 1110 | 386 | 255 |
| 22 | 877 | 790 | 508 | 462 | 634 | 1040 | 4220 | 1770 | 3640 | 1050 | 471 | 226 |
| 23 | 894 | 776 | 505 | 450 | 693 | 1200 | 3990 | 1730 | 3220 | 1050 | 515 | 203 |
| 24 | 874 | 770 | 513 | 448 | 793 | 1880 | 3810 | 1690 | 2970 | 1080 | 518 | 184 |
| 25 | 854 | 765 | 508 | 455 | 890 | 4300 | 3650 | 1680 | 2970 | 1080 | 537 | 173 |
| 26 | 834 | 760 | 492 | 455 | 1040 | 8100 | 3500 | 1620 | 3190 | 1050 | 530 | 164 |
| 27 | 830 | 755 | 488 | 450 | 1120 | 12600 | 3370 | 1530 | 3430 | 1040 | 514 | 164 |
| 28 | 837 | 750 | 487 | 450 | 1200 | 14700 | 3220 | 1460 | 3600 | 1020 | 481 | 149 |
| 29 | 846 | 740 | 489 | 445 | 1370 | 17500 | 3110 | 1420 | 3580 | 1010 | 429 | 148 |
| 30 | 837 | 730 | 489 | 445 | --- | 19100 | 3030 | 1390 | 3320 | 1000 | 385 | 156 |
| 31 | 830 | --- | 489 | 443 | --- | 20700 | --- | 1370 | --- | 984 | 376 | --- |
| TOTAL | 22857 | 23297 | 18619 | 15688 | 17228 | 129940 | 276980 | 67370 | 160840 | 46544 | 17712 | 8575 |
| MEAN | 737 | 777 | 601 | 506 | 594 | 4192 | 9233 | 2173 | 5361 | 1501 | 571 | 286 |
| MAX | 894 | 817 | 720 | 575 | 1370 | 20700 | 21800 | 3000 | 13000 | 2950 | 897 | 444 |
| MIN | 535 | 730 | 487 | 443 | 340 | 920 | 3030 | 1370 | 1160 | 984 | 376 | 148 |
| AC-FT | 45340 | 46210 | 36930 | 31120 | 34170 | 257700 | 549400 | 133600 | 319000 | 92320 | 35130 | 17010 |
| CAL YR 1983 | TOTAL | 521968 | | MEAN | 1430 | MAX | 7050 | MIN | 270 | AC-FT | 1035000 | |
| WTR YR 1984 | TOTAL | 805650 | | MEAN | 2201 | MAX | 21800 | MIN | 148 | AC-FT | 1598000 | |

RED RIVER OF THE NORTH BASIN

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05064500 RED RIVER OF THE NORTH AT HALSTAD, MN
(National stream-quality accounting network station)

PERIOD OF RECORD.--Water years 1961-67, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 24... | 1020 | 877 | 650 | 8.0 | 9.5 | 9.0 | 22 | 10.2 | 90 | 32 | 760 |
| JAN 12... | 1355 | 575 | 780 | 8.3 | .9 | .0 | 5.0 | 8.8 | 65 | -- | -- |
| FEB 22... | 1325 | 647 | 598 | 7.8 | 1.0 | .0 | 3.5 | 7.8 | 56 | 280 | 1500 |
| MAY 22... | 1405 | 1860 | 692 | 6.7 | 21.5 | 18.4 | 70 | 7.7 | 85 | 20 | 85 |
| JUL 30... | 1335 | 1010 | 595 | 8.3 | 27.0 | 27.5 | 480 | 6.9 | 90 | 550 | 900 |
| SEP 27... | 1240 | 164 | 790 | 9.2 | 3.0 | 8.7 | 2.0 | 13.9 | 122 | 5 | 20 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|--------------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| JAN 12... | 300 | 0 | 60 | 37 | 40 | 22 | 1 | 9.2 | 302 | 2.9 | 80 | 17 |
| FEB 22... | 290 | 10 | 58 | 34 | 28 | 17 | .7 | 7.1 | 275 | 8.4 | 59 | 19 |
| MAY 22... | 310 | 90 | 64 | 36 | 32 | 18 | .8 | 8.0 | 219 | 85 | 150 | 16 |
| JUL 30... | 290 | 63 | 57 | 35 | 22 | 14 | .6 | 8.7 | 224 | 2.2 | 110 | 14 |
| SEP 27... | 320 | 91 | 64 | 40 | 52 | 25 | 1 | 8.6 | 234 | .3 | 160 | 30 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|--------------|---|--|---|--|--|--|--|--|---|--|---|
| JAN 12... | .20 | 16 | 460 | 440 | .63 | 714 | .31 | .44 | 1.3 | .130 | .40 |
| FEB 22... | .20 | 19 | 385 | 390 | .52 | 673 | .57 | .39 | 1.2 | .100 | .31 |
| MAY 22... | .30 | 6.7 | 458 | 450 | .62 | 2300 | .40 | .21 | 2.5 | .300 | -- |
| JUL 30... | .20 | 17 | 413 | 400 | .56 | 1130 | .29 | .08 | 1.0 | .330 | -- |
| SEP 27... | .40 | 9.1 | 518 | 510 | .70 | 229 | <.10 | .06 | 1.2 | .370 | -- |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (MG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|--------------|---|---|--|--|---|---|---|--|---|---|---|
| JAN 12... | .100 | .080 | .25 | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB 22... | .070 | .050 | .15 | 10 | 3 | 77 | <1 | <1 | <3 | 1 | 17 |
| MAY 22... | .160 | .100 | .31 | <10 | 2 | 93 | <1 | <1 | <3 | 2 | 13 |
| JUL 30... | .170 | .120 | .37 | -- | -- | -- | -- | -- | -- | -- | -- |
| SEP 27... | .260 | .250 | .77 | <10 | 4 | 70 | <1 | <1 | <3 | 3 | 9 |

RED RIVER OF THE NORTH BASIN

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|---|---|--|---|--|---|---|---|---|
| FEB 22... | <1 | 28 | 38 | <.1 | <10 | <1 | <1 | <1 | 200 | <6 | 14 |
| MAY 22... | 2 | 47 | 5 | .1 | <10 | 4 | <1 | <1 | 260 | <6 | 23 |
| SEP 27... | 5 | 56 | 8 | <.1 | <10 | 7 | <1 | <1 | 280 | <6 | 4 |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER 0.062 MM (70331) |
|--------------|------|--|--|--|---|
| OCT 24... | 1020 | 877 | 45 | 107 | 98 |
| FEB 22... | 1325 | 647 | 7 | 12 | -- |
| MAY 22... | 1710 | 1860 | 171 | 859 | 99 |
| JUL 30... | 1335 | 1010 | 247 | 674 | -- |
| SEP 27... | 1130 | 164 | 26 | 12 | -- |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| FEB | | | | | | | |
| 22... | 1125 | 14.0 | 1.6 | .0 | 588 | 7.6 | 7.1 |
| 22... | 1127 | 22.0 | 1.6 | .0 | 590 | 7.7 | 7.6 |
| 22... | 1129 | 30.0 | 1.6 | .0 | 597 | 7.6 | 8.1 |
| 22... | 1131 | 38.0 | 1.6 | .0 | 597 | 7.7 | 7.8 |
| 22... | 1133 | 46.0 | 1.6 | .0 | 599 | 7.7 | 7.8 |
| 22... | 1135 | 54.0 | 1.6 | .0 | 597 | 7.7 | 7.8 |
| 22... | 1137 | 62.0 | 1.6 | .0 | 597 | 7.8 | 8.2 |
| 22... | 1139 | 70.0 | 1.6 | .0 | 596 | 7.8 | 8.6 |
| 22... | 1141 | 78.0 | 1.6 | .0 | 599 | 7.8 | 7.5 |
| 22... | 1142 | 86.0 | 1.6 | .0 | 599 | 7.8 | 7.5 |
| 22... | 1143 | 94.0 | 1.6 | .0 | 597 | 7.8 | 8.3 |
| 22... | 1145 | 102 | 1.6 | .0 | 600 | 7.8 | 7.7 |
| 22... | 1147 | 110 | 1.6 | .0 | 599 | 7.8 | 7.4 |
| 22... | 1149 | 110 | 3.2 | .0 | 600 | 7.8 | 7.4 |
| 22... | 1151 | 118 | 1.6 | .0 | 599 | 7.8 | 7.5 |
| 22... | 1153 | 126 | 1.6 | .0 | 599 | 7.8 | 7.9 |
| 22... | 1155 | 126 | 3.2 | .0 | 599 | 7.8 | 7.9 |
| 22... | 1157 | 134 | 1.6 | .0 | 599 | 7.9 | 7.8 |
| 22... | 1159 | 142 | 1.6 | .0 | 598 | 7.9 | 8.0 |
| 22... | 1200 | 150 | 1.6 | .0 | 596 | 7.9 | 7.6 |
| 22... | 1201 | 150 | 3.2 | .0 | 597 | 7.9 | 7.4 |
| 22... | 1202 | 158 | 1.6 | .0 | 595 | 7.9 | 7.9 |
| 22... | 1203 | 158 | 3.2 | .0 | 596 | 7.9 | 7.9 |
| 22... | 1205 | 166 | 1.6 | .0 | 596 | 7.9 | 8.3 |
| 22... | 1207 | 166 | 3.2 | .0 | 596 | 7.9 | 8.2 |
| 22... | 1210 | 174 | 1.6 | .0 | 586 | 7.9 | 7.4 |
| MAY | | | | | | | |
| 22... | 1445 | 209 | 1.6 | 18.1 | 690 | -- | 7.3 |
| 22... | 1447 | 209 | 3.3 | 18.2 | 696 | -- | 7.4 |
| 22... | 1448 | 191 | 1.6 | 18.4 | 690 | 7.3 | 7.7 |
| 22... | 1449 | 191 | 3.3 | 18.3 | 691 | -- | 10.1 |
| 22... | 1450 | 177 | 1.6 | 18.4 | 693 | -- | 7.4 |
| 22... | 1452 | 177 | 3.3 | 18.4 | 692 | -- | 7.4 |
| 22... | 1454 | 177 | 6.6 | 18.4 | 691 | -- | 7.3 |
| 22... | 1456 | 165 | 1.6 | 18.4 | 690 | -- | 7.4 |
| 22... | 1458 | 165 | 3.3 | 18.4 | 691 | -- | 7.4 |
| 22... | 1500 | 165 | 6.6 | 18.4 | 690 | -- | 7.3 |
| 22... | 1502 | 153 | 1.6 | 18.4 | 695 | -- | 7.5 |
| 22... | 1504 | 153 | 3.3 | 18.4 | 693 | -- | 7.4 |
| 22... | 1506 | 141 | 6.6 | 18.4 | 691 | -- | 7.4 |

05064500 RED RIVER OF THE NORTH AT HALSTAD, MN--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| MAY | | | | | | | |
| 22... | 1508 | 141 | 1.6 | 18.4 | 691 | -- | 7.4 |
| 22... | 1510 | 141 | 3.3 | 18.4 | 690 | -- | 7.4 |
| 22... | 1512 | 129 | 1.6 | 18.3 | 674 | 6.7 | 7.5 |
| 22... | 1513 | 129 | 3.3 | 18.4 | 669 | -- | 7.4 |
| 22... | 1515 | 106 | 1.6 | 18.4 | 696 | -- | 7.9 |
| 22... | 1516 | 106 | 3.3 | 18.4 | 693 | -- | 8.0 |
| 22... | 1517 | 94.0 | 1.6 | 18.4 | 610 | -- | 8.1 |
| 22... | 1518 | 94.0 | 3.3 | 18.5 | 620 | -- | 8.3 |
| 22... | 1519 | 82.0 | 1.6 | 18.4 | 692 | -- | 7.5 |
| 22... | 1520 | 82.0 | 3.3 | 18.5 | 691 | -- | 7.4 |
| 22... | 1521 | 68.0 | 1.6 | 18.4 | 695 | 7.0 | 7.6 |
| 22... | 1523 | 52.0 | 1.6 | 18.4 | 693 | -- | 7.6 |
| 22... | 1524 | 52.0 | 3.3 | 18.5 | 691 | -- | 7.6 |
| 22... | 1525 | 44.0 | 1.6 | 18.4 | 697 | -- | 7.8 |
| 22... | 1526 | 44.0 | 3.3 | 18.5 | 694 | -- | 7.8 |
| 22... | 1527 | 34.0 | 1.6 | 18.5 | 693 | -- | 7.9 |
| 22... | 1528 | 34.0 | 3.3 | 18.5 | 692 | -- | 7.6 |
| 22... | 1529 | 24.0 | 1.6 | 18.4 | 694 | -- | 8.8 |
| 22... | 1534 | 24.0 | 3.3 | 18.5 | 687 | -- | 9.2 |
| SEP | | | | | | | |
| 27... | 1130 | 10.0 | 1.5 | 8.8 | 774 | 9.3 | 13.9 |
| 27... | 1131 | 20.0 | 1.8 | 8.7 | 779 | 9.2 | 14.0 |
| 27... | 1132 | 30.0 | 1.7 | 8.7 | 782 | 9.2 | 14.3 |
| 27... | 1133 | 40.0 | 1.4 | 8.7 | 786 | 9.2 | 14.6 |
| 27... | 1134 | 50.0 | 1.0 | 8.7 | 788 | 9.2 | 14.1 |
| 27... | 1135 | 60.0 | 1.2 | 8.6 | 789 | 9.2 | 13.5 |
| 27... | 1136 | 70.0 | 1.0 | 8.7 | 791 | 9.2 | 13.8 |
| 27... | 1137 | 80.0 | 1.5 | 8.7 | 794 | 9.2 | 14.0 |
| 27... | 1138 | 90.0 | 1.0 | 8.7 | 795 | 9.2 | 14.2 |
| 27... | 1139 | 100 | 1.0 | 8.7 | 794 | 9.2 | 14.0 |
| 27... | 1140 | 110 | 1.1 | 8.7 | 796 | 9.2 | 13.9 |
| 27... | 1141 | 120 | 1.2 | 8.7 | 796 | 9.2 | 13.9 |
| 27... | 1142 | 130 | 1.4 | 8.8 | 796 | 9.1 | 13.8 |
| 27... | 1143 | 140 | 1.6 | 8.8 | 796 | 9.1 | 13.5 |
| 27... | 1144 | 150 | 1.7 | 8.8 | 796 | 9.1 | 13.0 |

RED RIVER OF THE NORTH BASIN

05064900 BEAVER CREEK NEAR FINLEY, ND
(Hydrologic bench-mark station)

LOCATION.--Lat 47°35'40", long 97°42'18", in NE¼ sec.31, T.148 N., R.55 W., Steele County, Hydrologic Unit 09020109, on right bank 500 ft upstream from bridge on county highway, and 7 mi northeast of Finley.

DRAINAGE AREA.--160 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1946 to current year.

GAGE.--Water-stage recorder and concrete broad-crested weir. Datum of gage is 1,170.08 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--20 years, 8.98 ft³/s, 6,510 acre-ft/yr; median of yearly mean discharges, 9.5 ft³/s, 6,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,900 ft³/s Apr. 19, 1979, gage height, 8.35 ft, backwater from ice; maximum gage height, 9.70 ft Mar. 14, 1966, backwater from ice; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Mar. 25 | -- | a*150 | Unknown | Apr. 7 | 0700 | 50 | 3.52 |
| Mar. 31 | -- | 142 | Ice jam | Apr. 13 | 1515 | 61 | 3.60 |

No flow for several months.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|------|-------|---------|--------|--------|-------|-------|------|-----|
| 1 | 4.6 | 2.6 | 1.1 | .00 | .00 | 5.0 | 113 | 16 | .94 | .14 | .00 | .00 |
| 2 | 4.6 | 2.4 | 1.0 | .00 | .00 | 5.0 | 95 | 12 | .73 | .12 | .00 | .00 |
| 3 | 4.6 | 2.4 | 1.0 | .00 | .00 | 4.8 | 62 | 9.2 | .58 | .09 | .00 | .00 |
| 4 | 4.8 | 2.4 | 1.0 | .00 | .00 | 4.8 | 48 | 7.5 | .57 | .04 | .00 | .00 |
| 5 | 4.8 | 2.3 | .90 | .00 | .00 | 4.8 | 40 | 6.9 | .64 | .02 | .00 | .00 |
| 6 | 4.5 | 2.2 | .90 | .00 | .00 | 4.5 | 45 | 7.2 | .70 | .00 | .00 | .00 |
| 7 | 4.2 | 2.2 | .80 | .00 | .00 | 4.2 | 49 | 7.1 | .79 | .00 | .00 | .00 |
| 8 | 4.0 | 2.2 | .70 | .00 | .00 | 4.0 | 45 | 6.8 | 1.6 | .00 | .00 | .00 |
| 9 | 3.6 | 2.2 | .60 | .00 | .00 | 3.8 | 38 | 6.1 | 2.0 | .00 | .00 | .00 |
| 10 | 3.6 | 2.1 | .60 | .00 | .00 | 3.6 | 32 | 5.2 | 1.6 | .00 | .00 | .00 |
| 11 | 3.6 | 1.9 | .50 | .00 | .00 | 3.4 | 30 | 4.4 | 2.9 | .00 | .00 | .00 |
| 12 | 3.7 | 1.8 | .50 | .00 | .00 | 3.0 | 38 | 3.9 | 4.8 | .00 | .00 | .00 |
| 13 | 4.0 | 1.8 | .40 | .00 | .00 | 2.5 | 58 | 3.7 | 4.2 | .00 | .00 | .00 |
| 14 | 4.0 | 1.8 | .40 | .00 | .20 | 2.0 | 50 | 3.7 | 3.9 | .00 | .00 | .00 |
| 15 | 3.8 | 1.7 | .30 | .00 | .50 | 1.5 | 36 | 3.5 | 3.3 | .00 | .00 | .00 |
| 16 | 4.0 | 1.7 | .20 | .00 | 1.0 | 1.0 | 28 | 3.3 | 2.8 | .00 | .00 | .00 |
| 17 | 3.8 | 1.7 | .10 | .00 | .80 | .80 | 24 | 3.0 | 2.2 | .00 | .00 | .00 |
| 18 | 3.6 | 1.7 | .10 | .00 | 1.5 | .60 | 21 | 2.6 | 1.7 | .00 | .00 | .00 |
| 19 | 3.5 | 1.8 | .10 | .00 | 2.5 | .40 | 18 | 2.4 | 1.4 | .00 | .00 | .00 |
| 20 | 3.7 | 1.9 | .00 | .00 | 5.0 | .20 | 15 | 2.2 | 1.2 | .00 | .00 | .00 |
| 21 | 3.7 | 2.3 | .00 | .00 | 7.0 | .50 | 12 | 2.1 | .84 | .00 | .00 | .00 |
| 22 | 3.5 | 1.8 | .00 | .00 | 8.7 | 5.0 | 10 | 2.1 | .61 | .00 | .00 | .00 |
| 23 | 3.4 | 1.7 | .00 | .00 | 8.5 | 70 | 8.5 | 4.2 | .44 | .00 | .00 | .00 |
| 24 | 3.5 | 1.6 | .00 | .00 | 8.0 | 120 | 8.3 | 4.0 | .34 | .00 | .00 | .00 |
| 25 | 3.5 | 1.5 | .00 | .00 | 7.5 | 150 | 8.9 | 2.7 | .25 | .00 | .00 | .00 |
| 26 | 3.3 | 1.4 | .00 | .00 | 7.0 | 140 | 9.3 | 2.1 | .27 | .00 | .00 | .00 |
| 27 | 3.2 | 1.3 | .00 | .00 | 6.5 | 135 | 15 | 1.5 | .23 | .00 | .00 | .00 |
| 28 | 3.0 | 1.3 | .00 | .00 | 6.0 | 130 | 20 | 1.1 | .16 | .00 | .00 | .00 |
| 29 | 2.9 | 1.2 | .00 | .00 | 5.1 | 96 | 22 | .95 | .10 | .00 | .00 | .00 |
| 30 | 2.8 | 1.2 | .00 | .00 | --- | 74 | 18 | 1.4 | .06 | .00 | .00 | .00 |
| 31 | 2.7 | --- | .00 | .00 | --- | 91 | --- | 1.4 | --- | .00 | .00 | --- |
| TOTAL | 116.5 | 56.1 | 11.20 | .00 | 75.80 | 1071.40 | 1017.0 | 140.25 | 41.85 | .41 | .00 | .00 |
| MEAN | 3.76 | 1.87 | .36 | .00 | 2.61 | 34.6 | 33.9 | 4.52 | 1.39 | .01 | .00 | .00 |
| MAX | 4.8 | 2.6 | 1.1 | .00 | 8.7 | 150 | 113 | 16 | 4.8 | .14 | .00 | .00 |
| MIN | 2.7 | 1.2 | .00 | .00 | .00 | .20 | 8.3 | .95 | .06 | .00 | .00 | .00 |
| AC-FT | 231 | 111 | 22 | .00 | 150 | 2130 | 2020 | 278 | 83 | .8 | .00 | .00 |
| CAL YR 1983 | TOTAL | 4124.52 | | MEAN | 11.3 | MAX | 166 | MIN | .00 | AC-FT | 8180 | |
| WTR YR 1984 | TOTAL | 2530.51 | | MEAN | 6.91 | MAX | 150 | MIN | .00 | AC-FT | 5020 | |

RED RIVER OF THE NORTH BASIN

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05064900 BEAVER CREEK NEAR FINLEY, ND--CONTINUED
(Hydrologic bench-mark station)

PERIOD OF RECORD.--Water years 1965 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED SATUR- ATION (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCHI KF AGAR (COLS. PER 100 ML) (31673) |
|-----------|------|--|--|---|--|--|---|--|---|---|--|
| OCT 25... | 1200 | 3.5 | 1410 | 8.1 | 10.5 | 6.0 | 6.9 | 12.5 | 105 | -- | -- |
| NOV 22... | 1235 | 1.9 | 1710 | 8.4 | - .9 | .5 | -- | -- | -- | -- | -- |
| FEB 29... | 1335 | 5.1 | 970 | -- | .0 | .5 | -- | -- | -- | -- | -- |
| MAR 28... | 1530 | 129 | 535 | -- | 4.0 | 2.5 | -- | -- | -- | -- | -- |
| APR 03... | 1510 | 57 | 690 | -- | 8.0 | 5.5 | -- | -- | -- | -- | -- |
| APR 11... | 1240 | 30 | 975 | 8.3 | 8.0 | 7.1 | 2.0 | -- | -- | 10 | 470 |
| MAY 16... | 1250 | 3.4 | 1660 | 9.0 | 23.0 | 17.0 | -- | 8.3 | 90 | -- | -- |
| JUN 26... | 1055 | .27 | 1880 | 8.3 | 16.0 | 21.0 | -- | -- | -- | -- | -- |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| OCT 25... | 570 | 236 | 130 | 60 | 120 | 31 | 2 | 13 | 336 | 5.1 | 480 | 25 |
| APR 11... | 400 | 199 | 94 | 40 | 64 | 25 | 1 | 13 | 201 | 1.9 | 320 | 12 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|-----------|---|--|--|---|--|--|--|--|---|--|---|
| OCT 25... | .20 | 8.2 | 1010 | 1000 | 1.4 | 9.5 | <.10 | .06 | 1.2 | .060 | .18 |
| APR 11... | .20 | 9.7 | 691 | 670 | .94 | 56 | .18 | .10 | 1.0 | .070 | .21 |
| MAY 16... | -- | -- | -- | -- | -- | -- | .10 | .15 | 1.5 | .250 | .77 |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|-----------|---|---|--|--|---|---|---|--|---|---|---|
| OCT 25... | .070 | .040 | .12 | -- | -- | -- | -- | -- | -- | -- | -- |
| APR 11... | .060 | .030 | .09 | <10 | 2 | 70 | <1 | <1 | <3 | 2 | 26 |
| MAY 16... | .230 | .070 | .21 | -- | -- | -- | -- | -- | -- | -- | -- |

RED RIVER OF THE NORTH BASIN

05064900 BEAVER CREEK NEAR FINLEY, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|--|---|---|--|---|--|---|---|---|---|
| APR 11... | <1 | 46 | 110 | .1 | <10 | 2 | <1 | <1 | 360 | <6 | 17 |
| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) | | | | | | |
| OCT 25... | 1200 | 3.5 | 15 | .14 | -- | | | | | | |
| APR 11... | 1300 | 30 | 5 | .43 | 76 | | | | | | |
| MAY 16... | 1250 | 3.4 | 29 | .27 | -- | | | | | | |
| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | | | | |
| APR | | | | | | | | | | | |
| 11... | 1405 | 22.0 | .88 | 7.1 | 950 | 8.3 | 10.2 | | | | |
| 11... | 1407 | 20.0 | 1.2 | 7.1 | 967 | 8.3 | 10.2 | | | | |
| 11... | 1409 | 18.0 | 1.4 | 7.1 | 973 | 8.3 | 10.2 | | | | |
| 11... | 1411 | 16.0 | 1.5 | 7.1 | 975 | 8.3 | 10.1 | | | | |
| 11... | 1413 | 14.0 | 1.5 | 7.1 | 976 | 8.3 | 10.1 | | | | |
| 11... | 1415 | 12.0 | .92 | 7.1 | 977 | 8.3 | 10.2 | | | | |
| 11... | 1417 | 10.0 | .84 | 7.1 | 977 | 8.3 | 10.2 | | | | |
| 11... | 1420 | 7.00 | .84 | 7.1 | 977 | 8.3 | 10.1 | | | | |
| 11... | 1425 | 6.00 | .60 | 7.1 | 978 | 8.2 | 10.1 | | | | |
| MAY | | | | | | | | | | | |
| 16... | 1300 | 2.00 | .40 | 17.2 | 1648 | 8.2 | 9.3 | | | | |
| 16... | 1301 | 3.00 | .60 | 17.2 | 1644 | 8.3 | 9.0 | | | | |
| 16... | 1302 | 4.00 | .65 | 17.2 | 1657 | 9.4 | 8.4 | | | | |
| 16... | 1303 | 5.00 | .70 | 17.2 | 1660 | 9.2 | 8.4 | | | | |
| 16... | 1304 | 6.00 | .70 | 17.2 | 1662 | 9.2 | 8.4 | | | | |
| 16... | 1305 | 7.00 | .70 | 17.2 | 1666 | 9.0 | 8.3 | | | | |
| 16... | 1306 | 8.00 | .70 | 17.2 | 1665 | 9.2 | 8.3 | | | | |
| 16... | 1307 | 9.00 | .70 | 17.2 | 1664 | 8.8 | 8.3 | | | | |
| 16... | 1308 | 10.0 | .70 | 17.3 | 1664 | 9.0 | 8.3 | | | | |
| 16... | 1309 | 11.0 | .65 | 17.3 | 1666 | 9.4 | 8.3 | | | | |
| 16... | 1310 | 12.0 | .50 | 17.3 | 1665 | 9.4 | 8.3 | | | | |
| 16... | 1311 | 13.0 | .40 | 17.3 | 1665 | 9.3 | 8.3 | | | | |

RED RIVER OF THE NORTH BASIN

115

05065500 GOOSE RIVER NEAR PORTLAND, ND

LOCATION.--Lat 47°32'20", long 97°27'20", in SE¼NE¼ sec.19, T.147 N., R.53 W., Traill County, Hydrologic Unit 09020101, on left bank 75 ft upstream from bridge on State Highway 18, 1.2 mi upstream from unnamed tributary 4 mi downstream from Beaver Creek, and 5 mi northwest of Portland.

DRAINAGE AREA.--517 mi², of which about 110 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1939 to September 1975, October 1980 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Datum of gage is 967.48 ft National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1956, nonrecording gages at site 2 mi upstream at datum 11.28 ft higher.

AVERAGE DISCHARGE.--49 years (1931-32, 1934-82), 68.0 ft³/s, 49,270 acre-ft/yr; median of yearly mean discharges, 40 ft³/s, 28,980 acre-ft/yr.

REMARKS.--Records poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,530 ft³/s, May 9, 1950, gage height, 20.12 ft, on basis of contracted opening measurement, present site and datum; no flow at times most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 20-21, 1979, reached a stage of 20.96, present datum, from floodmark; discharge not determined.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,170 ft³/s Mar. 27, gage height, 13.09 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|---------|------|------|------|-------|-------|-----|
| 1 | | | | | | 8.0 | 500 | 80 | 13 | 11 | 3.2 | .00 |
| 2 | | | | | | 10 | 424 | 75 | 13 | 9.3 | 3.0 | .00 |
| 3 | | | | | | 9.0 | 352 | 75 | 12 | 7.0 | 2.8 | .00 |
| 4 | | | | | | 8.0 | 310 | 70 | 13 | 10 | 2.6 | .00 |
| 5 | | | | | | 3.4 | 219 | 65 | 14 | 10 | 2.3 | .00 |
| 6 | | | | | | 2.2 | 179 | 62 | 15 | 10 | 2.1 | .00 |
| 7 | | | | | | 1.5 | 149 | 57 | 16 | 8.7 | 1.8 | .00 |
| 8 | | | | | | 1.3 | 141 | 54 | 19 | 6.8 | 1.6 | .00 |
| 9 | | | | | | 1.2 | 130 | 51 | 20 | 7.8 | 1.3 | .00 |
| 10 | | | | | | 1.3 | 118 | 49 | 20 | 8.4 | .92 | .00 |
| 11 | | | | | | 1.0 | 108 | 45 | 23 | 8.2 | .73 | .00 |
| 12 | | | | | | .45 | 105 | 42 | 24 | 7.9 | .52 | .00 |
| 13 | | | | | | .20 | 114 | 40 | 22 | 7.4 | .24 | .00 |
| 14 | | | | | | .10 | 145 | 38 | 31 | 8.0 | .10 | .00 |
| 15 | | | | | | .10 | 169 | 35 | 30 | 8.2 | .00 | .00 |
| 16 | | | | | | .10 | 161 | 30 | 27 | 7.6 | .00 | .00 |
| 17 | | | | | | .10 | 141 | 24 | 31 | 7.6 | .00 | .00 |
| 18 | | | | | | .10 | 122 | 25 | 26 | 7.1 | .00 | .00 |
| 19 | | | | | | .10 | 106 | 25 | 21 | 7.5 | .00 | .00 |
| 20 | | | | | | .10 | 93 | 22 | 17 | 7.6 | .00 | .00 |
| 21 | | | | | | .12 | 83 | 22 | 14 | 7.6 | .00 | .00 |
| 22 | | | | | | 3.4 | 74 | 18 | 12 | 8.1 | .00 | .00 |
| 23 | | | | | | 25 | 70 | 14 | 11 | 8.3 | .00 | .00 |
| 24 | | | | | | 121 | 67 | 12 | 12 | 8.5 | .00 | .00 |
| 25 | | | | | | 250 | 63 | 11 | 12 | 8.2 | .00 | .00 |
| 26 | | | | | | 704 | 61 | 11 | 12 | 7.9 | .00 | .00 |
| 27 | | | | | | 1140 | 62 | 12 | 13 | 7.6 | .00 | .00 |
| 28 | | | | | | 1100 | 64 | 12 | 12 | 7.3 | .00 | .00 |
| 29 | | | | | | 963 | 70 | 13 | 12 | 6.6 | .00 | .00 |
| 30 | | | | | | 800 | 75 | 13 | 11 | 6.0 | .00 | .00 |
| 31 | | | | | | 633 | --- | 12 | --- | 4.5 | .00 | --- |
| TOTAL | | | | | | 5787.77 | 4475 | 1114 | 528 | 246.7 | 23.21 | .00 |
| MEAN | | | | | | 187 | 149 | 35.9 | 17.6 | 7.96 | .75 | .00 |
| MAX | | | | | | 1140 | 500 | 80 | 31 | 11 | 3.2 | .00 |
| MIN | | | | | | .10 | 61 | 11 | 11 | 4.5 | .00 | .00 |
| AC-FT | | | | | | 11480 | 8880 | 2210 | 1050 | 489 | 46 | .00 |

RED RIVER OF THE NORTH BASIN

05065500 GOOSE RIVER NEAR PORTLAND, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| MAR 26... | 1410 | 770 | 415 | 7.7 | 5.0 | 2.0 | 150 | 48 | 37 | 15 | 20 | |
| MAY 08... | 1710 | 54 | 1290 | -- | 10.0 | 11.0 | -- | -- | -- | -- | -- | |
| JUN 29... | 1200 | 12 | 1360 | -- | 27.0 | 23.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 26... | 21 | .7 | 9.1 | 130 | .000 | 110 | 4.1 | 85 | 9.2 | .10 | 11 | 261 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 26... | 250 | .36 | 543 | 1 | 20 | 90 | 0 | 20 | 270 | .3 | 0 | 130 |

RED RIVER OF THE NORTH BASIN

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05066500 GOOSE RIVER AT HILLSBORO, ND

LOCATION.--Lat 47°24'34", long 97°03'39", in NW¼ sec.5, T.145 N., R.50 W., Traill County, Hydrologic Unit 09020109, on right bank 600 ft upstream from Foogman Dam in Hillsboro, and 27.5 mi upstream from mouth.

DRAINAGE AREA.--1,203 mi², of which 110 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1931 to current year (no winter records 1932-34). Monthly discharge only for some periods, published in WSP 1308.

GAGE.--Water-stage recorder and masonry dam. Datum of gage is 879.52 ft National Geodetic Vertical Datum of 1929. Sept. 26, 1941, to Oct. 27, 1965, at site 600 ft downstream at same datum. See WSP 1728 or 1913 for history of changes prior to Sept. 26, 1941.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--51 years (1931-32, 1934-84), 68.9 ft³/s, 49,920 acre-ft/yr; median of yearly mean discharges, 41 ft³/s, 29,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft³/s Apr. 21, 1979, gage height, 16.76 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 29 | -- | a*2660 | *7.99 | June 8 | 1330 | 575 | 3.11 |
| Apr. 15 | 0715 | 494 | 2.99 | June 16 | 1530 | 395 | 2.83 |

Minimum daily, no flow for several days.

a - Ice jam

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|-------|-------|-------|-------|------|------|--------|-------|-----|
| 1 | 23 | 31 | 23 | 9.5 | 5.6 | 28 | 1400 | 162 | 23 | 19 | .02 | .00 |
| 2 | 19 | 30 | 23 | 9.5 | 5.6 | 28 | 1150 | 171 | 20 | 18 | .02 | .00 |
| 3 | 18 | 30 | 22 | 9.5 | 5.6 | 29 | 1000 | 167 | 16 | 15 | .11 | .00 |
| 4 | 18 | 30 | 21 | 9.5 | 5.0 | 35 | 885 | 153 | 12 | 13 | .48 | .00 |
| 5 | 16 | 29 | 21 | 9.5 | 4.6 | 40 | 791 | 143 | 15 | 11 | .47 | .00 |
| 6 | 16 | 30 | 19 | 9.5 | 3.6 | 44 | 660 | 131 | 100 | 8.6 | .11 | .00 |
| 7 | 18 | 30 | 17 | 9.5 | 3.6 | 40 | 498 | 120 | 300 | 8.3 | .43 | .00 |
| 8 | 19 | 30 | 17 | 9.5 | 3.6 | 35 | 388 | 110 | 560 | 6.6 | .12 | .00 |
| 9 | 17 | 29 | 16 | 9.5 | 3.3 | 32 | 327 | 107 | 424 | 5.4 | .00 | .00 |
| 10 | 16 | 28 | 16 | 9.5 | 2.9 | 30 | 291 | 100 | 340 | 4.0 | .00 | .00 |
| 11 | 18 | 26 | 16 | 9.5 | 2.9 | 28 | 260 | 93 | 200 | 2.9 | .00 | .00 |
| 12 | 19 | 23 | 16 | 9.5 | 3.3 | 26 | 254 | 91 | 150 | 2.9 | .00 | .00 |
| 13 | 20 | 23 | 16 | 9.5 | 3.6 | 24 | 334 | 84 | 132 | 2.6 | .00 | .00 |
| 14 | 21 | 23 | 16 | 9.5 | 3.9 | 22 | 466 | 79 | 112 | 2.3 | .00 | .00 |
| 15 | 23 | 23 | 15 | 9.5 | 5.2 | 20 | 426 | 76 | 95 | 1.6 | .00 | .00 |
| 16 | 25 | 23 | 15 | 9.5 | 6.6 | 18 | 392 | 70 | 207 | 1.2 | .00 | .00 |
| 17 | 27 | 23 | 15 | 9.5 | 6.6 | 16 | 345 | 65 | 133 | .97 | .00 | .00 |
| 18 | 32 | 23 | 15 | 9.5 | 6.6 | 14 | 298 | 60 | 89 | .60 | .00 | .00 |
| 19 | 32 | 24 | 14 | 9.5 | 6.6 | 14 | 253 | 58 | 76 | .29 | .00 | .00 |
| 20 | 33 | 24 | 14 | 9.0 | 6.6 | 14 | 220 | 56 | 72 | .30 | .01 | .00 |
| 21 | 36 | 24 | 13 | 8.5 | 6.6 | 14 | 192 | 55 | 64 | .18 | .02 | .00 |
| 22 | 37 | 24 | 13 | 8.0 | 7.7 | 20 | 170 | 52 | 55 | .24 | .00 | .00 |
| 23 | 40 | 24 | 12 | 7.5 | 9.0 | 50 | 150 | 50 | 50 | .08 | .00 | .00 |
| 24 | 37 | 24 | 12 | 7.0 | 9.0 | 150 | 134 | 48 | 41 | .16 | .00 | .00 |
| 25 | 33 | 24 | 12 | 6.6 | 9.0 | 280 | 126 | 47 | 37 | .30 | .00 | .00 |
| 26 | 32 | 24 | 12 | 5.8 | 9.0 | 518 | 119 | 45 | 28 | .64 | .00 | .00 |
| 27 | 33 | 24 | 11 | 5.6 | 11 | 1730 | 118 | 43 | 25 | .84 | .00 | .00 |
| 28 | 37 | 24 | 11 | 5.6 | 20 | 2400 | 124 | 40 | 22 | .74 | .00 | .00 |
| 29 | 37 | 24 | 10 | 5.6 | 28 | 2500 | 138 | 36 | 19 | .63 | .00 | .00 |
| 30 | 36 | 23 | 10 | 5.6 | --- | 2300 | 152 | 33 | 18 | .02 | .00 | .00 |
| 31 | 34 | --- | 10 | 5.6 | --- | 2000 | --- | 28 | --- | .02 | .00 | --- |
| TOTAL | 822 | 771 | 473 | 260.9 | 204.6 | 12499 | 12061 | 2573 | 3435 | 128.41 | 1.79 | .00 |
| MEAN | 26.5 | 25.7 | 15.3 | 8.42 | 7.06 | 403 | 402 | 83.0 | 115 | 4.14 | .06 | .00 |
| MAX | 40 | 31 | 23 | 9.5 | 28 | 2500 | 1400 | 171 | 560 | 19 | .48 | .00 |
| MIN | 16 | 23 | 10 | 5.6 | 2.9 | 14 | 118 | 28 | 12 | .02 | .00 | .00 |
| AC-FT | 1630 | 1530 | 938 | 517 | 406 | 24790 | 23920 | 5100 | 6810 | 255 | 3.6 | .00 |
| CAL YR 1983 | TOTAL | 32307.4 | | MEAN | 88.5 | MAX | 1130 | MIN | 4.7 | AC-FT | 64080 | |
| WTR YR 1984 | TOTAL | 33229.70 | | MEAN | 90.8 | MAX | 2500 | MIN | .00 | AC-FT | 65910 | |

RED RIVER OF THE NORTH BASIN

05066500 GOOSE RIVER AT HILLSBORO, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 24... | 1445 | 37 | 1320 | -- | 8.5 | 9.0 | -- | -- | -- | -- | -- | |
| NOV 18... | 1235 | 24 | 1230 | -- | 2.0 | 4.0 | -- | -- | -- | -- | -- | |
| JAN 19... | 1240 | 9.6 | 2250 | -- | -17.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 02... | 1415 | 28 | 1660 | -- | -3.0 | 1.5 | -- | -- | -- | -- | -- | |
| MAR 29... | 1220 | 2560 | 360 | 7.4 | 3.0 | 3.5 | 150 | 52 | 37 | 14 | 13 | |
| MAY 07... | 1410 | 121 | 1310 | -- | 6.0 | 11.0 | -- | -- | -- | -- | -- | |
| JUN 25... | 1450 | 38 | 1290 | -- | 27.0 | 24.0 | -- | -- | -- | -- | -- | |
| AUG 03... | 1300 | E.02 | 1790 | -- | 26.0 | 26.0 | 730 | 405 | 150 | 87 | 150 | |
| SEP 25... | 1045 | E.03 | 1620 | -- | 2.0 | 8.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 29... | 15 | .5 | 8.2 | 120 | .000 | 98 | 7.6 | 68 | 21 | .10 | 12 | 245 |
| AUG 03... | 30 | 2 | 20 | 400 | .000 | 330 | -- | 550 | 150 | .40 | 18 | 1400 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 29... | 230 | .33 | 1690 | 3 | 30 | 30 | 0 | 20 | 250 | .3 | 0 | 140 |
| AUG 03... | 1300 | 1.9 | -- | 11 | 180 | 20 | 0 | 140 | 830 | .0 | 0 | 930 |

RED RIVER OF THE NORTH BASIN

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05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND

LOCATION.--Lat 47°56'34", long 97°03'10", in sec.2, T.151 N., R.50 W., Grand Forks County, Hydrologic Unit 09020301, on the right bank, 200 ft upstream from the DeMers Avenue bridge, .4 mi downstream from Red Lake River, and at mile 293.8.

DRAINAGE AREA.--30,100 mi², approximately, including 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1882 to current year. Monthly discharge only prior to May 1901, published in WSP 1308.

REVISED RECORDS.--WSP 855: 1936(M). WSP 1115: 1942. WSP 1175: 1897(M). WSP 1388: 1904, 1914-15, 1917-19, 1921-22, 1927, 1950. WSP 1728: Drainage area. WRD-ND-81-1: 1882, 1897 (M).

GAGE.--Water-stage recorder. Datum of gage is 780.00 ft National Geodetic Vertical Datum of 1929. Apr. 14, 1965, to Sept. 30, 1983, water-stage recorder 1.9 mi downstream at a datum of 778.35 ft. Nov. 3, 1933, to Apr. 13, 1965, water-stage recorder 0.3 mi upstream at 778.35 ft datum. See WSP 1728 or 1913 for history of changes prior to Nov. 3, 1933.

REMARKS.--Records good.

AVERAGE DISCHARGE.--102 years, 2,575 ft³/s, 1,866,000 acre-ft/yr; median of yearly mean discharge, 2,170 ft³/s, 1,570,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 85,000 ft³/s Apr. 10, 1897, gage height, 50.2 ft, site and datum then in use, from rating curve extended above 54,000 ft³/s; minimum, 1.8 ft³/s Sept. 2, 1977, caused by unusual regulation during repair of dam at Grand Forks.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32,300 ft³/s Apr. 2, gage height, 37.06 ft; minimum daily, 634 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|-------|
| 1 | 1640 | 2190 | 1750 | 1780 | 1630 | 2700 | 31500 | 5410 | 2400 | 5680 | 1960 | 929 |
| 2 | 1560 | 2090 | 1930 | 1770 | 1640 | 2760 | 32200 | 5310 | 2340 | 5300 | 1920 | 953 |
| 3 | 1530 | 2060 | 2020 | 1760 | 1630 | 2860 | 32000 | 5140 | 2320 | 4870 | 1830 | 969 |
| 4 | 1520 | 2010 | 2030 | 1770 | 1630 | 2940 | 31200 | 4980 | 2280 | 4530 | 1760 | 1050 |
| 5 | 1520 | 2010 | 2020 | 1770 | 1640 | 2990 | 29700 | 4840 | 2260 | 4230 | 1740 | 1070 |
| 6 | 1560 | 2250 | 2070 | 1770 | 1630 | 3000 | 28000 | 4670 | 2250 | 4040 | 1710 | 1050 |
| 7 | 1590 | 2370 | 2120 | 1760 | 1620 | 3060 | 26500 | 4580 | 2440 | 3890 | 1780 | 1040 |
| 8 | 1620 | 2330 | 2130 | 1730 | 1600 | 3040 | 24900 | 4530 | 10100 | 3760 | 1750 | 1050 |
| 9 | 1700 | 2330 | 2130 | 1730 | 1620 | 2910 | 23100 | 4500 | 13300 | 3680 | 1770 | 1050 |
| 10 | 1770 | 2320 | 2090 | 1730 | 1620 | 2790 | 20900 | 4460 | 22500 | 3520 | 1760 | 1030 |
| 11 | 1960 | 2310 | 2050 | 1710 | 1600 | 2660 | 18200 | 4440 | 28900 | 3390 | 1770 | 1010 |
| 12 | 2010 | 2310 | 2010 | 1700 | 1560 | 2550 | 15300 | 4360 | 29300 | 3240 | 1730 | 960 |
| 13 | 2050 | 2300 | 2020 | 1700 | 1540 | 2410 | 13400 | 4230 | 29400 | 3100 | 1660 | 962 |
| 14 | 2000 | 2260 | 2020 | 1700 | 1540 | 2240 | 12800 | 4080 | 25700 | 2950 | 1610 | 999 |
| 15 | 2020 | 2250 | 2040 | 1690 | 1590 | 2170 | 12300 | 3980 | 23200 | 2780 | 1580 | 1020 |
| 16 | 2100 | 2250 | 2040 | 1670 | 1610 | 2160 | 11800 | 3890 | 20900 | 2650 | 1640 | 1030 |
| 17 | 1960 | 2230 | 2000 | 1670 | 1620 | 2120 | 10900 | 3740 | 18400 | 2530 | 1670 | 986 |
| 18 | 2500 | 2250 | 1940 | 1650 | 1620 | 2070 | 10100 | 3630 | 15800 | 2440 | 1640 | 1010 |
| 19 | 3110 | 2180 | 1930 | 1620 | 1700 | 2030 | 9100 | 3520 | 13200 | 2430 | 1510 | 1020 |
| 20 | 3170 | 2220 | 1910 | 1620 | 1730 | 2020 | 8310 | 3370 | 11800 | 2380 | 1340 | 1010 |
| 21 | 2950 | 2320 | 1880 | 1630 | 1770 | 2040 | 7760 | 3270 | 9760 | 2410 | 1180 | 996 |
| 22 | 2790 | 2360 | 1850 | 1600 | 1820 | 2160 | 7160 | 3150 | 8180 | 2280 | 1090 | 965 |
| 23 | 2700 | 2260 | 1820 | 1590 | 1890 | 2450 | 6680 | 3110 | 7480 | 2190 | 1060 | 944 |
| 24 | 2650 | 1800 | 1800 | 1590 | 1950 | 3200 | 6300 | 3000 | 6910 | 2110 | 1080 | 897 |
| 25 | 2580 | 1230 | 1780 | 1590 | 2250 | 5090 | 6070 | 2920 | 6230 | 2100 | 1110 | 912 |
| 26 | 2480 | 979 | 1770 | 1600 | 2580 | 10400 | 5760 | 2900 | 5800 | 2280 | 1130 | 918 |
| 27 | 2420 | 1060 | 1770 | 1630 | 2610 | 12100 | 5620 | 2840 | 5660 | 2110 | 1130 | 822 |
| 28 | 2390 | 1220 | 1770 | 1630 | 2640 | 14700 | 5520 | 2710 | 5640 | 2090 | 1090 | 710 |
| 29 | 2360 | 1360 | 1770 | 1630 | 2700 | 18400 | 5390 | 2630 | 5720 | 2040 | 1040 | 649 |
| 30 | 2290 | 1510 | 1770 | 1630 | --- | 23400 | 5430 | 2550 | 5720 | 1970 | 984 | 634 |
| 31 | 2250 | --- | 1770 | 1630 | --- | 28400 | --- | 2480 | --- | 1950 | 931 | --- |
| TOTAL | 66750 | 60619 | 60000 | 52050 | 52580 | 173820 | 463900 | 119220 | 345890 | 94920 | 45955 | 28645 |
| MEAN | 2153 | 2021 | 1935 | 1679 | 1813 | 5607 | 15460 | 3846 | 11530 | 3062 | 1482 | 955 |
| MAX | 3170 | 2370 | 2130 | 1780 | 2700 | 28400 | 32200 | 5410 | 29400 | 5680 | 1960 | 1070 |
| MIN | 1520 | 979 | 1750 | 1590 | 1540 | 2020 | 5390 | 2480 | 2250 | 1950 | 931 | 634 |
| AC-FT | 132400 | 120200 | 119000 | 103200 | 104300 | 344800 | 920100 | 236500 | 686100 | 188300 | 91150 | 56820 |
| CAL YR 1983 | TOTAL | 1314549 | | MEAN | 3602 | MAX | 14200 | MIN | 979 | AC-FT | 2607000 | |
| WTR YR 1984 | TOTAL | 1564349 | | MEAN | 4274 | MAX | 32200 | MIN | 634 | AC-FT | 3103000 | |

RED RIVER OF THE NORTH BASIN

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|--------------|--|---|---|--|--|--|---|--|--|---|---|
| OCT 21... | 69 | 31 | 11 | 7 | .3 | 5.9 | 210 | 2.0 | 94 | 10 | .20 |
| APR 13... | 56 | 24 | 16 | 12 | .5 | 7.0 | 170 | 1.9 | 81 | 8.5 | .10 |
| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
| OCT 21... | 10 | 400 | 360 | .54 | 3100 | -- | -- | -- | 4 | -- | 50 |
| APR 13... | 12 | 311 | 310 | .42 | 11000 | 1.2 | .060 | .18 | 2 | 68 | 50 |
| DATE | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
| OCT 21... | -- | -- | 20 | 2 | 20 | 10 | .2 | 1 | 0 | 220 | -- |
| APR 13... | <1 | 4 | 33 | <1 | 25 | 10 | <.1 | 2 | <1 | 170 | 10 |

05082500 RED RIVER OF THE NORTH AT GRAND FORKS, ND

PERIOD OF RECORD.--Water years 1949, 1956 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) |
|-------|------|--|--|---|--|--|---|---|--|
| OCT | | | | | | | | | |
| 21... | 1005 | 2870 | 585 | 8.3 | 7.0 | 6.5 | -- | 300 | 93 |
| DEC | | | | | | | | | |
| 21... | 1640 | 1840 | 555 | -- | -2 .9 | .0 | -- | -- | -- |
| JAN | | | | | | | | | |
| 25... | 1420 | 1550 | 550 | -- | -1 .9 | .0 | -- | -- | -- |
| FEB | | | | | | | | | |
| 24... | 1630 | 1980 | 462 | -- | - .9 | .0 | -- | -- | -- |
| MAR | | | | | | | | | |
| 29... | 0830 | 17800 | 305 | -- | .0 | .5 | -- | -- | -- |
| 31... | 0940 | 28200 | 325 | -- | 6.0 | 1.0 | -- | -- | -- |
| APR | | | | | | | | | |
| 02... | 1030 | 32200 | 345 | -- | 10.0 | 1.5 | -- | -- | -- |
| 06... | 1215 | 28100 | 430 | -- | 11.0 | 4.0 | -- | -- | -- |
| 10... | 1120 | 21000 | 450 | -- | 9.0 | 6.0 | -- | -- | -- |
| 13... | 1530 | 13100 | 530 | 8.2 | 14.0 | 7.5 | -- | 240 | 74 |
| 19... | 1015 | 9190 | 620 | -- | 15.0 | 9.5 | -- | -- | -- |
| 25... | 0910 | 5870 | 660 | -- | 9.5 | 12.5 | -- | -- | -- |
| MAY | | | | | | | | | |
| 25... | 1100 | 2880 | 655 | -- | 14.0 | 16.0 | -- | -- | -- |
| JUN | | | | | | | | | |
| 11... | 1210 | 28200 | 465 | -- | 21.5 | 18.0 | -- | -- | -- |
| 13... | 1240 | 29300 | 385 | -- | 18.0 | 17.0 | -- | -- | -- |
| 19... | 1055 | 13300 | 520 | -- | 18.0 | 21.0 | -- | -- | -- |
| 22... | 0845 | 8320 | 595 | -- | 22.0 | 21.5 | -- | -- | -- |
| 25... | 1205 | 6250 | 615 | -- | 25.0 | 22.0 | -- | -- | -- |
| JUL | | | | | | | | | |
| 26... | 1225 | 2180 | 504 | -- | 24.5 | 24.5 | -- | -- | -- |
| AUG | | | | | | | | | |
| 28... | 1155 | 1110 | 420 | -- | 25.5 | 23.5 | -- | -- | -- |
| SEP | | | | | | | | | |
| 27... | 1640 | 795 | 500 | -- | 6.0 | 8.0 | -- | -- | -- |

RED RIVER OF THE NORTH BASIN

05083000 TURTLE RIVER AT MANVEL, ND

LOCATION.--Lat 48°04'43", long 97°11'03", in SE $\frac{1}{4}$ sec.10, T.153 N., R.51 W., Grand Forks County, Hydrologic Unit 09020307, on left bank 10 ft downstream from bridge on State Highway No. 33, 0.3 mi west of Manvel, and 10 mi upstream from mouth.

DRAINAGE AREA.--613 mi², of which 57 mi² is probably noncontributing.

PERIOD OF RECORD.--Water years 1972-73, 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|--|---|---|---|--|
| | | MAR 28... | 1710 | 448 | 770 | 7.8 | .5 | 220 | 114 | 56 | 20 | 63 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | |
| MAR 28... | 37 | 2 | 11 | 130 | .000 | 110 | 3.3 | 130 | 89 | .20 | 13 | 465 | |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | |
| MAR 28... | 450 | .63 | 562 | 3 | 80 | 90 | 0 | 50 | 280 | .0 | 2 | 420 | |

05083600 MIDDLE BRANCH FOREST RIVER NEAR WHITMAN, ND

LOCATION.--Lat 48°14'50", long 98°07'00", in SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.16, T.155 N., R.58 W., Walsh County, Hydrologic Unit 09020308, 150 ft downstream from bridge on State Highway 35, and 6 mi north of Whitman.

DRAINAGE AREA.--47.7 mi², of which 8.8 mi² is noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1960 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,510 ft from topographic map.

REMARKS.--Records good.

AVERAGE DISCHARGE.--24 years, 3.03 ft³/s, 2,200 acre-ft/yr; median of yearly mean discharges, 2.2 ft³/s, 1,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 984 ft³/s May 19, 1974, gage height, 7.11 ft; no flow for many months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 25 ft³/s March 30, gage height, 4.41; no peak discharges above base of 70 ft³/s; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-----|------|------|--------|--------|------|------|-------|------|-----|
| 1 | .00 | .07 | .00 | .00 | .00 | .00 | 13 | .60 | .00 | .00 | .00 | .00 |
| 2 | .00 | .06 | .00 | .00 | .00 | .00 | 12 | .51 | .00 | .04 | .00 | .00 |
| 3 | .00 | .06 | .00 | .00 | .00 | .00 | 8.9 | .45 | .00 | .02 | .00 | .00 |
| 4 | .00 | .05 | .00 | .00 | .00 | .00 | 8.1 | .40 | .00 | .00 | .00 | .00 |
| 5 | .00 | .05 | .00 | .00 | .00 | .00 | 7.3 | .35 | .00 | .00 | .00 | .00 |
| 6 | .00 | .05 | .00 | .00 | .00 | .00 | 6.5 | .32 | .00 | .00 | .00 | .00 |
| 7 | .00 | .05 | .00 | .00 | .00 | .00 | 5.7 | .29 | .00 | .00 | .00 | .00 |
| 8 | .00 | .05 | .00 | .00 | .00 | .00 | 5.0 | .23 | .00 | .00 | .00 | .00 |
| 9 | .00 | .04 | .00 | .00 | .00 | .00 | 3.7 | .19 | .10 | .00 | .00 | .00 |
| 10 | .00 | .03 | .00 | .00 | .00 | .00 | 3.0 | .18 | .17 | .00 | .00 | .00 |
| 11 | .00 | .01 | .00 | .00 | .00 | .00 | 2.8 | .15 | .39 | .00 | .00 | .00 |
| 12 | .00 | .01 | .00 | .00 | .00 | .00 | 3.5 | .13 | .76 | .00 | .00 | .00 |
| 13 | .00 | .02 | .00 | .00 | .00 | .00 | 3.2 | .10 | .75 | .00 | .00 | .00 |
| 14 | .00 | .02 | .00 | .00 | .00 | .00 | 2.3 | .09 | .54 | .00 | .00 | .00 |
| 15 | .04 | .03 | .00 | .00 | .00 | .00 | 1.9 | .06 | .40 | .00 | .00 | .00 |
| 16 | .09 | .03 | .00 | .00 | .00 | .00 | 1.7 | .02 | .30 | .00 | .00 | .00 |
| 17 | .11 | .04 | .00 | .00 | .00 | .00 | 1.4 | .00 | .19 | .00 | .00 | .00 |
| 18 | .09 | .04 | .00 | .00 | .00 | .00 | 1.2 | .00 | .10 | .00 | .00 | .00 |
| 19 | .09 | .06 | .00 | .00 | .00 | .00 | 1.4 | .00 | .05 | .00 | .00 | .00 |
| 20 | .11 | .08 | .00 | .00 | .00 | .00 | 1.3 | .00 | .02 | .00 | .00 | .00 |
| 21 | .12 | .07 | .00 | .00 | .00 | 2.5 | 1.1 | .00 | .00 | .00 | .00 | .00 |
| 22 | .11 | .04 | .00 | .00 | .00 | 5.0 | .92 | .00 | .00 | .00 | .00 | .00 |
| 23 | .11 | .04 | .00 | .00 | .00 | 10 | .76 | .00 | .00 | .00 | .00 | .00 |
| 24 | .13 | .00 | .00 | .00 | .00 | 12 | .71 | .00 | .00 | .00 | .00 | .00 |
| 25 | .14 | .01 | .00 | .00 | .00 | 9.9 | .65 | .00 | .00 | .00 | .00 | .00 |
| 26 | .11 | .00 | .00 | .00 | .00 | 19 | .68 | .00 | .00 | .00 | .00 | .00 |
| 27 | .10 | .00 | .00 | .00 | .00 | 18 | 1.3 | .00 | .00 | .00 | .00 | .00 |
| 28 | .10 | .00 | .00 | .00 | .00 | 18 | 1.1 | .00 | .00 | .00 | .00 | .00 |
| 29 | .09 | .00 | .00 | .00 | .00 | 17 | 1.0 | .00 | .00 | .00 | .00 | .00 |
| 30 | .07 | .00 | .00 | .00 | --- | 17 | .79 | .00 | .00 | .00 | .00 | .00 |
| 31 | .07 | --- | .00 | .00 | --- | 16 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 1.68 | 1.01 | .00 | .00 | .00 | 144.40 | 102.91 | 4.07 | 3.77 | .06 | .00 | .00 |
| MEAN | .05 | .03 | .00 | .00 | .00 | 4.66 | 3.43 | .13 | .13 | .00 | .00 | .00 |
| MAX | .14 | .08 | .00 | .00 | .00 | 19 | 13 | .60 | .76 | .04 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .65 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | 3.3 | 2.0 | .00 | .00 | .00 | 286 | 204 | 8.1 | 7.5 | .1 | .00 | .00 |
| CAL YR 1983 | TOTAL | 766.30 | | MEAN | 2.10 | MAX | 49 | MIN | .00 | AC-FT | 1520 | |
| WTR YR 1984 | TOTAL | 257.90 | | MEAN | .70 | MAX | 19 | MIN | .00 | AC-FT | 512 | |

RED RIVER OF THE NORTH BASIN

05083600 MIDDLE BRANCH FOREST RIVER NEAR WHITMAN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| NOV 17... | 1540 | .04 | 5100 | -- | -.5 | .5 | -- | -- | -- | -- | -- | |
| MAR 23... | 1535 | 8.8 | 325 | -- | 7.5 | .5 | -- | -- | -- | -- | -- | |
| 30... | 1620 | 18 | 545 | 7.6 | 6.5 | .5 | 190 | 96 | 45 | 18 | 35 | |
| MAY 03... | 1325 | .46 | 2350 | -- | 11.0 | 13.0 | -- | -- | -- | -- | -- | |
| JUN 14... | 1220 | .57 | 3810 | -- | 16.5 | 16.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 28 | 1 | 7.9 | 110 | .000 | 91 | 4.4 | 150 | 12 | .10 | 12 | 352 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 340 | .48 | 17 | 3 | 20 | 70 | 0 | 20 | 320 | .7 | 0 | 160 |

05084000 FOREST RIVER NEAR FORDVILLE, ND

LOCATION.--Lat 48°11'50", long 97°43'49", on line between secs.32 and 33, T.155 N., R.55 W., Walsh County, Hydrologic Unit 09020308, on right bank 50 ft upstream from highway bridge, 0.5 mi downstream from South Branch, and 3 mi southeast of Fordville.

DRAINAGE AREA.--456 mi², of which about 120 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1940 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,035 ft, from topographic map. Prior to July 21, 1951, non-recording gage at site 50 ft downstream at same datum.

REMARKS.--Records good. Some regulation of high flows by temporary retention in several retarding basins above station. Retarding basins have a combined capacity of about 14,000 acre-ft.

AVERAGE DISCHARGE.--44 years, 38.3 ft³/s, 27,700 acre-ft/yr; median of yearly mean discharges, 36 ft³/s, 26,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,400 ft³/s Apr. 18, 1950, gage height, 14.48 ft, from flood-mark, from rating curve extended above 5,600 ft³/s on basis of contracted opening and slope-area measurements of peak flow; no flow Apr. 1-13, Sept. 3, 1940.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Mar. 24 | 1545 | *386 | 3.92 | Mar. 29 | -- | 202 | ice jam |

Minimum daily, 1.2 ft³/s Aug. 16.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|------|------|-------|-------|-------|-------|
| 1 | 11 | 6.0 | 6.2 | 2.9 | 15 | 12 | 124 | 38 | 14 | 13 | 6.9 | 23 |
| 2 | 13 | 5.0 | 5.7 | 2.9 | 15 | 10 | 113 | 35 | 13 | 13 | 6.7 | 21 |
| 3 | 11 | 4.6 | 5.4 | 3.0 | 14 | 9.1 | 102 | 33 | 12 | 12 | 6.5 | 18 |
| 4 | 11 | 4.2 | 5.7 | 3.4 | 13 | 8.3 | 91 | 32 | 13 | 11 | 6.9 | 15 |
| 5 | 11 | 5.2 | 5.8 | 5.1 | 13 | 8.0 | 85 | 32 | 15 | 11 | 7.2 | 7.9 |
| 6 | 11 | 7.3 | 5.8 | 5.6 | 13 | 8.6 | 77 | 32 | 17 | 9.8 | 6.2 | 7.5 |
| 7 | 12 | 7.7 | 5.6 | 5.6 | 13 | 7.5 | 70 | 32 | 18 | 10 | 3.3 | 7.6 |
| 8 | 13 | 7.5 | 5.1 | 5.6 | 13 | 7.5 | 58 | 30 | 26 | 12 | 17 | 7.8 |
| 9 | 12 | 7.3 | 4.3 | 5.8 | 13 | 6.9 | 51 | 28 | 36 | 10 | 8.4 | 7.6 |
| 10 | 13 | 7.4 | 3.9 | 6.2 | 16 | 6.9 | 48 | 28 | 48 | 10 | 7.6 | 7.5 |
| 11 | 13 | 23 | 4.5 | 6.3 | 17 | 6.9 | 47 | 26 | 40 | 11 | 7.4 | 6.1 |
| 12 | 15 | 46 | 5.1 | 7.1 | 15 | 6.9 | 58 | 26 | 31 | 9.9 | 5.8 | 1.8 |
| 13 | 15 | 36 | 5.1 | 7.5 | 14 | 6.5 | 84 | 26 | 27 | 9.7 | 1.8 | 1.6 |
| 14 | 13 | 14 | 5.4 | 6.9 | 13 | 6.5 | 92 | 25 | 23 | 9.1 | 1.7 | 1.7 |
| 15 | 6.3 | 7.9 | 5.1 | 6.9 | 12 | 6.0 | 71 | 25 | 22 | 8.4 | 1.5 | 1.9 |
| 16 | 5.8 | 7.5 | 5.1 | 7.4 | 11 | 6.0 | 58 | 24 | 20 | 8.2 | 1.2 | 2.3 |
| 17 | 4.6 | 7.0 | 4.7 | 7.5 | 10 | 5.1 | 52 | 24 | 19 | 8.4 | 1.6 | 2.4 |
| 18 | 4.3 | 7.9 | 4.7 | 7.5 | 9.3 | 5.6 | 47 | 23 | 17 | 7.9 | 1.6 | 2.7 |
| 19 | 4.7 | 7.2 | 4.6 | 7.5 | 8.4 | 5.6 | 42 | 22 | 16 | 7.5 | 1.5 | 16 |
| 20 | 5.3 | 8.1 | 4.2 | 7.5 | 7.5 | 6.0 | 40 | 22 | 15 | 7.5 | 1.8 | 49 |
| 21 | 4.5 | 8.2 | 4.2 | 7.5 | 7.6 | 6.9 | 36 | 22 | 15 | 8.0 | 1.8 | 27 |
| 22 | 4.6 | 7.9 | 4.2 | 7.5 | 10 | 9.8 | 33 | 22 | 14 | 7.9 | 1.7 | 3.4 |
| 23 | 4.8 | 7.5 | 4.2 | 7.5 | 42 | 44 | 32 | 20 | 14 | 7.5 | 1.7 | 2.2 |
| 24 | 5.3 | 7.4 | 4.2 | 8.3 | 46 | 278 | 31 | 20 | 13 | 7.5 | 1.6 | 3.0 |
| 25 | 4.2 | 6.7 | 4.2 | 11 | 34 | 353 | 31 | 19 | 13 | 7.4 | 1.6 | 4.0 |
| 26 | 5.0 | 6.5 | 4.1 | 11 | 28 | 275 | 31 | 18 | 15 | 7.5 | 1.8 | 2.7 |
| 27 | 5.8 | 6.1 | 3.8 | 11 | 23 | 224 | 35 | 17 | 13 | 7.3 | 1.6 | 2.2 |
| 28 | 5.7 | 6.0 | 3.8 | 11 | 17 | 196 | 39 | 16 | 13 | 6.7 | 1.3 | 2.0 |
| 29 | 15 | 6.3 | 3.8 | 11 | 14 | 156 | 39 | 15 | 12 | 6.6 | 2.0 | 1.9 |
| 30 | 39 | 6.5 | 3.6 | 11 | --- | 141 | 39 | 15 | 11 | 7.0 | 22 | 1.8 |
| 31 | 30 | --- | 3.3 | 12 | --- | 131 | --- | 16 | --- | 7.1 | 22 | --- |
| TOTAL | 328.9 | 295.9 | 145.4 | 227.0 | 476.8 | 1960.6 | 1756 | 763 | 575 | 279.9 | 161.7 | 258.6 |
| MEAN | 10.6 | 9.86 | 4.69 | 7.32 | 16.4 | 63.2 | 58.5 | 24.6 | 19.2 | 9.03 | 5.22 | 8.62 |
| MAX | 39 | 46 | 6.2 | 12 | 46 | 353 | 124 | 38 | 48 | 13 | 22 | 49 |
| MIN | 4.2 | 4.2 | 3.3 | 2.9 | 7.5 | 5.1 | 31 | 15 | 11 | 6.6 | 1.2 | 1.6 |
| AC-FT | 652 | 587 | 288 | 450 | 946 | 3890 | 3480 | 1510 | 1140 | 555 | 321 | 513 |
| CAL YR 1983 | TOTAL | 14252.8 | MEAN | 39.0 | MAX | 775 | MIN | 3.1 | AC-FT | 28270 | | |
| WTR YR 1984 | TOTAL | 7228.8 | MEAN | 19.8 | MAX | 353 | MIN | 1.2 | AC-FT | 14340 | | |

RED RIVER OF THE NORTH BASIN

05084000 FOREST RIVER NEAR FORDVILLE, ND--CONTINUED

PERIOD OF RECORD.--Water year 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-----------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 12... | 1625 | 15 | 684 | 8.3 | 5.0 | 6.5 | 320 | 70 | 77 | 30 | 29 |
| NOV 18... | 1130 | 7.9 | 765 | -- | 3.0 | 1.5 | -- | -- | -- | -- | -- |
| JAN 09... | 1435 | 5.6 | 790 | -- | -15.0 | .0 | -- | -- | -- | -- | -- |
| FEB 17... | 1310 | 10 | 720 | -- | 1.0 | .5 | -- | -- | -- | -- | -- |
| MAR 27... | 1320 | 220 | 518 | -- | 3.0 | .5 | -- | -- | -- | -- | -- |
| APR 18... | 1225 | 47 | 845 | 8.5 | 16.0 | 9.0 | 340 | 119 | 83 | 33 | 52 |
| MAY 03... | 1540 | 33 | 800 | -- | 12.5 | 12.0 | -- | -- | -- | -- | -- |
| JUN 14... | 1515 | 24 | 1130 | -- | 17.5 | 17.5 | -- | -- | -- | -- | -- |
| JUL 18... | 1125 | 7.3 | 695 | -- | 25.5 | 23.5 | -- | -- | -- | -- | -- |
| AUG 06... | 1345 | 6.0 | 695 | -- | 26.5 | 27.5 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|-----------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| OCT 12... | 16 | .7 | 7.4 | 300 | .000 | 250 | 2.4 | 120 | 9.7 | .20 | 21 | 463 |
| APR 18... | 24 | 1 | 7.9 | 270 | .000 | 230 | 1.4 | 210 | 18 | .20 | 17 | 564 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|-----------|--|--|--|---|---|---|---|---|---|---|--|---|
| OCT 12... | 440 | .63 | 19 | 6 | 50 | 10 | 4 | 30 | 730 | .3 | 0 | 260 |
| APR 18... | 560 | .77 | 72 | 3 | 50 | 10 | 0 | 40 | 370 | .1 | 1 | 290 |

RED RIVER OF THE NORTH BASIN

127

05085000 FOREST RIVER AT MINTO, ND

LOCATION.--Lat 48°16'10", long 97°22'10", in SE¼ sec.31, T.156 N., R.52 W., Walsh County, Hydrologic Unit 09020308, on right bank 30 ft upstream from dam in Minto, 150 ft upstream from Burlington Northern Railway bridge, and 900 ft east of U.S. Highway 81.

DRAINAGE AREA.--740 mi², of which about 120 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1944 to current year.

REVISED RECORDS.--WSP 1438: 1948-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 806.95 ft National Geodetic Vertical Datum of 1929. Prior to July 15, 1954, nonrecording gage at site 400 ft upstream at same datum.

REMARKS.--Records good except those for the winter periods, which are fair. Occasionally during high stages, particularly when the channel is filled with snow, overflow occurs 0.5 mi below the municipality of Forest River and bypasses the gage 3 mi south of Minto and flows into Lake Ardoch. Bypass flow is not included in computation of discharge record for station at Minto.

AVERAGE DISCHARGE.--40 years, 50.0 ft³/s, 36,200 acre-ft/yr; median of yearly mean discharges, 46 ft³/s, 33,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,600 ft³/s Apr. 18, 1950, gage height, 11.80 ft from flood-marks, from rating curve extended above 7,200 ft³/s on basis of contracted opening measurement of peak flow; no flow at times each year 1945-47, 1953-55, 1959-64.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 394 ft³/s March 26, gage height 2.77 ft backwater from ice, only peak above base of 200 ft³/s, minimum daily .20 ft³/s Jan. 21-29, Feb. 15, Aug. 31 - Sept. 3.

Minimum daily, 4.20 ft³/s several days.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|--------|--------|------|------|------|-------|-------|--------|
| 1 | 6.9 | 44 | 6.5 | 1.6 | .40 | 22 | 197 | 43 | 17 | 17 | 7.4 | .20 |
| 2 | 7.5 | 40 | 6.2 | 1.6 | .50 | 15 | 185 | 42 | 17 | 16 | 7.0 | .20 |
| 3 | 7.9 | 19 | 6.0 | 1.5 | .50 | 10 | 170 | 40 | 18 | 16 | 5.6 | .20 |
| 4 | 9.0 | 13 | 5.7 | 1.5 | .85 | 9.4 | 159 | 38 | 17 | 15 | 4.8 | 4.8 |
| 5 | 10 | 10 | 5.3 | 1.6 | 1.2 | 6.8 | 142 | 36 | 15 | 15 | 5.4 | 8.0 |
| 6 | 10 | 9.2 | 5.3 | 1.7 | .70 | 7.7 | 127 | 35 | 19 | 14 | 6.4 | 5.2 |
| 7 | 12 | 8.1 | 4.9 | 1.7 | .50 | 4.1 | 125 | 34 | 20 | 14 | 5.8 | 5.0 |
| 8 | 13 | 8.2 | 4.8 | 1.5 | .50 | 4.5 | 108 | 32 | 28 | 13 | 5.3 | 4.4 |
| 9 | 13 | 8.9 | 4.6 | 1.4 | .50 | 6.0 | 102 | 31 | 37 | 12 | 5.1 | 3.4 |
| 10 | 13 | 9.5 | 4.3 | 1.2 | .85 | 5.0 | 96 | 32 | 38 | 14 | 5.3 | 3.6 |
| 11 | 13 | 8.6 | 4.3 | 1.0 | 1.0 | 4.9 | 86 | 29 | 45 | 13 | 5.1 | 3.8 |
| 12 | 14 | 8.5 | 4.0 | 1.0 | 1.0 | 2.9 | 81 | 28 | 52 | 12 | 5.5 | 3.9 |
| 13 | 9.6 | 11 | 3.9 | .85 | 1.0 | 2.5 | 84 | 26 | 47 | 12 | 4.4 | 3.8 |
| 14 | 12 | 53 | 4.1 | .85 | .70 | 2.2 | 88 | 26 | 41 | 11 | 3.4 | 3.3 |
| 15 | 13 | 45 | 4.0 | .70 | .20 | 2.0 | 104 | 24 | 37 | 9.8 | 3.0 | 3.3 |
| 16 | 13 | 25 | 3.4 | .60 | .30 | 1.7 | 92 | 23 | 34 | 8.2 | 2.4 | 3.5 |
| 17 | 11 | 17 | 3.0 | .50 | .60 | 1.5 | 83 | 22 | 31 | 7.5 | 2.2 | 3.2 |
| 18 | 8.5 | 14 | 2.8 | .40 | .50 | 1.4 | 76 | 21 | 28 | 6.8 | 2.0 | 2.5 |
| 19 | 6.2 | 12 | 2.7 | .30 | .50 | 1.4 | 71 | 21 | 26 | 6.4 | 1.6 | 2.0 |
| 20 | 5.4 | 12 | 2.5 | .30 | .60 | 1.5 | 61 | 22 | 26 | 6.0 | 1.4 | 1.3 |
| 21 | 5.1 | 8.5 | 2.3 | .20 | 1.0 | 2.0 | 53 | 23 | 24 | 5.5 | 1.6 | .82 |
| 22 | 5.4 | 8.5 | 2.2 | .20 | 1.2 | 2.4 | 48 | 23 | 23 | 5.8 | 1.4 | .70 |
| 23 | 5.4 | 7.7 | 2.1 | .20 | 1.2 | 3.3 | 43 | 22 | 20 | 6.6 | 1.2 | 18 |
| 24 | 5.9 | 7.4 | 2.0 | .20 | 1.3 | 5.5 | 41 | 21 | 17 | 7.0 | .85 | 9.2 |
| 25 | 6.1 | 7.4 | 1.9 | .20 | 1.9 | 33 | 40 | 20 | 18 | 6.7 | .60 | 5.0 |
| 26 | 6.2 | 6.9 | 1.8 | .20 | 9.5 | 334 | 39 | 20 | 18 | 6.2 | .55 | 3.9 |
| 27 | 7.2 | 6.7 | 1.9 | .20 | 33 | 296 | 39 | 19 | 16 | 5.8 | .50 | 3.0 |
| 28 | 7.4 | 6.4 | 1.9 | .20 | 39 | 242 | 42 | 19 | 19 | 6.5 | .40 | 2.6 |
| 29 | 7.4 | 6.6 | 1.8 | .20 | 29 | 209 | 43 | 19 | 17 | 6.2 | .30 | 2.2 |
| 30 | 7.4 | 6.6 | 1.6 | .30 | --- | 209 | 45 | 19 | 16 | 6.5 | .25 | 2.2 |
| 31 | 12 | --- | 1.6 | .40 | --- | 203 | --- | 18 | --- | 5.9 | .20 | --- |
| TOTAL | 283.5 | 448.7 | 109.4 | 24.30 | 130.00 | 1651.7 | 2670 | 828 | 781 | 307.4 | 96.95 | 113.22 |
| MEAN | 9.15 | 15.0 | 3.53 | .78 | 4.48 | 53.3 | 89.0 | 26.7 | 26.0 | 9.92 | 3.13 | 3.77 |
| MAX | 14 | 53 | 6.5 | 1.7 | 39 | 334 | 197 | 43 | 52 | 17 | 7.4 | 18 |
| MIN | 5.1 | 6.4 | 1.6 | .20 | .20 | 1.4 | 39 | 18 | 15 | 5.5 | .20 | .20 |
| AC-FT | 562 | 890 | 217 | 48 | 258 | 3280 | 5300 | 1640 | 1550 | 610 | 192 | 225 |
| CAL YR 1983 | TOTAL | 18692.8 | | MEAN | 51.2 | MAX | 700 | MIN | 1.6 | AC-FT | 37080 | |
| WTR YR 1984 | TOTAL | 7444.17 | | MEAN | 20.3 | MAX | 334 | MIN | .20 | AC-FT | 14770 | |

RED RIVER OF THE NORTH BASIN

05085000 FOREST RIVER AT MINTO, ND--CONTINUED

PERIOD OF RECORD---Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 11... | 1635 | 12 | 745 | 8.4 | 6.0 | 9.0 | 330 | 81 | 78 | 32 | 37 | |
| NOV 23... | 1105 | 7.4 | 815 | -- | -7.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 11... | 1455 | .96 | 1650 | -- | -17.5 | .0 | -- | -- | -- | -- | -- | |
| FEB 15... | 1200 | .20 | 1900 | -- | 1.0 | .0 | -- | -- | -- | -- | -- | |
| APR 11... | 1210 | 87 | 662 | 8.2 | 8.0 | 4.5 | 270 | 85 | 67 | 26 | 37 | |
| MAY 07... | 1140 | 35 | 920 | -- | 6.0 | 8.0 | -- | -- | -- | -- | -- | |
| JUN 18... | 1605 | 26 | 1050 | -- | 24.0 | 23.0 | -- | -- | -- | -- | -- | |
| AUG 10... | 1425 | 5.4 | 820 | 8.1 | 18.5 | 22.5 | 330 | 90 | 74 | 36 | 48 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| OCT 11... | 19 | .9 | 8.8 | 300 | .000 | 250 | 1.9 | 130 | 22 | .20 | 14 | 498 |
| APR 11... | 22 | 1 | 7.4 | 230 | .000 | 190 | 2.3 | 140 | 14 | .10 | 18 | 439 |
| AUG 10... | 23 | 1 | 9.6 | 300 | .000 | 240 | 3.7 | 140 | 36 | .20 | 24 | 530 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| OCT 11... | 470 | .68 | 16 | 5 | 60 | 10 | 2 | 30 | 30 | .2 | 0 | 290 |
| APR 11... | 420 | .60 | 103 | 2 | 40 | 30 | 0 | 30 | 150 | .1 | 1 | 210 |
| AUG 10... | 510 | .72 | 7.7 | 8 | 60 | 30 | 0 | 36 | 520 | .0 | 0 | 280 |

RED RIVER OF THE NORTH BASIN

129

05088500 HOMME RESERVOIR NEAR PARK RIVER, ND

LOCATION.--Lat 48°24'20", long 97°47'10", in SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.19, T.157 N., R.55 W., Walsh County, Hydrologic Unit 09020310, at Homme Dam on South Branch Park River, and 2 mi west of town of Park River.

DRAINAGE AREA.--226 mi².

PERIOD OF RECORD.--September 1949 to current year.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by an earth-fill dam, 865 ft long; storage began in September 1949, dam completed in October 1950. Usable capacity between invert of outlet, elevation, 1,048.0 ft, and crest of spillway, elevation, 1,080.0 ft, is 3,550 acre-ft. Dead storage is 100 acre-ft. Low flows are controlled by two sluice gates 3 x 5 ft. The spillway, which is 150 ft long, is uncontrolled. The records herein represent total contents. The reservoir is operated for flood control, water supply, and pollution abatement during low-flow periods.

COOPERATION.--Records furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 4,710 acre-ft Apr. 20, 1979, elevation, 1,084.58 ft; minimum since first reaching spillway level, 184 acre-ft Feb. 8, 1952, elevation, 1,051.22 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 3,739 acre-ft Mar. 31, elevation, 1,080.42 ft; minimum, 2,877 acre-ft Jan. 27, elevation, 1,075.88 ft.

MONTHEND ELEVATION AND CONTENTS AT 0800, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 1,079.25 | 3,518 | -- |
| Oct. 31----- | 1,079.48 | 3,561 | +43 |
| Nov. 30----- | 1,079.00 | 3,470 | -91 |
| Dec. 31----- | 1,077.91 | 3,262 | -208 |
| CAL YR 1983----- | -- | -- | -151 |
| Jan. 31----- | 1,075.90 | 2,881 | -381 |
| Feb. 28----- | 1,077.00 | 3,090 | +209 |
| Mar. 31----- | 1,080.42 | 3,739 | +649 |
| Apr. 30----- | 1,080.12 | 3,682 | -57 |
| May 31----- | 1,079.65 | 3,593 | -89 |
| June 30----- | 1,079.98 | 3,656 | +63 |
| July 31----- | 1,078.75 | 3,422 | -234 |
| Aug. 31----- | 1,077.16 | 3,120 | -302 |
| Sept. 30----- | 1,076.65 | 3,024 | -96 |
| WTR YR 1984----- | -- | -- | -78 |

RED RIVER OF THE NORTH BASIN

05089000 SOUTH BRANCH PARK RIVER BELOW HOMME DAM, ND

LOCATION.--Lat 48°24'07", long 97°46'55", in SE¹/₄ sec.19, T.157 N., R.55 W., Walsh County, Hydrologic Unit 09020310, on right bank 0.5 mi downstream from Homme Dam, and 2 mi west of town of Park River.

DRAINAGE AREA.--226 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1949 to current year. Monthly discharge only for October and November 1949, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,000.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Flow regulated by Homme Lake (station 05088500).

AVERAGE DISCHARGE.--35 years, 26.6 ft³/s, 19,270 acre-ft/yr; median of yearly mean discharges, 22 ft³/s, 15,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 13,000 ft³/s Apr. 24, 1950, gage height, 37.52 ft, from rating curve extended above 5,500 ft³/s, result of failure of emergency embankment at site of Homme Dam; no flow Oct. 1 to Dec. 3, 1949, Oct. 1-4, 1969, Sept. 21, 1970, July 1, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 244 ft³/s Mar. 25, gage height, 24.83 ft; minimum daily, 0.05 ft³/s Feb. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|--------|-------|--------|-------|-------|-------|-------|-------|-------|
| 1 | .22 | .11 | 5.9 | 1.5 | .08 | 2.1 | 62 | 11 | 4.3 | 3.3 | 2.8 | 4.3 |
| 2 | .20 | .29 | 5.6 | 1.2 | .06 | 2.3 | 52 | 9.7 | 3.7 | 3.2 | 2.9 | 4.3 |
| 3 | .18 | .34 | 5.7 | .80 | .05 | 2.7 | 48 | 11 | 3.5 | 3.1 | 3.0 | 4.9 |
| 4 | .24 | .35 | 6.1 | .50 | .08 | 2.4 | 43 | 11 | 3.7 | 3.2 | 2.9 | 4.5 |
| 5 | .31 | .36 | 6.3 | .30 | .23 | 1.2 | 38 | 9.6 | 3.5 | 3.3 | 3.2 | 2.9 |
| 6 | .74 | .42 | 6.3 | .25 | .18 | .56 | 33 | 9.6 | 3.6 | 3.1 | 3.0 | 2.8 |
| 7 | .80 | .67 | 5.8 | .21 | .15 | .38 | 29 | 16 | 3.4 | 3.1 | 3.0 | 3.1 |
| 8 | .56 | 2.7 | 5.2 | .15 | .08 | .30 | 25 | 7.1 | 4.3 | 3.4 | 3.0 | 4.4 |
| 9 | .51 | 5.5 | 5.1 | .12 | .09 | .38 | 22 | 3.2 | 3.2 | 3.2 | 3.2 | 4.3 |
| 10 | .60 | 5.7 | 4.4 | 6.4 | .24 | .24 | 20 | 14 | 3.1 | 3.1 | 3.4 | 3.6 |
| 11 | .49 | 5.8 | 4.5 | 12 | .78 | .15 | 23 | 9.6 | 4.8 | 3.1 | 3.1 | 3.2 |
| 12 | .68 | 5.9 | 5.3 | 12 | .67 | .19 | 28 | 4.5 | 8.6 | 3.1 | 3.2 | 3.9 |
| 13 | .64 | 5.9 | 5.5 | 12 | .53 | .23 | 41 | 4.2 | 7.0 | 2.7 | 3.3 | 4.6 |
| 14 | .49 | 5.7 | 5.5 | 12 | .35 | .53 | 35 | 4.2 | 3.9 | 2.6 | 3.4 | 4.1 |
| 15 | .43 | 5.7 | 5.2 | 12 | .25 | .43 | 32 | 4.1 | 3.9 | 2.6 | 4.0 | 2.2 |
| 16 | .42 | 5.7 | 5.1 | 12 | .25 | .46 | 24 | 4.4 | 4.3 | 2.4 | 3.8 | 1.7 |
| 17 | .29 | 5.7 | 5.5 | 12 | .33 | .36 | 19 | 10 | 7.3 | 2.4 | 4.1 | 1.8 |
| 18 | .19 | 5.8 | 5.9 | 12 | .19 | .49 | 16 | 9.1 | 5.5 | 2.4 | 3.7 | 1.6 |
| 19 | .20 | 5.2 | 5.9 | 12 | .11 | 1.1 | 14 | 4.6 | 2.9 | 2.2 | 4.1 | .80 |
| 20 | .27 | 5.4 | 5.7 | 12 | 1.5 | 1.4 | 13 | 4.4 | 3.0 | 2.3 | 4.2 | .79 |
| 21 | .21 | 5.5 | 5.7 | 12 | 2.9 | 2.0 | 11 | 4.5 | 3.3 | 2.3 | 4.1 | 1.1 |
| 22 | .19 | 5.7 | 5.5 | 12 | 1.3 | 2.6 | 9.7 | 5.6 | 4.7 | 2.3 | 4.0 | .63 |
| 23 | .18 | 5.8 | 5.0 | 12 | 1.2 | 2.8 | 9.8 | 4.3 | 5.3 | 2.1 | 3.7 | .33 |
| 24 | .21 | 5.9 | 5.3 | 12 | .95 | 3.5 | 14 | 6.6 | 3.7 | 2.2 | 3.6 | .21 |
| 25 | .28 | 5.1 | 6.9 | 12 | 1.3 | 177 | 6.7 | 4.1 | 3.4 | 2.3 | 3.4 | .13 |
| 26 | .18 | 5.3 | 4.8 | 11 | .93 | 212 | 7.9 | 4.2 | 4.5 | 2.2 | 3.4 | .13 |
| 27 | .14 | 5.4 | 3.8 | 6.0 | .67 | 155 | 16 | 4.1 | 3.5 | 2.4 | 4.0 | .19 |
| 28 | .12 | 5.5 | 3.0 | .54 | .97 | 120 | 23 | 4.5 | 3.3 | 2.4 | 4.6 | .17 |
| 29 | .12 | 5.8 | 2.6 | .23 | 1.4 | 86 | 10 | 4.2 | 3.1 | 2.3 | 4.6 | .12 |
| 30 | .09 | 5.9 | 2.2 | .17 | --- | 69 | 17 | 4.8 | 3.0 | 2.5 | 4.8 | .08 |
| 31 | .10 | --- | 1.8 | .16 | --- | 67 | --- | 5.2 | --- | 2.6 | 3.8 | --- |
| TOTAL | 10.28 | 129.14 | 157.1 | 209.53 | 17.82 | 914.80 | 742.1 | 213.4 | 125.3 | 83.4 | 111.3 | 66.88 |
| MEAN | .33 | 4.30 | 5.07 | 6.76 | .61 | 29.5 | 24.7 | 6.88 | 4.18 | 2.69 | 3.59 | 2.23 |
| MAX | .80 | 5.9 | 6.9 | 12 | 2.9 | 212 | 62 | 16 | 8.6 | 3.4 | 4.8 | 4.9 |
| MIN | .09 | .11 | 1.8 | .12 | .05 | .15 | 6.7 | 3.2 | 2.9 | 2.1 | 2.8 | .08 |
| AC-FT | 20 | 256 | 312 | 416 | 35 | 1810 | 1470 | 423 | 249 | 165 | 221 | 133 |
| CAL YR 1983 | TOTAL | 8455.02 | | MEAN | 23.2 | MAX | 564 | MIN | .09 | AC-FT | 16770 | |
| WTR YR 1984 | TOTAL | 2781.05 | | MEAN | 7.60 | MAX | 212 | MIN | .05 | AC-FT | 5520 | |

05089000 SOUTH BRANCH PARK RIVER BELOW HOMME DAM, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | | |
|--------------|------|---|--|---|--|--|--|--|--|---|--|---|---|
| OCT 12... | 1320 | .70 | 756 | 8.0 | 2.5 | 7.0 | 300 | 99 | 73 | 28 | 50 | | |
| NOV 18... | 1340 | 5.8 | 725 | -- | 4.5 | 3.5 | -- | -- | -- | -- | -- | | |
| JAN 06... | 1310 | .27 | 960 | -- | 4.0 | .5 | -- | -- | -- | -- | -- | | |
| FEB 15... | 1005 | .24 | 970 | -- | .5 | .5 | -- | -- | -- | -- | -- | | |
| MAR 27... | 1505 | 152 | 402 | -- | 3.0 | 1.0 | -- | -- | -- | -- | -- | | |
| APR 18... | 0910 | 17 | 742 | 8.2 | -- | 4.5 | 290 | 108 | 71 | 27 | 49 | | |
| MAY 03... | 1050 | 11 | 770 | -- | 7.5 | 8.5 | -- | -- | -- | -- | -- | | |
| JUN 28... | 1325 | 3.2 | 805 | -- | 23.0 | 22.5 | -- | -- | -- | -- | -- | | |
| AUG 09... | 1645 | 3.5 | 842 | 8.0 | -- | 21.5 | 330 | 112 | 79 | 32 | 53 | | |
| | | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | |
| OCT 12... | 26 | 1 | 11 | 240 | .000 | 200 | 3.9 | 190 | 14 | .20 | 16 | 523 | |
| APR 18... | 26 | 1 | 8.7 | 220 | .000 | 180 | 2.2 | 190 | 14 | .20 | 9.8 | 486 | |
| AUG 09... | 25 | 1 | 11 | 220 | 21 | 220 | 3.5 | 200 | 17 | .20 | 12 | 561 | |
| | | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| OCT 12... | 500 | .71 | .99 | 3 | 90 | 0 | 3 | 40 | 380 | .2 | 0 | 360 | |
| APR 18... | 480 | .66 | 22 | 2 | 50 | 20 | 0 | 50 | 600 | .0 | 0 | 340 | |
| AUG 09... | 560 | .76 | 5.3 | 7 | 60 | 20 | 0 | 45 | 2000 | .0 | 0 | 370 | |

RED RIVER OF THE NORTH BASIN

05089100 MIDDLE BRANCH PARK RIVER NEAR UNION, ND

LOCATION.--Lat 48°32'32", long 98°01'10", on north line of sec.5, T.158 N., R.57 W., Walsh County, Hydrologic Unit 09020310, on left bank 20 ft downstream from bridge on county highway between Walsh and Cavalier Counties, and 3.5 mi southwest of Union.

DRAINAGE AREA.--15.3 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1965 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Altitude of gage is 1,495 ft, from topographic map.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--17 years (1965 to 1982), 2.18 ft³/s, 1,580 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 960 ft³/s Apr. 20, 1979, gage height, 6.16 ft, backwater from ice; maximum gage height, 7.51 ft May 4, 1966, from floodmark, backwater from snowdrift; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 71 ft³/s July 14, gage height, 3.38 ft. Maximum gage height, 4.97 Mar. 28, backwater from ice; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-------|-------|------|------|-------|------|-----|
| 1 | | | | | | .00 | 12 | .61 | .08 | .09 | .03 | .00 |
| 2 | | | | | | .00 | 11 | .42 | .08 | .12 | .00 | .00 |
| 3 | | | | | | .00 | 10 | .40 | .08 | .08 | .01 | .00 |
| 4 | | | | | | .00 | 9.5 | .28 | .08 | .11 | .00 | .00 |
| 5 | | | | | | .00 | 8.7 | .24 | .07 | .08 | .01 | .00 |
| 6 | | | | | | .00 | 7.9 | .23 | .08 | .08 | .01 | .00 |
| 7 | | | | | | .00 | 7.1 | .19 | .14 | .08 | .01 | .00 |
| 8 | | | | | | .00 | 6.3 | .17 | 1.3 | .08 | .01 | .00 |
| 9 | | | | | | .00 | 5.4 | .16 | .50 | .07 | .01 | .00 |
| 10 | | | | | | .00 | 4.6 | .16 | .24 | .06 | .02 | .00 |
| 11 | | | | | | .00 | 3.8 | .16 | .17 | .04 | .00 | .00 |
| 12 | | | | | | .00 | 2.8 | .16 | .10 | .04 | .00 | .00 |
| 13 | | | | | | .00 | 1.8 | .16 | .05 | .26 | .00 | .00 |
| 14 | | | | | | .00 | 1.3 | .16 | .03 | 12 | .02 | .00 |
| 15 | | | | | | .00 | .76 | .16 | .00 | .52 | .02 | .00 |
| 16 | | | | | | .00 | .49 | .16 | .00 | .11 | .03 | .00 |
| 17 | | | | | | .00 | .42 | .15 | .00 | .03 | .03 | .00 |
| 18 | | | | | | .00 | .47 | .15 | .00 | .00 | .06 | .00 |
| 19 | | | | | | .00 | .42 | .14 | .00 | .00 | .15 | .00 |
| 20 | | | | | | .00 | .29 | .14 | .00 | .00 | .22 | .00 |
| 21 | | | | | | .00 | .32 | .15 | .00 | .00 | .20 | .00 |
| 22 | | | | | | .00 | .22 | .14 | .00 | .00 | .18 | .00 |
| 23 | | | | | | .00 | .26 | .14 | .00 | .03 | .19 | .00 |
| 24 | | | | | | .00 | .26 | .14 | .00 | .01 | .18 | .00 |
| 25 | | | | | | 2.5 | .24 | .14 | .00 | .01 | .18 | .00 |
| 26 | | | | | | 5.2 | .24 | .12 | .02 | .02 | .14 | .00 |
| 27 | | | | | | 8.3 | .47 | .08 | .04 | .02 | .04 | .00 |
| 28 | | | | | | 9.5 | .38 | .08 | .04 | .00 | .00 | .00 |
| 29 | | | | | | 14 | .48 | .07 | .03 | .02 | .00 | .00 |
| 30 | | | | | | 16 | .80 | .07 | .03 | .01 | .00 | .00 |
| 31 | | | | | | 15 | --- | .07 | --- | .03 | .00 | --- |
| TOTAL | | | | | | 70.50 | 98.72 | 5.60 | 3.16 | 14.00 | 1.75 | .00 |
| MEAN | | | | | | 2.27 | 3.29 | .18 | .11 | .45 | .06 | .00 |
| MAX | | | | | | 16 | 12 | .61 | 1.3 | 12 | .22 | .00 |
| MIN | | | | | | .00 | .22 | .07 | .00 | .00 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

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05089100 MIDDLE BRANCH PARK RIVER NEAR UNION, ND---CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 12... | 1110 | .09 | 705 | -- | 1.0 | 4.0 | -- | -- | -- | -- | -- | |
| MAR 27... | 0950 | 7.2 | 278 | -- | 2.5 | .5 | -- | -- | -- | -- | -- | |
| APR 12... | 1305 | 3.0 | 585 | 7.8 | 8.0 | 5.0 | 160 | 18 | 39 | 15 | 64 | |
| MAY 02... | 1035 | .37 | 730 | -- | 3.5 | 6.0 | -- | -- | -- | -- | -- | |
| JUN 29... | 1110 | .03 | 750 | -- | 20.5 | 18.5 | -- | -- | -- | -- | -- | |
| AUG 09... | 1400 | .01 | 648 | 7.8 | 23.5 | 19.5 | 210 | 0 | 54 | 18 | 66 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 12... | 45 | 2 | 8.1 | 170 | .000 | 140 | 4.3 | 110 | 17 | .20 | 18 | 329 |
| AUG 09... | 40 | 2 | 8.1 | 400 | .000 | 330 | 10 | 3.3 | 15 | .40 | 34 | 412 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 12... | 360 | .45 | 2.7 | 1 | 70 | 370 | 0 | 50 | 480 | 2.6 | 0 | 150 |
| AUG 09... | 390 | .56 | .01 | 1 | 80 | 60 | 0 | 43 | 380 | .1 | 0 | 170 |

RED RIVER OF THE NORTH BASIN

05089500 CART CREEK AT MOUNTAIN, ND

LOCATION.--Lat 48°40'37", long 97°51'41", in SW1/4 sec.15, T.160 N., R.56 W., Pembina County, Hydrologic Unit 09020310, on right bank 50 ft downstream from bridge on State Highway 32, and 0.7 mi south of Mountain.

DRAINAGE AREA.--16.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1954 to current year (discontinued).

GAGE.--Water-stage recorder and wooden control. Datum of gage is 1,027.40 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--30 years, 2.78 ft³/s, 2,010 acre-ft/yr; median of yearly mean discharges, 2.6 ft³/s, 1,880 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,300 ft³/s June 18, 1964, gage height, 9.18 ft; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 22 ft³/s Mar. 26, gage height 3.04 ft, backwater from ice. Maximum observed gage height, 3.40 ft Mar. 22; no peaks above base of 30 ft³/s; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|------|--------|--------|-------|-------|-------|------|-----|
| 1 | .56 | .41 | .18 | .00 | .00 | .02 | 13 | 2.9 | .55 | .44 | .00 | .00 |
| 2 | .46 | .36 | .17 | .00 | .00 | .01 | 11 | 2.6 | .46 | .22 | .00 | .00 |
| 3 | .76 | .34 | .16 | .00 | .00 | .00 | 9.2 | 1.8 | .35 | .20 | .00 | .00 |
| 4 | .31 | .40 | .15 | .00 | .00 | .00 | 7.2 | 1.3 | .34 | .12 | .00 | .00 |
| 5 | .19 | .42 | .14 | .00 | .00 | .00 | 6.9 | 1.0 | .55 | .09 | .00 | .00 |
| 6 | .11 | .39 | .13 | .00 | .00 | .00 | 7.5 | .92 | .50 | .07 | .00 | .00 |
| 7 | .36 | .41 | .12 | .00 | .00 | .00 | 6.6 | .85 | .92 | .04 | .00 | .00 |
| 8 | .31 | .37 | .11 | .00 | .00 | .00 | 6.1 | 1.1 | 2.6 | .29 | .00 | .00 |
| 9 | .13 | .34 | .10 | .00 | .00 | .00 | 5.2 | 1.0 | 2.8 | .25 | .00 | .00 |
| 10 | .17 | .31 | .09 | .00 | .00 | .00 | 3.1 | 1.2 | .85 | .14 | .00 | .00 |
| 11 | .18 | .27 | .08 | .00 | .00 | .00 | 3.6 | 1.0 | .46 | .10 | .00 | .00 |
| 12 | .31 | .31 | .07 | .00 | .00 | .00 | 13 | 1.0 | .42 | .10 | .00 | .00 |
| 13 | .39 | .45 | .06 | .00 | .00 | .00 | 8.5 | 1.0 | .31 | .17 | .00 | .00 |
| 14 | .28 | .57 | .05 | .00 | .00 | .00 | 5.5 | .92 | .24 | .32 | .00 | .00 |
| 15 | .27 | .49 | .04 | .00 | .00 | .00 | 4.0 | .92 | .21 | .23 | .00 | .00 |
| 16 | .39 | .45 | .03 | .00 | .00 | .00 | 3.1 | .85 | .24 | .18 | .00 | .00 |
| 17 | .31 | .40 | .02 | .00 | .00 | .00 | 2.6 | .79 | .21 | .18 | .00 | .00 |
| 18 | .26 | .50 | .01 | .00 | .00 | .00 | 1.8 | .64 | .18 | .19 | .00 | .00 |
| 19 | .29 | .49 | .00 | .00 | .00 | .00 | 1.4 | .79 | .25 | .17 | .00 | .00 |
| 20 | .38 | .60 | .00 | .00 | .00 | .00 | 1.2 | .98 | .23 | .19 | .00 | .00 |
| 21 | .36 | .44 | .00 | .00 | .10 | .00 | .98 | 1.6 | .25 | .21 | .00 | .00 |
| 22 | .35 | .35 | .00 | .00 | .20 | 1.2 | .92 | 1.1 | .24 | .18 | .00 | .00 |
| 23 | .33 | .35 | .00 | .00 | .10 | 2.1 | .85 | .79 | .20 | .18 | .00 | .00 |
| 24 | .51 | .30 | .00 | .00 | .10 | 5.8 | .85 | .74 | .18 | .16 | .00 | .00 |
| 25 | .42 | .27 | .00 | .00 | .08 | 14 | .85 | .69 | .15 | .14 | .00 | .00 |
| 26 | .33 | .25 | .00 | .00 | .06 | 22 | .79 | .64 | .12 | .12 | .00 | .00 |
| 27 | .33 | .23 | .00 | .00 | .06 | 13 | 4.0 | .64 | .17 | .10 | .00 | .00 |
| 28 | .31 | .20 | .00 | .00 | .04 | 13 | 4.2 | .64 | .12 | .08 | .00 | .00 |
| 29 | .27 | .15 | .00 | .00 | .04 | 12 | 2.6 | .64 | .10 | .06 | .00 | .00 |
| 30 | .36 | .19 | .00 | .00 | --- | 11 | 4.2 | .69 | .06 | .04 | .00 | .00 |
| 31 | .38 | --- | .00 | .00 | --- | 13 | --- | .64 | --- | .02 | .00 | --- |
| TOTAL | 10.37 | 11.01 | 1.71 | .00 | .78 | 107.13 | 140.74 | 32.37 | 14.26 | 4.98 | .00 | .00 |
| MEAN | .33 | .37 | .05 | .00 | .03 | 3.46 | 4.69 | 1.04 | .48 | .16 | .00 | .00 |
| MAX | .76 | .60 | .18 | .00 | .20 | 22 | 13 | 2.9 | 2.8 | .44 | .00 | .00 |
| MIN | .11 | .15 | .00 | .00 | .00 | .00 | .79 | .64 | .06 | .02 | .00 | .00 |
| AC-FT | 21 | 22 | 3.4 | .00 | 1.5 | 212 | 279 | 64 | 28 | 9.9 | .00 | .00 |
| CAL YR 1983 | TOTAL | 1278.87 | | MEAN | 3.50 | MAX | 92 | MIN | .00 | AC-FT | 2540 | |
| WTR YR 1984 | TOTAL | 323.35 | | MEAN | .88 | MAX | 22 | MIN | .00 | AC-FT | 641 | |

RED RIVER OF THE NORTH BASIN

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05089500 CART CREEK AT MOUNTAIN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|--|
| OCT 07... | 1405 | .37 | 1030 | 8.0 | 10.0 | 9.0 | 480 | 205 | 130 | 37 | 49 | |
| NOV 17... | 1325 | .49 | 1020 | -- | 1.0 | .5 | -- | -- | -- | -- | -- | |
| MAR 26... | 1730 | 8.6 | 400 | -- | 3.0 | .5 | -- | -- | -- | -- | -- | |
| APR 12... | 1115 | 11 | 792 | 8.0 | -- | .5 | 290 | 143 | 79 | 22 | 52 | |
| MAY 02... | 0915 | 2.3 | 775 | -- | 1.5 | 6.0 | -- | -- | -- | -- | -- | |
| JUN 29... | 1345 | .07 | 1080 | -- | 25.0 | 21.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| OCT 07... | 18 | 1 | 11 | 330 | .000 | 270 | 5.3 | 280 | 22 | .60 | 24 | 734 |
| APR 12... | 28 | 1 | 7.0 | 180 | .000 | 150 | 2.8 | 230 | 19 | .30 | 19 | 546 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| OCT 07... | 720 | 1.0 | .73 | 2 | 110 | 20 | 1 | 60 | 100 | .2 | 1 | 460 |
| APR 12... | 520 | .74 | 16 | 2 | 80 | 60 | 0 | 60 | 610 | .1 | 4 | 360 |

RED RIVER OF THE NORTH BASIN

05090000 PARK RIVER AT GRAFTON, ND

LOCATION.--Lat 48°25'24", long 97°24'30", in NE1/4 sec.13, T.157 N., R.53 W., Walsh County, Hydrologic Unit 09020310, on right bank 30 ft upstream from Wakeman Avenue bridge in Grafton, and 3.5 mi downstream from South Branch.

DRAINAGE AREA.--695 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: 1941. WSP 1438: 1932, 1933(M), 1936-37(M), 1939(M), 1944. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 807.39 ft National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1940, nonrecording gage at site 30 ft downstream at same datum. Oct. 1, 1940, to Sept. 17, 1946, nonrecording gage at site 2 mi downstream above masonry dam at same datum. Sept. 18, 1946, to July 25, 1952, nonrecording gage at site 30 ft downstream at same datum.

REMARKS.--Records fair. Flow regulated by Homme Lake (station 05088500) and several small reservoirs.

AVERAGE DISCHARGE.--53 years, 57.8 ft³/s, 41,900 acre-ft/yr; median of yearly mean discharges, 43 ft³/s, 31,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,600 ft³/s Apr. 19, 1950, gage height, 20.13 ft, result of dam failure, from rating curve extended above 9,000 ft³/s; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Maximum observed discharge, 269 ft³/s Mar. 27, gage height, 8.72 ft; no flow Sept. 19-30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|-------|-------|--------|------|-------|-------|-------|-------|------|
| 1 | .15 | 1.3 | 1.5 | .60 | .40 | 3.0 | 136 | 66 | 7.9 | 6.0 | 2.6 | .20 |
| 2 | .17 | 1.7 | 1.4 | .50 | .40 | 3.0 | 129 | 55 | 6.9 | 6.0 | 1.5 | .20 |
| 3 | .17 | 1.7 | 1.4 | .50 | .40 | 3.0 | 119 | 37 | 6.0 | 6.0 | 1.5 | .15 |
| 4 | .18 | 1.7 | 1.4 | .50 | .40 | 3.0 | 106 | 37 | 6.0 | 4.0 | 1.3 | .15 |
| 5 | .19 | 2.6 | 1.3 | .50 | .40 | 3.0 | 106 | 34 | 7.9 | 2.9 | 1.3 | .15 |
| 6 | .22 | 3.1 | 1.2 | .50 | .40 | 3.0 | 89 | 29 | 11 | 2.0 | 1.3 | .10 |
| 7 | .79 | 6.0 | 1.2 | .50 | .40 | 3.0 | 87 | 28 | 12 | 2.0 | 2.0 | .05 |
| 8 | .79 | 5.2 | 1.2 | .50 | .40 | 3.0 | 87 | 31 | 39 | 2.6 | 1.9 | .05 |
| 9 | 1.1 | 4.0 | 1.2 | .50 | .50 | 3.0 | 73 | 23 | 47 | 2.3 | 1.8 | .05 |
| 10 | 3.5 | 3.0 | 1.2 | .50 | .80 | 3.0 | 71 | 23 | 55 | 2.0 | 1.7 | .10 |
| 11 | .80 | 6.0 | 1.2 | .50 | 1.0 | 3.0 | 74 | 21 | 54 | 2.0 | 1.5 | .10 |
| 12 | 1.3 | 9.0 | 1.2 | .50 | 1.0 | 3.0 | 91 | 23 | 54 | 2.0 | 1.4 | .10 |
| 13 | 1.3 | 11 | 1.2 | .50 | 1.0 | 3.0 | 94 | 23 | 37 | 4.0 | 1.3 | .10 |
| 14 | .92 | 11 | 1.2 | .50 | 1.0 | 2.5 | 126 | 17 | 31 | 3.0 | 1.2 | .10 |
| 15 | 1.1 | 9.0 | 1.1 | .50 | 2.0 | 2.5 | 121 | 12 | 31 | 2.0 | 1.1 | .05 |
| 16 | 2.1 | 9.0 | 1.1 | .50 | 3.0 | 2.0 | 96 | 9.8 | 15 | 1.7 | .90 | .05 |
| 17 | 2.0 | 5.7 | 1.0 | .50 | 2.0 | 2.0 | 76 | 9.8 | 12 | 1.3 | .80 | .05 |
| 18 | 1.3 | 9.8 | .80 | .50 | 2.0 | 2.5 | 62 | 15 | 11 | 1.1 | .70 | .02 |
| 19 | 1.7 | 11 | .70 | .50 | 2.0 | 3.0 | 49 | 17 | 9.8 | 1.5 | .58 | .00 |
| 20 | 1.7 | 9.8 | .70 | .50 | 2.0 | 3.0 | 42 | 15 | 7.1 | 1.1 | 2.0 | .00 |
| 21 | 1.7 | 7.9 | .70 | .45 | 3.0 | 6.0 | 41 | 15 | 5.2 | 1.1 | 1.3 | .00 |
| 22 | 1.7 | 6.0 | .70 | .45 | 4.0 | 10 | 56 | 15 | 5.2 | 1.5 | 1.7 | .00 |
| 23 | 1.7 | 2.3 | .70 | .40 | 3.0 | 10 | 46 | 13 | 5.2 | 1.1 | 1.7 | .00 |
| 24 | 3.5 | 1.7 | .70 | .40 | 3.0 | 10 | 46 | 13 | 6.0 | .92 | 1.5 | .00 |
| 25 | 1.3 | 1.6 | .60 | .40 | 3.0 | 30 | 42 | 12 | 6.0 | .92 | 1.1 | .00 |
| 26 | 1.1 | 1.5 | .60 | .40 | 3.0 | 152 | 39 | 12 | 6.0 | .79 | .79 | .00 |
| 27 | 1.2 | 1.5 | .60 | .40 | 3.0 | 231 | 37 | 9.8 | 5.2 | .68 | 1.3 | .00 |
| 28 | 1.7 | 1.5 | .60 | .40 | 3.0 | 208 | 46 | 11 | 6.0 | .79 | .58 | .00 |
| 29 | 1.5 | 1.5 | .60 | .40 | 3.0 | 158 | 57 | 9.8 | 4.6 | 1.1 | .50 | .00 |
| 30 | 1.5 | 1.5 | .60 | .40 | --- | 158 | 85 | 9.0 | 4.0 | 3.5 | .29 | .00 |
| 31 | 1.7 | --- | .60 | .40 | --- | 108 | --- | 7.9 | --- | 1.7 | .24 | --- |
| TOTAL | 40.08 | 148.6 | 30.20 | 14.60 | 49.50 | 1137.5 | 2329 | 653.1 | 514.0 | 69.60 | 39.38 | 1.77 |
| MEAN | 1.29 | 4.95 | .97 | .47 | 1.71 | 36.7 | 77.6 | 21.1 | 17.1 | 2.25 | 1.27 | .06 |
| MAX | 3.5 | 11 | 1.5 | .60 | 4.0 | 231 | 136 | 66 | 55 | 6.0 | 2.6 | .20 |
| MIN | .15 | 1.3 | .60 | .40 | .40 | 2.0 | 37 | 7.9 | 4.0 | .68 | .24 | .00 |
| CAL YR 1983 | TOTAL | 27609.83 | | MEAN | 75.6 | MAX | 1360 | MIN | .12 | | | |
| WTR YR 1984 | TOTAL | 5027.33 | | MEAN | 13.7 | MAX | 231 | MIN | .00 | | | |

RED RIVER OF THE NORTH BASIN

137

05090000 PARK RIVER AT GRAFTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 11... | 1355 | .72 | 1120 | 8.0 | 5.0 | 9.0 | 340 | 101 | 75 | 36 | 110 | |
| NOV 22... | 1445 | 7.0 | 1920 | -- | -4.5 | 1.0 | -- | -- | -- | -- | -- | |
| JAN 11... | 1255 | .53 | 1780 | -- | -17.5 | .0 | -- | -- | -- | -- | -- | |
| APR 11... | 1350 | 72 | 610 | 8.1 | -- | 3.0 | 210 | 90 | 53 | 20 | 46 | |
| MAY 07... | 0955 | 23 | 875 | -- | 6.0 | 7.0 | -- | -- | -- | -- | -- | |
| JUN 13... | 1525 | 35 | 1150 | -- | 23.5 | 18.0 | -- | -- | -- | -- | -- | |
| AUG 10... | 1150 | 1.7 | 1390 | 8.1 | -- | 21.5 | 450 | 186 | 95 | 52 | 130 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| OCT 11... | 41 | 3 | 11 | 290 | .000 | 230 | 4.6 | 190 | 110 | .30 | 19 | 669 |
| APR 11... | 31 | 1 | 9.1 | 150 | .000 | 120 | 1.9 | 130 | 31 | .20 | 7.7 | 312 |
| AUG 10... | 38 | 3 | 14 | 330 | .000 | 270 | 4.1 | 320 | 110 | .50 | 15 | 906 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| OCT 11... | 690 | .91 | 1.3 | 7 | 240 | 20 | 1 | 60 | 40 | .5 | 1 | 360 |
| APR 11... | 370 | .42 | 61 | 2 | 80 | 30 | 0 | 30 | 290 | 1.0 | 0 | 200 |
| AUG 10... | 900 | 1.2 | 4.2 | 7 | 240 | 40 | 0 | 75 | 240 | .1 | 0 | 520 |

RED RIVER OF THE NORTH BASIN

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND

LOCATION.--Lat 48°34'20", long 97°08'50", in SE1/4SE1/4SE1/4 sec.24, T.159 N., R.51 W., Pembina County, Hydrologic Unit 09020311, on downstream end of east pier of interstate highway bridge, 1.5 mi northeast of Drayton, and at mile 206.7.

DRAINAGE AREA.--34,800 mi², approximately, includes 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1936 to June 1937, April 1941 to current year (fragmentary prior to April 1949).

REVISED RECORDS.--WSP 1388: 1949-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft National Geodetic Vertical Datum of 1929 (Minnesota highway benchmark). Prior to Nov. 30, 1954, nonrecording gage at site 1.5 mi upstream at datum 1.59 ft higher.

REMARKS.--Records good. Some regulation by reservoirs on tributaries.

AVERAGE DISCHARGE.--35 years (1949-84), 3,818 ft³/s, 2,766,000 acre-ft/yr; median of yearly mean discharges, 2,890 ft³/s, 2,094,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 92,900 ft³/s Apr. 28, 1979, gage height, 43.66 ft; minimum observed, 7.7 ft³/s Oct. 16, 1936, gage height, 1.75 ft, former site and datum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1897 reached a stage of about 41 ft, at site and datum in use prior to Nov. 30, 1954.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32,400 ft³/s Apr. 6, maximum gage height, 35.33 ft Apr. 7; minimum daily, 834 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|--------|-------|-------|--------|---------|--------|--------|--------|---------|-------|
| 1 | 1860 | 2250 | 1320 | 1590 | 1550 | 2410 | 22500 | 5500 | 2450 | 5590 | 1850 | 1080 |
| 2 | 1780 | 2190 | 1430 | 1570 | 1540 | 2460 | 25100 | 5500 | 2370 | 5570 | 1830 | 1060 |
| 3 | 1700 | 2150 | 1580 | 1590 | 1540 | 2530 | 28300 | 5430 | 2310 | 5420 | 1820 | 1020 |
| 4 | 1640 | 2070 | 1730 | 1620 | 1520 | 2620 | 30200 | 5390 | 2260 | 5190 | 1780 | 999 |
| 5 | 1600 | 1990 | 1870 | 1620 | 1470 | 2690 | 32000 | 5220 | 2260 | 4990 | 1720 | 999 |
| 6 | 1590 | 1940 | 1950 | 1640 | 1470 | 2740 | 32400 | 5180 | 2240 | 4780 | 1650 | 1020 |
| 7 | 1610 | 1960 | 1970 | 1660 | 1480 | 2840 | 31900 | 5060 | 2370 | 4580 | 1620 | 1030 |
| 8 | 1630 | 2100 | 2020 | 1650 | 1480 | 2910 | 31600 | 5000 | 2420 | 4320 | 1610 | 1040 |
| 9 | 1660 | 2200 | 2040 | 1590 | 1480 | 3000 | 30500 | 4900 | 3360 | 4130 | 1630 | 1040 |
| 10 | 1690 | 2210 | 2040 | 1590 | 1460 | 3000 | 29400 | 4850 | 10000 | 3980 | 1630 | 1040 |
| 11 | 1730 | 2210 | 2040 | 1570 | 1440 | 2860 | 28300 | 4820 | 16500 | 3860 | 1610 | 1040 |
| 12 | 1860 | 2210 | 2040 | 1570 | 1420 | 2740 | 27000 | 4810 | 20500 | 3730 | 1580 | 1020 |
| 13 | 1990 | 2210 | 2020 | 1570 | 1410 | 2600 | 25600 | 4790 | 23100 | 3590 | 1560 | 985 |
| 14 | 2040 | 2210 | 1970 | 1570 | 1410 | 2490 | 23900 | 4700 | 24600 | 3420 | 1530 | 970 |
| 15 | 2050 | 2210 | 1920 | 1570 | 1440 | 2320 | 22200 | 4670 | 25500 | 3210 | 1480 | 950 |
| 16 | 2050 | 2210 | 1910 | 1570 | 1450 | 2270 | 20400 | 4490 | 25900 | 3020 | 1450 | 961 |
| 17 | 2080 | 2200 | 1910 | 1560 | 1460 | 2270 | 18600 | 4300 | 26000 | 2840 | 1410 | 953 |
| 18 | 2090 | 2170 | 1910 | 1560 | 1490 | 2270 | 16600 | 4160 | 24500 | 2680 | 1420 | 954 |
| 19 | 2220 | 2150 | 1870 | 1560 | 1490 | 2270 | 14500 | 4040 | 22100 | 2540 | 1450 | 943 |
| 20 | 2800 | 2150 | 1850 | 1560 | 1520 | 2240 | 12600 | 3900 | 19800 | 2450 | 1430 | 945 |
| 21 | 3210 | 2120 | 1810 | 1560 | 1560 | 2040 | 11000 | 3790 | 17300 | 2390 | 1360 | 962 |
| 22 | 3240 | 2110 | 1780 | 1570 | 1600 | 1950 | 9850 | 3620 | 14700 | 2350 | 1290 | 954 |
| 23 | 3090 | 2020 | 1740 | 1570 | 1640 | 1980 | 8690 | 3500 | 12400 | 2280 | 1210 | 930 |
| 24 | 2930 | 1680 | 1710 | 1600 | 1670 | 2100 | 7650 | 3370 | 10800 | 2230 | 1130 | 930 |
| 25 | 2800 | 1560 | 1660 | 1570 | 1680 | 2480 | 6920 | 3280 | 9280 | 2130 | 1090 | 928 |
| 26 | 2720 | 1380 | 1660 | 1540 | 1760 | 4020 | 6400 | 3160 | 7910 | 2070 | 1080 | 930 |
| 27 | 2640 | 1390 | 1660 | 1540 | 1950 | 7620 | 6100 | 3080 | 6870 | 2040 | 1090 | 930 |
| 28 | 2520 | 1420 | 1660 | 1570 | 2180 | 11800 | 5890 | 3000 | 6170 | 2030 | 1100 | 919 |
| 29 | 2460 | 1370 | 1640 | 1590 | 2320 | 14900 | 5650 | 2850 | 5880 | 1990 | 1100 | 892 |
| 30 | 2400 | 1300 | 1620 | 1570 | --- | 17400 | 5520 | 2710 | 5610 | 1960 | 1100 | 834 |
| 31 | 2350 | --- | 1620 | 1550 | --- | 19900 | --- | 2560 | --- | 1900 | 1100 | --- |
| TOTAL | 68030 | 59340 | 55950 | 49010 | 45880 | 137720 | 577270 | 131630 | 357460 | 103260 | 44710 | 29258 |
| MEAN | 2195 | 1978 | 1805 | 1581 | 1582 | 4443 | 19240 | 4246 | 11920 | 3331 | 1442 | 975 |
| MAX | 3240 | 2250 | 2040 | 1660 | 2320 | 19900 | 32400 | 5500 | 26000 | 5590 | 1850 | 1080 |
| MIN | 1590 | 1300 | 1320 | 1540 | 1410 | 1950 | 5520 | 2560 | 2240 | 1900 | 1080 | 834 |
| AC-FT | 134900 | 117700 | 111000 | 97210 | 91000 | 273200 | 1145000 | 261100 | 709000 | 204800 | 88680 | 58030 |
| CAL YR 1983 | TOTAL | 1531290 | | MEAN | 4195 | MAX | 21300 | MIN | 1260 | AC-FT | 3037000 | |
| WTR YR 1984 | TOTAL | 1659518 | | MEAN | 4534 | MAX | 32400 | MIN | 834 | AC-FT | 3292000 | |

RED RIVER OF THE NORTH BASIN

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05092000 RED RIVER OF THE NORTH AT DRAYTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-------|------|--|--|---|--|--|---|--|---|---|---|
| OCT | | | | | | | | | | | |
| 13... | 1205 | 1660 | 671 | 8.3 | 1.5 | 8.0 | 290 | 69 | 65 | 30 | 34 |
| NOV | | | | | | | | | | | |
| 22... | 1135 | 2260 | 700 | -- | -4.0 | .5 | -- | -- | -- | -- | -- |
| JAN | | | | | | | | | | | |
| 03... | 1315 | 1600 | 605 | -- | 2.0 | .0 | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | |
| 03... | 1220 | 1420 | 550 | -- | .0 | .0 | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 02... | 1455 | 25500 | 362 | -- | 11.5 | 1.0 | -- | -- | -- | -- | -- |
| 05... | 1340 | 32300 | 380 | -- | 16.0 | 4.0 | -- | -- | -- | -- | -- |
| 09... | 1250 | 30500 | 412 | -- | 11.0 | 6.0 | -- | -- | -- | -- | -- |
| 16... | 1540 | 20100 | 656 | -- | 16.0 | 9.0 | -- | -- | -- | -- | -- |
| 19... | 1550 | 14200 | 740 | 8.2 | -- | 9.5 | 290 | 103 | 67 | 30 | 39 |
| 25... | 1120 | 6920 | 700 | -- | 14.0 | 13.0 | -- | -- | -- | -- | -- |
| 30... | 1225 | 5550 | 775 | -- | 8.0 | 7.5 | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | |
| 11... | 1120 | 16500 | 430 | -- | 16.0 | 17.5 | -- | -- | -- | -- | -- |
| 13... | 1210 | 23100 | 358 | -- | 22.0 | 17.5 | -- | -- | -- | -- | -- |
| 15... | 1255 | 25500 | 400 | -- | 19.5 | 17.5 | -- | -- | -- | -- | -- |
| 18... | 1105 | 24500 | 535 | -- | 25.5 | 20.0 | -- | -- | -- | -- | -- |
| 22... | 1300 | 14600 | 710 | -- | 28.0 | 22.0 | -- | -- | -- | -- | -- |
| 27... | 1200 | 6880 | 690 | -- | 23.5 | 23.0 | -- | -- | -- | -- | -- |
| AUG | | | | | | | | | | | |
| 14... | 1245 | 1630 | 580 | -- | 26.0 | 25.5 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|-------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| OCT | | | | | | | | | | | | |
| 13... | 20 | .9 | 6.6 | 270 | .000 | 220 | 2.1 | 82 | 42 | .20 | 8.6 | 432 |
| APR | | | | | | | | | | | | |
| 19... | 22 | 1 | 8.0 | 230 | .000 | 190 | 2.3 | 120 | 46 | .20 | 13 | 458 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|-------|---|--|--|---|---|---|---|---|---|---|--|---|
| OCT | | | | | | | | | | | | |
| 13... | 400 | .59 | 1940 | 5 | 80 | 10 | 4 | 30 | 20 | .1 | 0 | 270 |
| APR | | | | | | | | | | | | |
| 19... | 440 | .62 | 17600 | 3 | 60 | 20 | 0 | 40 | 20 | .0 | 1 | 280 |

RED RIVER OF THE NORTH BASIN

05092200 PEMBINA COUNTY DRAIN 20 NEAR GLASSTON, ND

LOCATION.--Lat 48°41'49", long 97°23'03", in NW¼ sec.8, T.160 N., R.52 W., Pembina County, Hydrologic Unit 09020311, on left bank 50 ft downstream from bridge on county highway, and 3 mi southeast of Glasston.

DRAINAGE AREA.--80 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1971 to current year (seasonal records only since 1983).

REVISED RECORDS.--WDR ND-78:Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 808 ft, from topographic map.

REMARKS.--Records good.

AVERAGE DISCHARGE.--11 years (water years 1972-82), 2.29 ft³/s, 1,660 acre-ft/yr; median of yearly mean discharges, 1.08 ft³/s, 783 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 940 ft³/s Apr. 20, 1979, gage height, 9.3 ft; maximum gage height, 14.64 ft Apr. 19, 1979, backwater from ice; no flow most of time.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 88 ft³/s Mar. 29, gage height, 8.66 ft; backwater from ice. No flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-------|-------|-----|-------|-----|-----|-----|
| 1 | | | | | | .00 | 7.1 | .07 | .00 | .00 | .00 | .00 |
| 2 | | | | | | .00 | 6.5 | .01 | .00 | .00 | .00 | .00 |
| 3 | | | | | | .00 | 5.2 | .00 | .00 | .00 | .00 | .00 |
| 4 | | | | | | .00 | 1.1 | .00 | .00 | .00 | .00 | .00 |
| 5 | | | | | | .00 | .75 | .00 | .00 | .00 | .00 | .00 |
| 6 | | | | | | .00 | .74 | .00 | .00 | .00 | .00 | .00 |
| 7 | | | | | | .00 | 1.1 | .00 | .00 | .00 | .00 | .00 |
| 8 | | | | | | .00 | .84 | .00 | .47 | .00 | .00 | .00 |
| 9 | | | | | | .00 | .83 | .00 | 2.6 | .00 | .00 | .00 |
| 10 | | | | | | .00 | .92 | .00 | 2.9 | .00 | .00 | .00 |
| 11 | | | | | | .00 | 1.3 | .00 | 1.6 | .00 | .00 | .00 |
| 12 | | | | | | .00 | 3.1 | .00 | .62 | .00 | .00 | .00 |
| 13 | | | | | | .00 | 4.2 | .00 | .08 | .00 | .00 | .00 |
| 14 | | | | | | .00 | 2.6 | .00 | .01 | .00 | .00 | .00 |
| 15 | | | | | | .00 | 1.1 | .00 | .00 | .00 | .00 | .00 |
| 16 | | | | | | .00 | .18 | .00 | .38 | .00 | .00 | .00 |
| 17 | | | | | | .00 | .02 | .00 | 2.1 | .00 | .00 | .00 |
| 18 | | | | | | .00 | .00 | .00 | 1.2 | .00 | .00 | .00 |
| 19 | | | | | | .00 | .00 | .00 | .21 | .00 | .00 | .00 |
| 20 | | | | | | .00 | .00 | .00 | .02 | .00 | .00 | .00 |
| 21 | | | | | | .00 | .00 | .00 | .03 | .00 | .00 | .00 |
| 22 | | | | | | .00 | .00 | .00 | .04 | .00 | .00 | .00 |
| 23 | | | | | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 24 | | | | | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 25 | | | | | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 26 | | | | | | .12 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | | | | | | .14 | .89 | .00 | .00 | .00 | .00 | .00 |
| 28 | | | | | | 1.1 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 29 | | | | | | 14 | 1.2 | .00 | .00 | .00 | .00 | .00 |
| 30 | | | | | | 26 | .47 | .00 | .00 | .00 | .00 | .00 |
| 31 | | | | | | 15 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | | | | | | 56.36 | 41.34 | .08 | 12.26 | .00 | .00 | .00 |
| MEAN | | | | | | 1.82 | 1.38 | .00 | .41 | .00 | .00 | .00 |
| MAX | | | | | | 26 | 7.1 | .07 | 2.9 | .00 | .00 | .00 |
| MIN | | | | | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | | | | | | 112 | 82 | .2 | 24 | .00 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

141

05092200 PEMBINA COUNTY DRAIN 20 NEAR GLASSTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANROUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| MAR 29... | 1440 | 18 | 260 | -- | 6.5 | 1.5 | -- | -- | -- | -- | -- | |
| APR 03... | 1210 | 9.4 | 328 | 7.7 | 10.0 | 1.5 | 160 | 67 | 38 | 15 | 4.5 | |
| 11... | 1720 | 1.1 | 485 | -- | 7.5 | 7.0 | -- | -- | -- | -- | -- | |
| 30... | 1505 | .32 | 1030 | 8.1 | 3.5 | 7.5 | 580 | 438 | 110 | 74 | 24 | |
| JUN 13... | 1200 | E.08 | 1750 | -- | 14.0 | 15.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 03... | 6 | .2 | 4.2 | 110 | .000 | 90 | 3.5 | 73 | 3.5 | .10 | 8.0 | 199 |
| 30... | 8 | .4 | 7.3 | 170 | .000 | 143 | 2.2 | 480 | 15 | .20 | 6.6 | 843 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 03... | 200 | .27 | 5.1 | 4 | 0 | 50 | 0 | 10 | 50 | .1 | 0 | 140 |
| 30... | 800 | 1.1 | .73 | 2 | 30 | 30 | 0 | 80 | 10 | .6 | 0 | 570 |

RED RIVER OF THE NORTH BASIN

05098700 HIDDEN ISLAND COULEE NEAR HANSBORO, ND
(International gaging station)

LOCATION.--Lat 48°57'10", long 99°25'35", in SE1/4SW1/4 sec.11, T.163 N., R.68 W., Towner County, Hydrologic Unit 09020313, on right bank 400 ft downstream from bridge on county highway, and 2.5 mi west of Hansboro.

DRAINAGE AREA.--38 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,615 ft, from topographic map. Prior to May 20, 1962, nonrecording gage 400 ft upstream at same datum.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--23 years, 3.59 ft³/s, 2,600 acre-ft/yr; median of yearly mean discharges, 2.4 ft³/s, 1,740 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 1,200 ft³/s Apr. 23, 1979, gage height, 10.50 ft, from floodmark, backwater from ice; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 25 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|------|-----------------------------------|---------------------|
| Mar. 24 | 1915 | *264 | 7.70 | May 4 | 0945 | 107 | 7.00 |
| Apr. 13 | 0645 | 101 | 6.95 | | | | |

No flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|------|--------|--------|--------|-----|-------|------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 10 | .22 | .05 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 10 | 3.6 | .03 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 9.1 | 5.3 | .00 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 8.0 | 30 | .00 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 6.9 | 42 | .04 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 5.9 | 26 | .03 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 4.3 | 16 | .07 | .00 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 2.3 | 13 | .04 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | .59 | 12 | .02 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | .28 | 11 | .00 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | .66 | 9.0 | .00 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 4.3 | 7.2 | .00 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 28 | 6.2 | .00 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | 14 | 4.8 | .00 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | 9.8 | 3.8 | .00 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | 8.4 | 3.0 | .00 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | 5.4 | 2.5 | .00 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | 2.1 | 1.6 | .00 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | .63 | .80 | .00 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | .98 | .37 | .00 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | .71 | .41 | .00 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .65 | .40 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | 11 | 1.1 | .30 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | 71 | 1.6 | .24 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 58 | 1.2 | .17 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | 45 | .96 | .14 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | 23 | .47 | .12 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 19 | .19 | .10 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 14 | .32 | .09 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 11 | .25 | .08 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 9.9 | --- | .07 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 261.90 | 139.09 | 200.51 | .28 | .00 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 8.45 | 4.64 | 6.47 | .01 | .00 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 71 | 28 | 42 | .07 | .00 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | --- | .19 | .07 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | 519 | 276 | 398 | .6 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 1144.20 | | MEAN | 3.13 | MAX | 80 | MIN | .00 | AC-FT | 2270 | |
| WTR YR 1984 | TOTAL | 601.78 | | MEAN | 1.64 | MAX | 71 | MIN | .00 | AC-FT | 1190 | |

RED RIVER OF THE NORTH BASIN

143

05098700 HIDDEN ISLAND COULEE NEAR HANSBORO, ND---CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| MAR 23... | 1200 | E.02 | 232 | -- | 1.0 | .0 | -- | -- | -- | -- | -- | |
| MAR 30... | 1015 | 12 | 660 | 7.7 | 1.5 | .5 | 270 | 155 | 57 | 30 | 29 | |
| MAY 02... | 1440 | 5.9 | 1350 | -- | 9.0 | 2.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 18 | .8 | 13 | 140 | .000 | 110 | 4.3 | 190 | 8.8 | .10 | 14 | 443 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 410 | .60 | 14 | 3 | 20 | 60 | 0 | 50 | 90 | .1 | 1 | 220 |

RED RIVER OF THE NORTH BASIN

05098800 CYPRESS CREEK NEAR SARLES, ND
(International gaging station)

LOCATION.--Lat 48°56'35", long 98°57'05", in SW1/4SE1/4 sec.9, T.163 N., R.64 W., Cavalier County, Hydrologic Unit 09020313, on right bank 150 ft downstream from twin multiplate culverts on county highway, and 2.5 mi east of Sarles.

DRAINAGE AREA.--71 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1961 to current year. Prior to October 1973, published as Long River near Sarles.

GAGE.--Water-stage recorder. Altitude of gage is 1,545 ft, from topographic map.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--23 years, 5.91 ft³/s, 4,280 acre-ft/yr; median of yearly mean discharges, 4.8 ft³/s, 3,480 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 2,000 ft³/s Apr. 21, 1979, gage height, 10.35 ft, backwater from ice and snow; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 38 ft³/s Mar. 28, gage height, 3.99 ft, no peak above base of 50 ft³/s; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|------|--------|-------|-------|-----|-------|------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 5.9 | .35 | .02 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 4.6 | .80 | .00 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 3.6 | 2.4 | .00 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 2.8 | 4.3 | .00 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 2.1 | 3.5 | .00 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 1.7 | 2.6 | .00 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 1.3 | 1.8 | .00 | .00 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 1.0 | 1.3 | .03 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | .88 | .96 | .07 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | .83 | .78 | .07 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | .86 | .63 | .07 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 1.1 | .54 | .08 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 1.2 | .44 | .08 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | .91 | .43 | .07 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | .68 | .41 | .06 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | .56 | .36 | .05 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | .45 | .28 | .02 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | .40 | .22 | .00 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | .35 | .22 | .00 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | .29 | .23 | .00 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | .24 | .25 | .00 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .21 | .22 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .99 | .17 | .20 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | 2.8 | .15 | .17 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 13 | .15 | .16 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | 21 | .12 | .15 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | 24 | .24 | .14 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 27 | .42 | .12 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 15 | .35 | .09 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 11 | .25 | .07 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 7.7 | --- | .05 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 122.49 | 33.81 | 24.17 | .62 | .00 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 3.95 | 1.13 | .78 | .02 | .00 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 27 | 5.9 | 4.3 | .08 | .00 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .12 | .05 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | 243 | 67 | 48 | 1.2 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 1597.07 | | MEAN | 4.38 | MAX | 120 | MIN | .00 | AC-FT | 3170 | |
| WTR YR 1984 | TOTAL | 181.09 | | MEAN | .49 | MAX | 27 | MIN | .00 | AC-FT | 359 | |

RED RIVER OF THE NORTH BASIN

145

05098800 CYPRESS CREEK NEAR SARLES, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| MAR 23... | 1215 | .31 | 155 | -- | 5.5 | 1.0 | -- | -- | -- | -- | -- | |
| 30... | 1150 | 10 | 560 | 7.6 | 3.5 | 1.0 | 200 | 87 | 51 | 18 | 27 | |
| MAY 02... | 1305 | .79 | 1030 | -- | 8.5 | 9.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 30... | 22 | .9 | 10 | 140 | .000 | 120 | 5.6 | 130 | 5.8 | .10 | 19 | 353 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 30... | 330 | .48 | 9.5 | 5 | 20 | 40 | 0 | 20 | 30 | .1 | 0 | 160 |

RED RIVER OF THE NORTH BASIN

05099100 SNOWFLAKE CREEK NEAR SNOWFLAKE, MAN
(International gaging station)

LOCATION.--Lat 49°01'17", long 98°36'13", in SW¼ sec.10, T.1, R.9 W., 1st meridian, at traffic bridge, 2.5 mi east, and 1.5 mi south of Snowflake.

DRAINAGE AREA.--348 mi².

PERIOD OF RECORD.--March 1961 to current year.

GAGE.--Water-stage recorder since March 1968 and nonrecording gage prior thereto. Datum of gage is 1,221.66 ft, Geodetic Survey of Canada datum. Prior to Apr. 2, 1964, nonrecording gage at present site and datum. Apr. 2, 1964, to May 10, 1965, nonrecording gage at site 0.5 mi downstream at present datum.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records furnished by the Water Survey of Canada.

AVERAGE DISCHARGE.--23 years, 15.7 ft³/s, 11,380 acre-ft/yr; median of yearly mean discharges, 7.4 ft³/s, 5,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,130 ft³/s Apr. 21, 1979, gage height, 8.28 ft; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14.9 ft³/s Mar. 26, gage height, 3.09 ft; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|-----|--------|-------|-------|-------|------|-----|-----|
| 1 | .00 | .03 | .05 | .00 | .00 | .00 | 7.1 | 1.4 | .00 | .00 | .00 | .00 |
| 2 | .03 | .03 | .02 | .00 | .00 | .00 | 5.7 | 1.7 | .00 | .00 | .00 | .00 |
| 3 | .05 | .03 | .00 | .00 | .00 | .00 | 4.7 | 2.6 | .00 | .00 | .00 | .00 |
| 4 | .09 | .03 | .00 | .00 | .00 | .00 | 4.6 | 2.7 | .00 | .00 | .00 | .00 |
| 5 | .06 | .03 | .00 | .00 | .00 | .00 | 5.9 | 4.6 | .00 | .00 | .00 | .00 |
| 6 | .03 | .03 | .00 | .00 | .00 | .00 | 6.7 | 10 | .01 | .00 | .00 | .00 |
| 7 | .04 | .04 | .00 | .00 | .00 | .00 | 4.3 | 7.7 | .02 | .00 | .00 | .00 |
| 8 | .03 | .04 | .00 | .00 | .00 | .00 | 3.9 | 5.0 | .73 | .00 | .00 | .00 |
| 9 | .02 | .03 | .00 | .00 | .00 | .00 | 2.9 | 3.8 | .56 | .00 | .00 | .00 |
| 10 | .07 | .02 | .00 | .00 | .00 | .00 | 3.0 | 3.4 | .11 | .00 | .00 | .00 |
| 11 | .05 | .02 | .00 | .00 | .00 | .00 | 3.8 | 6.1 | .05 | .00 | .00 | .00 |
| 12 | .11 | .02 | .00 | .00 | .00 | .00 | 7.9 | 4.4 | .12 | .00 | .00 | .00 |
| 13 | .09 | .02 | .00 | .00 | .00 | .00 | 5.9 | 2.6 | .08 | .00 | .00 | .00 |
| 14 | .09 | .03 | .00 | .00 | .00 | .00 | 4.4 | 1.7 | .03 | .00 | .00 | .00 |
| 15 | .08 | .05 | .00 | .00 | .00 | .00 | 3.4 | 1.2 | .02 | .00 | .00 | .00 |
| 16 | .07 | .05 | .00 | .00 | .04 | .00 | 2.4 | .86 | .02 | .00 | .00 | .00 |
| 17 | .05 | .03 | .00 | .00 | .04 | .00 | 1.7 | .51 | .00 | .00 | .00 | .00 |
| 18 | .04 | .05 | .00 | .00 | .04 | .00 | 1.1 | .21 | .00 | .00 | .00 | .00 |
| 19 | .06 | .06 | .00 | .00 | .04 | .00 | .97 | .15 | .00 | .00 | .00 | .00 |
| 20 | .07 | .07 | .00 | .00 | .07 | 5.3 | .85 | .13 | .00 | .00 | .00 | .00 |
| 21 | .07 | .06 | .00 | .00 | .11 | 11 | .77 | .45 | .00 | .00 | .00 | .00 |
| 22 | .07 | .06 | .00 | .00 | .07 | 11 | .63 | .26 | .00 | .00 | .00 | .00 |
| 23 | .06 | .06 | .00 | .00 | .04 | 11 | .52 | .12 | .00 | .00 | .00 | .00 |
| 24 | .09 | .04 | .00 | .00 | .04 | 9.1 | .52 | .12 | .00 | .00 | .00 | .00 |
| 25 | .05 | .11 | .00 | .00 | .04 | 12 | .46 | .07 | .00 | .00 | .00 | .00 |
| 26 | .05 | .14 | .00 | .00 | .04 | 15 | .43 | .05 | .03 | .00 | .00 | .00 |
| 27 | .05 | .18 | .00 | .00 | .04 | 8.6 | 1.1 | .03 | .00 | .00 | .00 | .00 |
| 28 | .04 | .19 | .00 | .00 | .00 | 8.8 | 2.7 | .02 | .00 | .00 | .00 | .00 |
| 29 | .03 | .12 | .00 | .00 | .00 | 8.7 | .59 | .00 | .00 | .00 | .00 | .00 |
| 30 | .03 | .08 | .00 | .00 | --- | 12 | .81 | .00 | .00 | .00 | .00 | .00 |
| 31 | .03 | --- | .00 | .00 | --- | 8.8 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | 1.70 | 1.75 | .07 | .00 | .61 | 121.30 | 89.75 | 61.88 | 1.78 | .00 | .00 | .00 |
| MEAN | .05 | .06 | .00 | .00 | .02 | 3.91 | 2.99 | 2.00 | .06 | .00 | .00 | .00 |
| MAX | .11 | .19 | .05 | .00 | .11 | 15 | 7.9 | 10 | .73 | .00 | .00 | .00 |
| MIN | .00 | .02 | .00 | .00 | .00 | .00 | .43 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | 3.4 | 3.5 | .1 | .00 | 1.2 | 241 | 178 | 123 | 3.5 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 1408.79 | MEAN | 3.86 | MAX | 40 | MIN | .00 | AC-FT | 2790 | | |
| WTR YR 1984 | TOTAL | 278.84 | MEAN | .76 | MAX | 15 | MIN | .00 | AC-FT | 553 | | |

RED RIVER OF THE NORTH BASIN

147

05099150 MOWBRAY CREEK NEAR MOWBRAY, MAN

LOCATION.--Lat 49°00'00", long 98°27'15", in SE¼ sec.3, T.1, R.8 W., 1st meridian, on downstream side of bridge on Municipal Road on international boundary, and 1.5 mi east of Mowbray.

DRAINAGE AREA.--93.9 mi².

PERIOD OF RECORD.--March 1962 to current year (seasonal records only most years).

GAGE.--Water-stage recorder operated March 1 to October 31 each year. Nonrecording gage prior to 1971.

COOPERATION.--Records furnished by Water Survey of Canada.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 777 ft³/s Apr. 24, 1979, gage height, 7.02 ft; maximum gage height, 7.88 ft Mar. 29, 1966, backwater from ice; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 68 ft³/s June 10, gage height, 4.47 ft; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|--------|--------|-------|--------|-----|-----|-----|
| 1 | .00 | | | | | .00 | 18 | .04 | .00 | .00 | .00 | .00 |
| 2 | .00 | | | | | .00 | 17 | .07 | .00 | .00 | .00 | .00 |
| 3 | .00 | | | | | .00 | 14 | .04 | .00 | .00 | .00 | .00 |
| 4 | .00 | | | | | .00 | 18 | .04 | .00 | .00 | .00 | .00 |
| 5 | .00 | | | | | .00 | 14 | .98 | .00 | .00 | .00 | .00 |
| 6 | .00 | | | | | .00 | 8.1 | 1.8 | .00 | .00 | .00 | .00 |
| 7 | .00 | | | | | .00 | 5.1 | 11 | .00 | .00 | .00 | .00 |
| 8 | .00 | | | | | .00 | 3.5 | 13 | .00 | .00 | .00 | .00 |
| 9 | .00 | | | | | .00 | 2.3 | 8.2 | 6.4 | .00 | .00 | .00 |
| 10 | .00 | | | | | .00 | 1.8 | 4.7 | 61 | .00 | .00 | .00 |
| 11 | .00 | | | | | .00 | 1.4 | 3.6 | 62 | .00 | .00 | .00 |
| 12 | .00 | | | | | .00 | 1.3 | 2.8 | 35 | .00 | .00 | .00 |
| 13 | .00 | | | | | .00 | 1.1 | 1.7 | 19 | .00 | .00 | .00 |
| 14 | .00 | | | | | .00 | .91 | 1.1 | 25 | .45 | .00 | .00 |
| 15 | .00 | | | | | .00 | 1.1 | .85 | 21 | .50 | .00 | .00 |
| 16 | .00 | | | | | .00 | 1.6 | .79 | 13 | .02 | .00 | .00 |
| 17 | .00 | | | | | .00 | 1.6 | .46 | 8.9 | .00 | .00 | .00 |
| 18 | .00 | | | | | .00 | 1.3 | .05 | 6.0 | .00 | .00 | .00 |
| 19 | .00 | | | | | .00 | .98 | .00 | 4.0 | .00 | .00 | .00 |
| 20 | .00 | | | | | .00 | .53 | .00 | 2.7 | .00 | .00 | .00 |
| 21 | .00 | | | | | .04 | .18 | .00 | 1.9 | .00 | .00 | .00 |
| 22 | .00 | | | | | .14 | .07 | .00 | 1.5 | .00 | .00 | .00 |
| 23 | .00 | | | | | .35 | .00 | .00 | .87 | .00 | .00 | .00 |
| 24 | .00 | | | | | .57 | .00 | .00 | .49 | .00 | .00 | .00 |
| 25 | .00 | | | | | .78 | .00 | .00 | .31 | .00 | .00 | .00 |
| 26 | .00 | | | | | 7.7 | .00 | .00 | .49 | .00 | .00 | .00 |
| 27 | .00 | | | | | 16 | .00 | .00 | .11 | .00 | .00 | .00 |
| 28 | .00 | | | | | 32 | .00 | .00 | .04 | .00 | .00 | .00 |
| 29 | .00 | | | | | 35 | .00 | .00 | .00 | .00 | .00 | .00 |
| 30 | .00 | | | | | 29 | .00 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | | | | | 26 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | .00 | | | | | 147.58 | 113.87 | 51.22 | 269.71 | .97 | .00 | .00 |
| MEAN | .00 | | | | | 4.76 | 3.80 | 1.65 | 8.99 | .03 | .00 | .00 |
| MAX | .00 | | | | | 35 | 18 | 13 | 62 | .50 | .00 | .00 |
| MIN | .00 | | | | | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | | | | | 293 | 226 | 102 | 535 | 1.9 | .00 | .00 |

RED RIVER OF THE NORTH BASIN

05099300 PEMBINA RIVER NEAR WINDYGATES, MAN
(International gaging station)

LOCATION.--Lat 49°01'53", long 98°16'40", in SE $\frac{1}{4}$ sec.13, T.1, R.7 W., 1st meridian, on left bank 0.2 mi downstream from bridge, and 3 mi northeast of Windygates.

DRAINAGE AREA.--3,020 mi².

PERIOD OF RECORD.--April 1962 to current year.

GAGE.--Water-stage recorder and nonrecording gage. Datum of recording gage is 1,102.02 ft. Datum of non-recording gage is 1,105.00 ft, both gages referred to Geodetic Survey of Canada datum.

REMARKS.--Records fair.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records furnished by Water Survey of Canada.

AVERAGE DISCHARGE.--22 years, 212 ft³/s, 153,600 acre-ft/yr; median of yearly mean discharges, 129 ft³/s, 93,460 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,500 ft³/s Apr. 26, 1974, gage height, 19.50 ft; no flow in some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 491 ft³/s June 16, gage height, 1.61 ft; no flow for several days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|------|------|--------|------|------|------|-------|-------|------|
| 1 | 10 | 7.4 | 3.8 | .07 | .00 | .32 | 74 | 69 | 68 | 38 | 1.8 | .01 |
| 2 | 16 | 7.2 | 3.8 | .00 | .00 | .18 | 90 | 60 | 69 | 39 | 2.2 | .01 |
| 3 | 16 | 6.5 | 3.9 | .00 | .00 | .25 | 107 | 54 | 70 | 36 | 1.8 | .02 |
| 4 | 15 | 6.8 | 3.8 | .00 | .00 | .28 | 119 | 55 | 73 | 33 | 1.9 | .03 |
| 5 | 11 | 7.0 | 3.7 | .00 | .00 | .14 | 127 | 61 | 79 | 29 | 1.9 | .03 |
| 6 | 10 | 6.5 | 3.4 | .11 | .00 | .04 | 110 | 67 | 87 | 26 | 1.7 | .06 |
| 7 | 10 | 6.6 | 3.2 | .25 | .00 | .00 | 98 | 80 | 96 | 22 | 1.6 | .09 |
| 8 | 8.7 | 6.6 | 3.0 | .11 | .00 | .00 | 79 | 89 | 101 | 22 | 1.8 | .11 |
| 9 | 8.4 | 5.9 | 2.9 | .04 | .00 | .00 | 70 | 100 | 105 | 21 | 1.7 | .12 |
| 10 | 9.9 | 4.8 | 2.6 | .00 | .00 | .00 | 62 | 99 | 103 | 20 | 1.5 | .12 |
| 11 | 8.1 | 5.6 | 2.5 | .00 | .00 | .00 | 58 | 90 | 139 | 18 | 1.3 | .15 |
| 12 | 8.6 | 6.6 | 2.3 | .00 | .00 | .00 | 62 | 92 | 159 | 16 | 1.1 | .43 |
| 13 | 8.8 | 6.4 | 2.2 | .00 | .00 | .00 | 65 | 90 | 134 | 17 | 1.1 | .35 |
| 14 | 8.8 | 6.2 | 1.9 | .00 | .00 | .00 | 64 | 90 | 113 | 15 | .94 | .23 |
| 15 | 8.6 | 6.1 | 1.1 | .00 | .00 | .00 | 64 | 83 | 117 | 11 | .83 | .04 |
| 16 | 8.3 | 5.5 | 1.6 | .00 | .00 | .00 | 65 | 77 | 304 | 9.4 | .68 | .02 |
| 17 | 8.1 | 5.9 | .92 | .00 | .00 | .00 | 62 | 73 | 179 | 8.0 | .68 | .00 |
| 18 | 7.7 | 7.2 | 1.0 | .00 | .00 | .00 | 60 | 67 | 131 | 7.0 | .60 | .00 |
| 19 | 7.6 | 6.7 | 1.3 | .00 | .00 | .18 | 57 | 64 | 95 | 5.8 | .49 | .00 |
| 20 | 7.7 | 6.7 | 1.1 | .00 | .00 | .71 | 53 | 68 | 85 | 4.4 | .53 | .00 |
| 21 | 7.6 | 5.5 | .64 | .00 | .18 | 3.5 | 50 | 87 | 83 | 4.4 | .51 | .00 |
| 22 | 7.7 | 3.9 | .35 | .00 | .53 | 11 | 49 | 92 | 76 | 4.8 | .45 | .00 |
| 23 | 15 | 3.3 | .25 | .00 | 1.1 | 19 | 47 | 87 | 69 | 3.0 | .33 | .00 |
| 24 | 19 | 3.7 | .35 | .00 | .71 | 12 | 45 | 86 | 66 | 3.1 | .29 | .00 |
| 25 | 15 | 4.6 | .64 | .00 | .53 | 10 | 43 | 84 | 59 | 2.5 | .26 | .00 |
| 26 | 12 | 5.9 | .57 | .00 | .64 | 5.7 | 42 | 83 | 62 | 2.4 | .21 | .01 |
| 27 | 10 | 6.2 | .46 | .00 | .74 | 9.1 | 48 | 81 | 56 | 2.2 | .13 | .00 |
| 28 | 8.5 | 5.7 | .39 | .00 | .60 | 19 | 55 | 77 | 50 | 2.1 | .04 | .00 |
| 29 | 7.2 | 4.8 | .32 | .00 | .46 | 33 | 69 | 74 | 47 | 1.9 | .02 | .00 |
| 30 | 7.3 | 4.1 | .21 | .00 | --- | 42 | 81 | 72 | 43 | 1.9 | .01 | .00 |
| 31 | 7.3 | --- | .14 | .00 | --- | 62 | --- | 70 | --- | 2.0 | .01 | --- |
| TOTAL | 313.9 | 175.9 | 54.34 | .58 | 5.49 | 228.40 | 2075 | 2421 | 2918 | 427.9 | 28.41 | 1.83 |
| MEAN | 10.1 | 5.86 | 1.75 | .02 | .19 | 7.37 | 69.2 | 78.1 | 97.3 | 13.8 | .92 | .06 |
| MAX | 19 | 7.4 | 3.9 | .25 | 1.1 | 62 | 127 | 100 | 304 | 39 | 2.2 | .43 |
| MIN | 7.2 | 3.3 | .14 | .00 | .00 | .00 | 42 | 54 | 43 | 1.9 | .01 | .00 |
| AC-FT | 623 | 349 | 108 | 1.2 | 11 | 453 | 4120 | 4800 | 5790 | 849 | 56 | 3.6 |
| CAL YR 1983 | TOTAL | 43674.00 | | MEAN | 120 | MAX | 1010 | MIN | .14 | AC-FT | 86630 | |
| WTR YR 1984 | TOTAL | 8650.75 | | MEAN | 23.6 | MAX | 304 | MIN | .00 | AC-FT | 17160 | |

RED RIVER OF THE NORTH BASIN

149

05099600 PEMBINA RIVER AT WALHALLA, ND

LOCATION.--Lat 48°54'50", long 97°55'00", in NE1/4NE1/4 sec.29, T.163 N., R.56 W., Pembina County, Hydrologic Unit 09020313, on left bank at downstream side of bridge on State Highway 32, at south edge of Walhalla, and 7 mi downstream from Little South Pembina River.

DRAINAGE AREA.--3,350 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1939 to current year. Prior to October 1963, published as "near Walhalla."

REVISED RECORDS.--WSP 1388: 1943, 1950(P). WSP 1558: 1957. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 934 ft, from topographic map. Prior to Nov. 10, 1943, nonrecording gage and Nov. 10, 1943, to Sept. 30, 1963, water-stage recorder at site 5.5 mi upstream at different datum.

REMARKS.--Records good.

AVERAGE DISCHARGE.--45 years, 231 ft³/s, 167,400 acre-ft/yr; median of yearly mean discharges, 165 ft³/s, 120,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,400 ft³/s Apr. 18, 1950, gage height, 19.2 ft former site and datum, 16.2 ft present site and datum, from rating curve extended above 7,000 ft³/s on basis of contracted-opening measurement of peak flow; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 374 ft³/s June 16, gage height 3.23 ft, no peak above the base of 400 ft³/s; minimum daily discharge 2.8 ft³/s Mar. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|------|------|-------|--------|-------|-------|
| 1 | 15 | 13 | 9.2 | 4.5 | 3.5 | 3.5 | 146 | 94 | 75 | 47 | 5.1 | 3.6 |
| 2 | 14 | 13 | 9.0 | 4.3 | 3.5 | 3.5 | 153 | 86 | 73 | 41 | 5.4 | 4.0 |
| 3 | 19 | 12 | 8.9 | 4.2 | 3.5 | 3.5 | 145 | 77 | 72 | 38 | 6.5 | 4.1 |
| 4 | 21 | 12 | 8.7 | 4.0 | 3.5 | 3.5 | 146 | 71 | 74 | 35 | 5.8 | 4.2 |
| 5 | 22 | 12 | 8.5 | 3.7 | 3.5 | 3.3 | 135 | 68 | 81 | 32 | 5.5 | 4.2 |
| 6 | 18 | 12 | 8.4 | 3.7 | 3.5 | 3.2 | 137 | 72 | 85 | 30 | 5.4 | 4.0 |
| 7 | 16 | 12 | 8.2 | 3.7 | 3.5 | 3.1 | 114 | 77 | 96 | 29 | 5.1 | 3.4 |
| 8 | 15 | 12 | 8.1 | 3.7 | 3.5 | 3.1 | 98 | 88 | 127 | 29 | 5.4 | 3.8 |
| 9 | 15 | 12 | 7.9 | 3.7 | 3.3 | 3.1 | 83 | 95 | 141 | 25 | 5.0 | 4.1 |
| 10 | 15 | 11 | 7.8 | 3.7 | 3.2 | 3.1 | 77 | 104 | 124 | 22 | 5.1 | 4.1 |
| 11 | 14 | 12 | 7.6 | 3.7 | 3.2 | 3.1 | 76 | 100 | 119 | 20 | 5.2 | 4.3 |
| 12 | 16 | 10 | 7.4 | 3.7 | 3.2 | 3.1 | 85 | 95 | 168 | 18 | 4.7 | 4.5 |
| 13 | 15 | 10 | 7.4 | 3.7 | 3.2 | 3.1 | 86 | 98 | 179 | 18 | 4.3 | 4.5 |
| 14 | 15 | 11 | 7.3 | 3.7 | 3.4 | 3.1 | 81 | 94 | 149 | 23 | 4.1 | 3.7 |
| 15 | 15 | 12 | 7.1 | 3.7 | 3.4 | 3.0 | 76 | 93 | 131 | 20 | 3.9 | 3.9 |
| 16 | 16 | 11 | 7.0 | 3.7 | 3.4 | 3.0 | 75 | 89 | 215 | 16 | 3.9 | 3.7 |
| 17 | 15 | 11 | 6.8 | 3.7 | 3.3 | 3.0 | 72 | 83 | 232 | 14 | 3.8 | 3.7 |
| 18 | 14 | 11 | 6.7 | 3.7 | 3.4 | 3.0 | 70 | 80 | 151 | 12 | 3.7 | 3.7 |
| 19 | 14 | 11 | 6.5 | 3.7 | 3.4 | 2.8 | 68 | 78 | 129 | 11 | 3.5 | 3.7 |
| 20 | 14 | 11 | 6.3 | 3.7 | 3.6 | 3.2 | 65 | 78 | 114 | 8.9 | 4.1 | 3.5 |
| 21 | 14 | 11 | 6.2 | 3.7 | 3.4 | 4.2 | 61 | 84 | 111 | 8.3 | 4.0 | 3.9 |
| 22 | 14 | 11 | 6.0 | 3.7 | 16 | 4.9 | 59 | 92 | 100 | 8.3 | 3.9 | 3.3 |
| 23 | 14 | 10 | 5.9 | 3.7 | 5.7 | 8.0 | 60 | 94 | 90 | 7.6 | 3.7 | 3.9 |
| 24 | 15 | 10 | 5.7 | 3.7 | 5.2 | 52 | 59 | 91 | 83 | 7.2 | 3.6 | 4.1 |
| 25 | 21 | 10 | 5.6 | 3.7 | 4.3 | 190 | 58 | 90 | 76 | 7.0 | 3.6 | 4.1 |
| 26 | 21 | 10 | 5.4 | 3.5 | 4.1 | 154 | 60 | 89 | 81 | 6.5 | 3.4 | 3.9 |
| 27 | 18 | 9.8 | 5.2 | 3.5 | 4.0 | 138 | 86 | 88 | 74 | 6.1 | 3.3 | 3.9 |
| 28 | 17 | 9.6 | 5.1 | 3.5 | 3.8 | 179 | 77 | 85 | 65 | 5.4 | 3.3 | 3.7 |
| 29 | 15 | 9.5 | 4.9 | 3.5 | 3.5 | 174 | 83 | 82 | 57 | 4.8 | 3.2 | 3.5 |
| 30 | 14 | 9.3 | 4.8 | 3.5 | --- | 135 | 94 | 78 | 50 | 5.1 | 3.2 | 3.5 |
| 31 | 13 | --- | 4.6 | 3.5 | --- | 139 | --- | 76 | --- | 4.8 | 3.3 | --- |
| TOTAL | 494 | 331.2 | 214.2 | 115.7 | 118.0 | 1241.4 | 2685 | 2669 | 3322 | 560.0 | 134.0 | 116.5 |
| MEAN | 15.9 | 11.0 | 6.91 | 3.73 | 4.07 | 40.0 | 89.5 | 86.1 | 111 | 18.1 | 4.32 | 3.88 |
| MAX | 22 | 13 | 9.2 | 4.5 | 16 | 190 | 153 | 104 | 232 | 47 | 6.5 | 4.5 |
| MIN | 13 | 9.3 | 4.6 | 3.5 | 3.2 | 2.8 | 58 | 68 | 50 | 4.8 | 3.2 | 3.3 |
| AC-FT | 980 | 657 | 425 | 229 | 234 | 2460 | 5330 | 5290 | 6590 | 1110 | 266 | 231 |
| CAL YR 1983 | TOTAL | 57253.2 | MEAN | 157 | MAX | 1440 | MIN | 3.5 | AC-FT | 113600 | | |
| WTR YR 1984 | TOTAL | 12001.0 | MEAN | 32.8 | MAX | 232 | MIN | 2.8 | AC-FT | 23800 | | |

RED RIVER OF THE NORTH BASIN

05099600 PEMBINA RIVER AT WALHALLA, ND--CONTINUED

PERIOD OF RECORD.--Water years 1962 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 05... | 1545 | 12 | 1010 | -- | -6.0 | .0 | -- | -- | -- | -- | -- |
| OCT 06... | 1345 | 18 | 825 | 8.2 | -- | 6.0 | 350 | 97 | 85 | 34 | 47 |
| APR 03... | 1610 | 165 | 518 | 8.2 | 12.0 | 1.5 | 190 | 67 | 46 | 17 | 35 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| OCT 06... | 22 | 1 | 11 | 310 | .000 | 260 | 3.1 | 190 | 14 | .30 | 18 | 575 |
| APR 03... | 28 | 1 | 8.4 | 140 | .000 | 120 | 1.4 | 120 | 11 | .20 | 16 | 345 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|--|--|--|---|---|---|---|---|---|---|--|---|
| OCT 06... | 550 | .78 | 28 | 4 | 110 | 0 | 4 | 40 | 210 | .3 | 0 | 440 |
| APR 03... | 320 | .47 | 154 | 2 | 80 | 30 | 0 | 40 | 190 | .6 | 1 | 240 |

RED RIVER OF THE NORTH BASIN

151

05100000 PEMBINA RIVER AT NECHE, ND
(International gaging station)

LOCATION.--Lat 48°59'20", long 97°33'05", in SE1/4NW1/4 sec.31, T.164 N., R.53 W., Pembina County, Hydrologic Unit 09020313, on right bank 0.3 mi east of State Highway 18, and at north edge of Neche.

DRAINAGE AREA.--3,410 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to September 1908, June 1909 to September 1915, April 1919 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1904-8, 1910-15, 1920, 1921, 1923, 1924. WSP 1388: 1904(M), 1914, 1915(M), 1931(M), 1933, 1938(M). WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 809.69 ft National Geodetic Vertical Datum of 1929. Prior to May 24, 1932, nonrecording gage at Burlington Northern Railway bridge 1 mi upstream, at same datum. May 25, 1932, to Apr. 17, 1939, nonrecording gage on bridge on State Highway 18, 500 ft downstream from railway bridge, at same datum.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--76 years (1903-8, 1909-15, 1919-83), 191 ft³/s, 138,400 acre-ft/yr; median of yearly mean discharges, 142 ft³/s, 102,900 acre-ft/yr.EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft³/s Apr. 20, 1950, gage height, 21.58 ft, backwater from ice; from rating curve extended above 5,300 ft³/s; maximum gage height, 23.64 ft Apr. 20, 1979, backwater from ice; no flow at times each year 1932-41, 1953, 1960-62.EXTREMES FOR CURRENT YEAR.--Maximum discharge, 312 ft³/s Apr. 7, gage height, 9.35 ft, no peak above base of 400 ft³/s; no flow Jan. 28-Mar. 21.DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|-------|------|--------|------|-------|------|-------|--------|-------|
| 1 | 8.6 | .39 | 6.2 | .50 | .00 | .00 | 184 | 172 | 148 | 66 | 12 | 2.9 |
| 2 | 11 | .39 | 6.2 | .60 | .00 | .00 | 202 | 182 | 145 | 64 | 11 | 3.0 |
| 3 | 14 | .39 | 5.9 | .70 | .00 | .00 | 249 | 175 | 136 | 59 | 9.9 | 3.5 |
| 4 | 14 | .39 | 5.6 | .70 | .00 | .00 | 223 | 171 | 139 | 54 | 9.2 | 3.1 |
| 5 | 14 | .39 | 5.2 | .96 | .00 | .00 | 225 | 154 | 120 | 49 | 8.8 | 3.1 |
| 6 | 20 | .39 | 5.1 | 1.0 | .00 | .00 | 232 | 148 | 120 | 42 | 8.4 | 3.0 |
| 7 | 23 | .37 | 5.1 | 1.2 | .00 | .00 | 244 | 136 | 123 | 42 | 8.5 | 3.3 |
| 8 | 25 | .26 | 5.1 | 1.6 | .00 | .00 | 205 | 139 | 132 | 42 | 9.2 | 2.5 |
| 9 | 25 | .25 | 4.3 | 1.4 | .00 | .00 | 171 | 148 | 135 | 44 | 9.9 | 1.9 |
| 10 | 25 | .23 | 2.6 | 1.2 | .00 | .00 | 133 | 161 | 158 | 44 | 9.6 | 1.9 |
| 11 | 26 | .18 | 2.0 | .98 | .00 | .00 | 121 | 168 | 154 | 42 | 8.9 | 1.9 |
| 12 | 23 | 9.4 | 1.8 | .86 | .00 | .00 | 120 | 175 | 129 | 40 | 8.5 | 2.5 |
| 13 | 20 | 9.4 | 1.8 | .82 | .00 | .00 | 120 | 175 | 126 | 38 | 8.0 | 4.1 |
| 14 | 20 | .12 | 1.8 | .78 | .00 | .00 | 133 | 175 | 192 | 38 | 7.4 | 3.5 |
| 15 | 20 | .17 | 1.8 | .67 | .00 | .00 | 124 | 175 | 217 | 35 | 6.3 | 3.3 |
| 16 | 25 | .15 | 1.6 | .39 | .00 | .00 | 116 | 175 | 206 | 32 | 6.3 | 3.3 |
| 17 | 25 | .13 | 1.4 | .35 | .00 | .00 | 108 | 171 | 188 | 32 | 5.9 | 3.3 |
| 18 | 25 | .13 | 1.4 | .30 | .00 | .00 | 97 | 164 | 238 | 30 | 5.0 | 3.9 |
| 19 | 25 | .14 | 1.0 | .25 | .00 | .00 | 97 | 158 | 198 | 25 | 4.9 | 3.3 |
| 20 | 25 | .19 | .90 | .25 | .00 | .00 | 99 | 154 | 161 | 23 | 5.7 | 2.2 |
| 21 | 25 | .15 | .85 | .20 | .00 | .00 | 101 | 154 | 132 | 23 | 7.4 | 1.6 |
| 22 | 25 | 8.3 | .85 | .20 | .00 | .02 | 101 | 154 | 120 | 22 | 5.5 | 1.8 |
| 23 | 25 | 9.3 | .80 | .20 | .00 | .10 | 102 | 154 | 112 | 19 | 4.8 | .78 |
| 24 | 26 | .10 | .70 | .15 | .00 | 4.5 | 104 | 171 | 105 | 18 | 4.7 | .20 |
| 25 | 28 | .11 | .65 | .15 | .00 | 15 | 112 | 171 | 97 | 16 | 4.9 | .20 |
| 26 | 30 | .6.5 | .65 | .10 | .00 | 32 | 111 | 171 | 91 | 15 | 5.2 | .20 |
| 27 | 30 | .6.2 | .60 | .05 | .00 | 68 | 118 | 171 | 86 | 15 | 5.1 | .39 |
| 28 | 37 | .6.2 | .55 | .00 | .00 | 182 | 135 | 171 | 86 | 14 | 5.1 | 1.0 |
| 29 | 39 | .6.2 | .55 | .00 | .00 | 169 | 183 | 167 | 83 | 12 | 4.1 | 1.5 |
| 30 | 39 | .6.2 | .55 | .00 | --- | 165 | 173 | 164 | 72 | 13 | 3.4 | 2.0 |
| 31 | 39 | --- | .50 | .00 | --- | 159 | --- | 161 | --- | 12 | 3.0 | --- |
| TOTAL | 756.6 | 569.7 | 74.05 | 16.56 | .00 | 794.62 | 4443 | 5085 | 4149 | 1020 | 216.6 | 69.17 |
| MEAN | 24.4 | 19.0 | 2.39 | .53 | .00 | 25.6 | 148 | 164 | 138 | 32.9 | 6.99 | 2.31 |
| MAX | 39 | 39 | 6.2 | 1.6 | .00 | 182 | 249 | 182 | 238 | 66 | 12 | 4.1 |
| MIN | 8.6 | 6.2 | .50 | .00 | .00 | .00 | 97 | 136 | 72 | 12 | 3.0 | .20 |
| AC-FT | 1500 | 1130 | 147 | 33 | .00 | 1580 | 8810 | 10090 | 8230 | 2020 | 430 | 137 |
| CAL YR 1983 | TOTAL | 60556.85 | | MEAN | 166 | MAX | 1600 | MIN | .50 | AC-FT | 120100 | |
| WTR YR 1984 | TOTAL | 17194.30 | | MEAN | 47.0 | MAX | 249 | MIN | .00 | AC-FT | 34100 | |

RED RIVER OF THE NORTH BASIN

05100000 PEMBINA RIVER AT NECHE, ND--CONTINUED
(International gaging station)

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 06... | 0940 | 20 | 825 | 8.0 | 5.0 | 5.5 | 390 | 122 | 94 | 37 | 39 |
| NOV 16... | 1500 | 14 | 960 | -- | 1.0 | 1.0 | -- | -- | -- | -- | -- |
| JAN 05... | 1200 | .73 | 1300 | -- | 4.5 | .0 | -- | -- | -- | -- | -- |
| APR 10... | 1015 | 131 | 650 | 8.1 | -- | 6.5 | 260 | 80 | 63 | 24 | 37 |
| MAY 01... | 1455 | 172 | 880 | -- | 10.0 | 7.0 | -- | -- | -- | -- | -- |
| JUN 12... | 1600 | 126 | 850 | -- | 18.0 | 17.5 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| OCT 06... | 18 | .9 | 9.6 | 320 | .000 | 270 | 5.1 | 160 | .19 | .30 | 20 | 543 |
| APR 10... | 23 | 1 | 8.3 | 220 | .000 | 180 | 2.7 | 150 | 15 | .20 | 19 | 425 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|--|--|--|---|---|---|---|---|---|---|--|---|
| OCT 06... | 540 | .74 | 29 | 4 | 90 | 10 | 1 | 60 | 130 | .5 | 1 | 450 |
| APR 10... | 420 | .58 | 150 | 2 | 70 | 20 | 0 | 70 | 50 | .0 | 0 | 290 |

05101000 TONGUE RIVER AT AKRA, ND

LOCATION.--Lat 48°46'42", long 97°44'43", in SW1/4 sec.10, T.161 N., R.55 W., Pembina County, Hydrologic Unit 09020313, on left bank 300 ft downstream from Renwick Dam, 0.9 mi northwest of Akra, and 6 mi west of Cavalier.

DRAINAGE AREA.--160 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to June 1950 (WSP 1137-B), October 1951 to 1983 (seasonal record since 1983).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 930.00 ft National Geodetic Vertical Datum of 1929. Prior to July 10, 1954, nonrecording gage 1.2 mi downstream at datum 30.00 ft lower. July 23, 1954, to Dec. 19, 1973, water stage recorder 2.7 mi downstream at datum 9.10 ft lower.

REMARKS.--Records good. Flow regulated by temporary retention in ten retarding basins beginning 300 ft above station, four of which have slow release outlet structures to regulate the flow. Retarding basins were completed during the period 1955 to 1961 and have a combined capacity of 19,245 acre-ft.

AVERAGE DISCHARGE.--31 years (water years 1952-82), 21.4 ft³/s, 15,500 acre-ft/yr; median of yearly mean discharges, 19 ft³/s, 13,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,800 ft³/s Apr. 18, 1950, gage height, 48.7 ft, from flood-marks, site and datum then in use, from rating curve extended above 1,500 ft³/s on basis of contracted-opening measurement of peak flow; no flow at times.

This flood is the highest known since settlement of the region in about 1860.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 33 ft³/s Apr. 14, gage height, 12.89 ft; minimum daily discharge 0.00 ft³/s, Sept. 24-30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-------|------|-------|--------|-------|-------|-------|
| 1 | | | | | | .20 | 28 | 24 | 4.3 | 14 | 2.3 | .17 |
| 2 | | | | | | .20 | 28 | 20 | 4.3 | 19 | 2.3 | .14 |
| 3 | | | | | | .20 | 28 | 18 | 4.1 | 18 | 1.9 | .17 |
| 4 | | | | | | .20 | 26 | 16 | 2.7 | 16 | 1.4 | .91 |
| 5 | | | | | | .20 | 26 | 15 | 1.1 | 14 | 1.2 | 2.6 |
| 6 | | | | | | .20 | 25 | 14 | .78 | 11 | .96 | 12 |
| 7 | | | | | | .20 | 26 | 12 | .66 | 9.7 | .85 | 14 |
| 8 | | | | | | .20 | 25 | 9.8 | 8.4 | 11 | 2.8 | 2.9 |
| 9 | | | | | | .20 | 25 | 8.9 | 15 | 11 | 3.4 | 2.6 |
| 10 | | | | | | .20 | 23 | 9.2 | 17 | 10 | 2.2 | 2.7 |
| 11 | | | | | | .20 | 23 | 8.3 | 16 | 9.3 | 1.7 | 3.7 |
| 12 | | | | | | .20 | 28 | 7.4 | 14 | 8.4 | 1.2 | 4.2 |
| 13 | | | | | | .20 | 32 | 8.2 | 12 | 9.7 | 1.1 | 3.6 |
| 14 | | | | | | .20 | 33 | 8.4 | 9.6 | 11 | .73 | 4.2 |
| 15 | | | | | | .20 | 30 | 7.5 | 8.0 | 9.9 | .41 | 4.3 |
| 16 | | | | | | .20 | 24 | 7.7 | 8.1 | 8.3 | .18 | 5.4 |
| 17 | | | | | | .20 | 21 | 9.1 | 8.6 | 7.2 | .15 | 5.7 |
| 18 | | | | | | .20 | 18 | 6.7 | 9.0 | 6.4 | .11 | 5.3 |
| 19 | | | | | | .20 | 16 | 5.5 | 8.1 | 5.7 | .11 | 4.4 |
| 20 | | | | | | .20 | 14 | 6.1 | 7.4 | 4.8 | .11 | 4.4 |
| 21 | | | | | | .20 | 13 | 7.8 | 8.0 | 3.9 | .11 | 4.9 |
| 22 | | | | | | .20 | 11 | 7.8 | 8.5 | 3.9 | .09 | 4.2 |
| 23 | | | | | | .17 | 11 | 7.7 | 7.6 | 3.7 | .36 | 3.3 |
| 24 | | | | | | .58 | 10 | 7.6 | 6.3 | 2.9 | .53 | 2.0 |
| 25 | | | | | | .85 | 10 | 6.6 | 5.9 | 2.6 | .39 | .00 |
| 26 | | | | | | 1.2 | 12 | 6.0 | 6.0 | 2.5 | .26 | .00 |
| 27 | | | | | | 1.4 | 17 | 5.7 | 6.5 | 2.5 | .20 | .00 |
| 28 | | | | | | 7.2 | 24 | 5.1 | 8.4 | 2.1 | .20 | .00 |
| 29 | | | | | | 18 | 28 | 4.3 | 9.3 | 1.4 | .15 | .00 |
| 30 | | | | | | 23 | 28 | 4.3 | 9.4 | 1.5 | .26 | .00 |
| 31 | | | | | | 26 | --- | 4.3 | --- | 2.3 | .25 | --- |
| TOTAL | | | | | | 82.80 | 663 | 289.0 | 235.04 | 243.7 | 27.91 | 97.79 |
| MEAN | | | | | | 2.67 | 22.1 | 9.32 | 7.83 | 7.86 | .90 | 3.26 |
| MAX | | | | | | 26 | 33 | 24 | 17 | 19 | 3.4 | 14 |
| MIN | | | | | | .17 | 10 | 4.3 | .66 | 1.4 | .09 | .00 |
| AC-FT | | | | | | 164 | 1320 | 573 | 466 | 483 | 55 | 194 |

RED RIVER OF THE NORTH BASIN

05101000 TONGUE RIVER AT AKRA, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 06... | 1635 | 5.4 | 550 | 8.6 | 13.5 | 11.5 | 240 | 33 | 65 | 20 | 28 | |
| MAR 22... | 1555 | .23 | 715 | -- | 4.5 | 5.5 | -- | -- | -- | -- | -- | |
| APR 04... | 0930 | 27 | 415 | 8.0 | -- | 4.0 | 170 | 28 | 45 | 13 | 17 | |
| MAY 01... | 0815 | 24 | -- | -- | .0 | 6.5 | -- | -- | -- | -- | -- | |
| JUN 11... | 1310 | 14 | 540 | -- | 19.5 | 17.0 | -- | -- | -- | -- | -- | |
| AUG 08... | 1100 | .96 | 548 | -- | 25.5 | 24.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| OCT 06... | 19 | .8 | 8.6 | 260 | .000 | 210 | 1.0 | 76 | 12 | .30 | 25 | 346 |
| APR 04... | 17 | .6 | 7.1 | 170 | .000 | 140 | 2.7 | 63 | 7.4 | .20 | 14 | 264 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| OCT 06... | 360 | .47 | 5.0 | 9 | 70 | 20 | 1 | 20 | 430 | .4 | 1 | 280 |
| APR 04... | 250 | .36 | 19 | 2 | 40 | 70 | 0 | 20 | 450 | .0 | 1 | 170 |

RED RIVER OF THE NORTH BASIN

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05102500 RED RIVER OF THE NORTH AT EMERSON, MAN
(National stream-quality accounting network station)
(International gaging station)

LOCATION.--Lat 49°00'30", long 97°12'40", in sec.2, T.1, R.2 E., on right bank 1,500 ft downstream from Canadian National Railway bridge in Emerson, 0.8 mi downstream from international boundary, 3.6 mi downstream from Pembina River, and at mile 154.3.

DRAINAGE AREA.--40,200 mi², approximately, includes 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to November 1902 (gage heights only), May 1912 to September 1929 (monthly discharge only, published in WSP 1308), October 1929 to current year.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft National Geodetic Vertical Datum of 1929, by Geodetic Survey of Canada. See WSP 1728 or 1913 for history of changes prior to Apr. 10, 1953.

REMARKS.--Records good. Discharge partially regulated by reservoirs on tributaries.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

AVERAGE DISCHARGE.--71 years (water years 1913-83), 3,326 ft³/s, 2,410,000 acre-ft/yr; median of yearly mean discharges, 2,760 ft³/s, 1,910,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 95,500 ft³/s May 13, 1950, gage height, 90.89 ft, gage height, 91.19 ft May 1, 1979; minimum observed discharge, 0.9 ft³/s Feb. 6-8, 1937.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 30,200 ft³/s Apr. 8; minimum daily, 862 ft³/s Sept. 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|--------|-------|-------|--------|---------|--------|--------|--------|---------|-------|
| 1 | 2040 | 2300 | 1920 | 1470 | 1260 | 1970 | 13500 | 5620 | 2630 | 5830 | 2000 | 1100 |
| 2 | 1930 | 2250 | 1920 | 1470 | 1260 | 2110 | 15900 | 5580 | 2540 | 5830 | 1950 | 1080 |
| 3 | 1840 | 2200 | 1910 | 1470 | 1260 | 2190 | 19300 | 5580 | 2460 | 5690 | 1910 | 1040 |
| 4 | 1760 | 2170 | 1900 | 1460 | 1260 | 2240 | 23200 | 5540 | 2410 | 5440 | 1900 | 1000 |
| 5 | 1700 | 2110 | 1900 | 1460 | 1260 | 2300 | 27000 | 5400 | 2370 | 5090 | 1840 | 985 |
| 6 | 1660 | 2050 | 1890 | 1460 | 1260 | 2360 | 29100 | 5260 | 2380 | 4770 | 1820 | 975 |
| 7 | 1650 | 2010 | 1890 | 1460 | 1250 | 2430 | 29400 | 5120 | 2490 | 4450 | 1730 | 985 |
| 8 | 1660 | 2010 | 1880 | 1460 | 1250 | 2490 | 30200 | 4980 | 2610 | 4240 | 1700 | 996 |
| 9 | 1670 | 2090 | 1880 | 1450 | 1240 | 2550 | 30100 | 4870 | 3120 | 4030 | 1720 | 1020 |
| 10 | 1690 | 2170 | 1870 | 1450 | 1230 | 2600 | 30000 | 4770 | 5300 | 3880 | 1750 | 1030 |
| 11 | 1710 | 2200 | 1850 | 1440 | 1210 | 2610 | 29800 | 4700 | 10700 | 3710 | 1740 | 1030 |
| 12 | 1770 | 2210 | 1840 | 1430 | 1190 | 2560 | 29700 | 4660 | 14400 | 3600 | 1710 | 1020 |
| 13 | 1860 | 2210 | 1810 | 1420 | 1180 | 2490 | 29500 | 4590 | 17500 | 3520 | 1660 | 1010 |
| 14 | 1980 | 2210 | 1780 | 1400 | 1180 | 2410 | 29300 | 4560 | 20000 | 3400 | 1640 | 982 |
| 15 | 2050 | 2200 | 1750 | 1390 | 1170 | 2320 | 27000 | 4450 | 21400 | 3230 | 1590 | 957 |
| 16 | 2080 | 2200 | 1720 | 1380 | 1160 | 2200 | 24300 | 4340 | 22700 | 3100 | 1540 | 936 |
| 17 | 2100 | 2180 | 1710 | 1370 | 1150 | 2070 | 22300 | 4200 | 23600 | 2950 | 1500 | 929 |
| 18 | 2120 | 2180 | 1690 | 1370 | 1150 | 1950 | 20100 | 4100 | 23900 | 2810 | 1480 | 922 |
| 19 | 2120 | 2160 | 1690 | 1360 | 1170 | 1860 | 17900 | 3990 | 23600 | 2670 | 1490 | 925 |
| 20 | 2210 | 2160 | 1670 | 1350 | 1190 | 1800 | 15600 | 3880 | 22600 | 2560 | 1500 | 918 |
| 21 | 2510 | 2160 | 1650 | 1330 | 1210 | 1750 | 13300 | 3780 | 21000 | 2480 | 1480 | 918 |
| 22 | 2780 | 2150 | 1620 | 1320 | 1230 | 1720 | 11300 | 3640 | 19000 | 2420 | 1410 | 918 |
| 23 | 2860 | 2080 | 1600 | 1320 | 1270 | 1700 | 9680 | 3510 | 16800 | 2380 | 1350 | 918 |
| 24 | 2820 | 1650 | 1580 | 1310 | 1310 | 1710 | 8330 | 3390 | 14000 | 2320 | 1270 | 893 |
| 25 | 2740 | 1930 | 1560 | 1300 | 1360 | 1760 | 7380 | 3300 | 11500 | 2270 | 1180 | 883 |
| 26 | 2660 | 2110 | 1530 | 1300 | 1410 | 1960 | 6710 | 3230 | 9460 | 2200 | 1120 | 890 |
| 27 | 2580 | 2020 | 1500 | 1290 | 1480 | 2550 | 6430 | 3140 | 7950 | 2150 | 1090 | 890 |
| 28 | 2510 | 1980 | 1490 | 1280 | 1610 | 4180 | 6180 | 3050 | 6920 | 2120 | 1090 | 883 |
| 29 | 2460 | 1940 | 1480 | 1270 | 1790 | 6800 | 5900 | 2980 | 6250 | 2110 | 1090 | 879 |
| 30 | 2400 | 1930 | 1470 | 1270 | --- | 9150 | 5690 | 2880 | 5930 | 2080 | 1100 | 862 |
| 31 | 2350 | --- | 1470 | 1270 | --- | 11000 | --- | 2750 | --- | 2050 | 1100 | --- |
| TOTAL | 66270 | 63220 | 53420 | 42780 | 36950 | 89790 | 574100 | 131840 | 347520 | 105380 | 47450 | 28774 |
| MEAN | 2138 | 2107 | 1723 | 1380 | 1274 | 2896 | 19140 | 4253 | 11580 | 3399 | 1531 | 959 |
| MAX | 2860 | 2300 | 1920 | 1470 | 1790 | 11000 | 30200 | 5620 | 23900 | 5830 | 2000 | 1100 |
| MIN | 1650 | 1650 | 1470 | 1270 | 1150 | 1700 | 5690 | 2750 | 2370 | 2050 | 1090 | 862 |
| AC-FT | 131400 | 125400 | 106000 | 84850 | 73290 | 178100 | 1139000 | 261500 | 689300 | 209000 | 94120 | 57070 |
| CAL YR 1983 | TOTAL | 1564540 | | MEAN | 4286 | MAX | 24600 | MIN | 1180 | AC-FT | 3103000 | |
| WTR YR 1984 | TOTAL | 1587494 | | MEAN | 4337 | MAX | 30200 | MIN | 862 | AC-FT | 3149000 | |

RED RIVER OF THE NORTH BASIN

05102500 RED RIVER AT EMERSON, MANITOBA--CONTINUED

PERIOD OF RECORD.--Water years 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-----------|------|--|--|---|--|--|---|--|---|
| OCT 27... | 1345 | 2590 | 683 | 8.4 | 10.0 | 7.5 | 22 | 11.4 | 99 |
| JAN 10... | 1225 | E1600 | 605 | -- | -1.9 | .0 | 4.5 | 10.5 | 73 |
| FEB 21... | 1350 | 1500 | 480 | 7.6 | 4.0 | .0 | -- | 10.4 | 74 |
| APR 10... | 1410 | 30600 | 408 | 8.1 | 8.0 | 6.0 | 160 | -- | -- |
| JUL 10... | 1310 | 4040 | 648 | 8.2 | 30.5 | 24.0 | 120 | 6.8 | 85 |
| AUG 14... | 1530 | E1630 | 585 | 8.6 | 27.0 | 25.5 | 58 | 6.2 | 79 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|-----------|---|---|---|---|---|------------------------------|--|--|--|--|--|--|
| OCT 27... | 310 | 94 | 70 | 32 | 30 | 17 | .8 | 5.6 | 213 | 1.6 | 120 | 42 |
| JAN 10... | 260 | 21 | 59 | 28 | 26 | 17 | .7 | 5.6 | 242 | -- | 55 | 21 |
| APR 10... | 170 | 49 | 43 | 16 | 12 | 12 | .4 | 7.9 | 124 | 1.9 | 57 | 11 |
| JUL 10... | 290 | 89 | 67 | 31 | 23 | 14 | .6 | 6.9 | 206 | 2.5 | 110 | 18 |
| AUG 14... | 240 | 45 | 53 | 26 | 29 | 20 | .8 | 5.4 | 195 | .9 | 58 | 36 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|-----------|---|--|---|--|--|--|--|--|---|--|---|
| OCT 27... | .20 | 9.6 | 461 | 440 | .63 | 3220 | .30 | .03 | 1.5 | .160 | .49 |
| JAN 10... | .20 | 8.1 | 370 | 350 | .50 | -- | .26 | .64 | 1.4 | .200 | .61 |
| APR 10... | .20 | 13 | 251 | 240 | .34 | 20700 | 2.2 | .70 | 2.1 | .420 | 1.3 |
| JUL 10... | .20 | 15 | 414 | 400 | .56 | 4520 | .35 | .05 | 2.0 | .380 | -- |
| AUG 14... | .20 | 12 | 353 | 340 | .48 | -- | .13 | .09 | 1.2 | .150 | -- |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|-----------|---|---|--|--|---|---|---|--|---|---|---|
| OCT 27... | .110 | .120 | .37 | 20 | 2 | 59 | <1 | <1 | <3 | 2 | 12 |
| JAN 10... | .170 | .190 | .58 | -- | -- | -- | -- | -- | -- | -- | -- |
| APR 10... | .420 | .100 | .31 | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL 10... | .120 | .120 | .37 | -- | -- | -- | -- | -- | -- | -- | -- |
| AUG 14... | .060 | .060 | .18 | 10 | 3 | 62 | <1 | <1 | <3 | 6 | <3 |

RED RIVER OF THE NORTH BASIN

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05102500 RED RIVER AT EMERSON, MANITOBA--CONTINUED

WATER QUALITY DTA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|---|---|--|---|--|---|---|---|---|
| OCT 27... | 4 | 34 | 2 | <.1 | <10 | 7 | <1 | <1 | 240 | <6 | 8 |
| --- | | | | | | | | | | | |
| ... | <1 | 19 | 8 | <.1 | <10 | 2 | <1 | <1 | 140 | <6 | 36 |
| AUG 14... | 4 | 32 | 2 | <.1 | <10 | 7 | <1 | <1 | 200 | <6 | 12 |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) |
|--------------|------|--|--|--|
| OCT 27... | 1345 | 2590 | 70 | 490 |
| JAN 10... | 1225 | E1600 | 8 | -- |
| APR 10... | 1410 | 30600 | 246 | 20300 |
| JUL 10... | 1310 | 4040 | 288 | 3140 |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| FEB | | | | | | | |
| 21... | 1350 | 20.0 | 1.6 | .0 | 480 | 7.6 | 10.4 |
| 21... | 1351 | 20.0 | 3.2 | .0 | 496 | 7.6 | 10.4 |
| 21... | 1352 | 30.0 | 1.6 | .0 | 492 | 7.6 | 10.9 |
| 21... | 1353 | 30.0 | 3.2 | .0 | 494 | 7.7 | 10.7 |
| 21... | 1354 | 40.0 | 1.6 | .0 | 497 | 7.7 | 11.6 |
| 21... | 1355 | 40.0 | 3.2 | .0 | 499 | 7.7 | 11.7 |
| 21... | 1356 | 50.0 | 1.6 | .0 | 499 | 7.7 | 12.4 |
| 21... | 1357 | 50.0 | 3.2 | .0 | 499 | 7.7 | 12.4 |
| 21... | 1358 | 50.0 | 6.4 | .0 | 499 | 7.7 | 12.2 |
| 21... | 1359 | 60.0 | 1.6 | .0 | 500 | 7.8 | 12.4 |
| 21... | 1400 | 60.0 | 3.2 | .0 | 501 | 7.7 | 12.0 |
| 21... | 1401 | 60.0 | 6.4 | .0 | 500 | 7.7 | 12.1 |
| 21... | 1402 | 70.0 | 1.6 | .0 | 501 | 7.8 | 12.4 |
| 21... | 1403 | 70.0 | 3.2 | .0 | 501 | 7.8 | 12.1 |
| 21... | 1404 | 70.0 | 6.4 | .0 | 501 | 7.8 | 12.1 |
| 21... | 1405 | 80.0 | 1.6 | .0 | 502 | 7.9 | 12.6 |
| 21... | 1406 | 80.0 | 3.2 | .0 | 502 | 7.8 | 12.5 |
| 21... | 1407 | 80.0 | 6.4 | .0 | 502 | 7.8 | 12.5 |
| 21... | 1408 | 90.0 | 1.6 | .0 | 502 | 7.9 | 12.8 |
| 21... | 1409 | 90.0 | 3.2 | .0 | 502 | 7.9 | 12.6 |
| 21... | 1410 | 90.0 | 6.4 | .0 | 502 | 7.8 | 12.6 |
| 21... | 1411 | 90.0 | 9.6 | .0 | 502 | 7.9 | 12.6 |
| 21... | 1412 | 100 | 1.6 | .0 | 502 | 7.9 | 12.9 |
| 21... | 1413 | 100 | 3.2 | .0 | 502 | 7.9 | 13.0 |
| 21... | 1414 | 100 | 6.4 | .0 | 502 | 7.9 | 13.0 |
| 21... | 1415 | 100 | 9.6 | .0 | 502 | 7.9 | 13.1 |
| 21... | 1416 | 110 | 1.6 | .0 | 503 | 8.0 | 13.8 |
| 21... | 1417 | 110 | 3.2 | .0 | 503 | 7.9 | 13.6 |
| 21... | 1418 | 110 | 6.4 | .0 | 503 | 7.9 | 13.6 |
| 21... | 1419 | 110 | 9.6 | .0 | 503 | 7.9 | 13.6 |
| 21... | 1420 | 120 | 1.6 | .0 | 504 | 7.9 | 12.7 |
| 21... | 1421 | 120 | 3.2 | .0 | 504 | 7.9 | 12.6 |
| 21... | 1422 | 120 | 6.4 | .0 | 504 | 7.9 | 12.6 |
| 21... | 1423 | 120 | 9.6 | .0 | 504 | 7.9 | 12.4 |
| 21... | 1424 | 130 | 1.6 | .0 | 504 | 7.9 | 12.9 |
| 21... | 1425 | 130 | 3.2 | .0 | 504 | 7.9 | 12.8 |
| 21... | 1426 | 130 | 6.4 | .0 | 504 | 7.9 | 12.9 |
| 21... | 1427 | 140 | 1.6 | .0 | 504 | 7.9 | 12.9 |
| 21... | 1428 | 140 | 3.2 | .0 | 504 | 7.9 | 12.8 |

05102500 RED RIVER AT EMERSON, MANITOBA--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| FEB | | | | | | | |
| 21... | 1429 | 140 | 6.4 | .0 | 504 | 7.9 | 12.7 |
| 21... | 1430 | 150 | 1.6 | .0 | 505 | 7.9 | 13.5 |
| 21... | 1431 | 150 | 3.2 | .0 | 505 | 8.0 | 13.4 |
| 21... | 1432 | 150 | 6.4 | .0 | 505 | 8.0 | 13.4 |
| 21... | 1433 | 160 | 1.6 | .0 | 505 | 8.0 | 12.8 |
| 21... | 1434 | 160 | 3.2 | .0 | 505 | 8.0 | 12.7 |
| 21... | 1435 | 160 | 6.4 | .0 | 505 | 8.0 | 12.7 |
| 21... | 1436 | 170 | 1.6 | .0 | 505 | 8.0 | 12.8 |
| 21... | 1437 | 170 | 3.2 | .0 | 505 | 8.0 | 12.7 |
| 21... | 1438 | 170 | 6.4 | .0 | 505 | 8.0 | 12.6 |
| 21... | 1439 | 180 | 1.6 | .0 | 505 | 8.0 | 13.0 |
| 21... | 1440 | 180 | 3.2 | .0 | 505 | 8.0 | 13.0 |
| 21... | 1441 | 180 | 6.4 | .0 | 505 | 8.0 | 13.1 |
| 21... | 1442 | 190 | 1.6 | .0 | 506 | 8.0 | 12.9 |
| 21... | 1443 | 190 | 3.2 | .0 | 506 | 8.0 | 12.7 |
| 21... | 1444 | 190 | 6.4 | .0 | 506 | 8.0 | 12.7 |
| 21... | 1445 | 200 | 1.6 | .0 | 506 | 8.0 | 12.8 |
| 21... | 1446 | 200 | 3.2 | .0 | 506 | 8.0 | 12.8 |
| MAY | | | | | | | |
| 15... | 1130 | 15.0 | 1.6 | 9.3 | 720 | 8.4 | -- |
| 15... | 1131 | 15.0 | 3.3 | 9.2 | 696 | 8.5 | -- |
| 15... | 1132 | 30.0 | 1.6 | 8.9 | 685 | 8.5 | -- |
| 15... | 1133 | 30.0 | 3.3 | 8.9 | 700 | 8.5 | -- |
| 15... | 1134 | 30.0 | 6.6 | 8.8 | 713 | 8.5 | -- |
| 15... | 1135 | 45.0 | 1.6 | 8.8 | 655 | 8.4 | -- |
| 15... | 1136 | 45.0 | 3.3 | 8.8 | 615 | 8.5 | -- |
| 15... | 1137 | 45.0 | 6.6 | 8.9 | 590 | 8.6 | -- |
| 15... | 1138 | 60.0 | 1.6 | 8.7 | 620 | 8.6 | -- |
| 15... | 1140 | 60.0 | 3.3 | 8.7 | 600 | 8.6 | -- |
| 15... | 1141 | 60.0 | 6.6 | 8.6 | 600 | 8.7 | -- |
| 15... | 1142 | 75.0 | 1.6 | 8.6 | 600 | 8.7 | -- |
| 15... | 1143 | 75.0 | 3.3 | 8.4 | 570 | 8.8 | -- |
| 15... | 1144 | 95.0 | 1.6 | 8.9 | 610 | 8.7 | -- |
| 15... | 1145 | 95.0 | 3.3 | 9.1 | 600 | 8.7 | -- |
| 15... | 1146 | 95.0 | 6.6 | 8.5 | 565 | 8.8 | -- |
| 15... | 1147 | 110 | 1.6 | 7.7 | 630 | 8.6 | -- |
| 15... | 1148 | 110 | 3.3 | 7.7 | 610 | 8.7 | -- |
| 15... | 1150 | 110 | 6.6 | 7.8 | 600 | 8.7 | -- |
| 15... | 1151 | 110 | 9.9 | 7.9 | 580 | 8.7 | -- |
| 15... | 1152 | 125 | 1.6 | 8.1 | 620 | 8.6 | -- |
| 15... | 1153 | 125 | 3.3 | 8.3 | 615 | 8.6 | -- |
| 15... | 1154 | 125 | 6.6 | 8.6 | 600 | 8.7 | -- |
| 15... | 1155 | 125 | 9.9 | 8.4 | 560 | 8.7 | -- |
| 15... | 1156 | 140 | 1.6 | 8.5 | 645 | 8.5 | -- |
| 15... | 1157 | 140 | 3.3 | 8.5 | 640 | 8.5 | -- |
| 15... | 1158 | 140 | 6.6 | 8.7 | 635 | 8.5 | -- |
| 15... | 1200 | 140 | 9.9 | 8.7 | 615 | 8.5 | -- |
| 15... | 1202 | 140 | 13 | 9.0 | 590 | 8.3 | -- |
| 15... | 1204 | 155 | 1.6 | 8.5 | 630 | 8.3 | -- |
| 15... | 1206 | 155 | 3.3 | 8.5 | 615 | 8.4 | -- |
| 15... | 1208 | 155 | 6.6 | 8.7 | 600 | 8.4 | -- |
| 15... | 1210 | 155 | 9.9 | 7.0 | 540 | 8.6 | -- |
| 15... | 1212 | 180 | 1.6 | 9.0 | 300 | 8.3 | -- |
| 15... | 1214 | 180 | 3.3 | 8.6 | 300 | 8.4 | -- |
| 15... | 1216 | 180 | 6.6 | 8.5 | 295 | 8.5 | -- |
| 15... | 1218 | 180 | 9.9 | 7.9 | 450 | 8.4 | -- |
| 15... | 1220 | 180 | 13 | 7.0 | 300 | 8.4 | -- |
| 15... | 1222 | 195 | 1.6 | 8.6 | 350 | 8.6 | -- |
| 15... | 1224 | 195 | 3.3 | 8.0 | 350 | 8.5 | -- |
| 15... | 1226 | 195 | 6.6 | 8.4 | 190 | 8.5 | -- |
| 15... | 1228 | 195 | 9.9 | 8.6 | 160 | 8.4 | -- |
| 15... | 1230 | 195 | 13 | 8.5 | 150 | 8.3 | -- |
| 15... | 1232 | 210 | 1.6 | 8.5 | 190 | 8.5 | -- |
| 15... | 1234 | 210 | 3.3 | 8.8 | 180 | 8.4 | -- |
| 15... | 1236 | 210 | 6.6 | 7.6 | 180 | 8.5 | -- |
| 15... | 1238 | 210 | 9.9 | 9.5 | 160 | 8.4 | -- |
| 15... | 1240 | 225 | 1.6 | 9.1 | 630 | 8.6 | -- |
| 15... | 1242 | 225 | 3.3 | 7.8 | 620 | 8.6 | -- |
| 15... | 1244 | 225 | 6.6 | 7.3 | 600 | 8.6 | -- |
| 15... | 1246 | 240 | 1.6 | 7.3 | 150 | 8.4 | -- |
| 15... | 1248 | 240 | 3.3 | 7.3 | 150 | 8.4 | -- |
| 15... | 1250 | 240 | 6.6 | 7.0 | 130 | 8.4 | -- |
| 15... | 1252 | 260 | 1.6 | 8.6 | 140 | 8.3 | -- |
| 15... | 1254 | 260 | 3.3 | 7.9 | 140 | 8.2 | -- |

05102500 RED RIVER AT EMERSON, MANITOBA--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| JUL | | | | | | | |
| 10... | 1400 | 15.0 | 3.3 | 24.0 | 633 | 8.2 | 6.8 |
| 10... | 1401 | 35.0 | 3.3 | 23.7 | 642 | 8.2 | 7.0 |
| 10... | 1402 | 35.0 | 3.3 | 23.7 | 642 | 8.2 | 7.0 |
| 10... | 1403 | 50.0 | 6.6 | 23.8 | 645 | 8.2 | 7.0 |
| 10... | 1404 | 50.0 | 3.3 | 23.8 | 644 | 8.2 | 7.0 |
| 10... | 1405 | 65.0 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1406 | 50.0 | 6.6 | 23.8 | 645 | 8.2 | 7.0 |
| 10... | 1407 | 95.0 | 3.3 | 23.7 | 648 | 8.2 | 6.8 |
| 10... | 1408 | 65.0 | 3.3 | 23.5 | 648 | 8.2 | 6.9 |
| 10... | 1409 | 110 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1410 | 65.0 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1411 | 118 | 6.6 | 23.8 | 648 | 8.2 | 6.7 |
| 10... | 1412 | 78.0 | 3.3 | 23.8 | 648 | 8.2 | 6.9 |
| 10... | 1413 | 128 | 3.3 | 23.7 | 649 | 8.2 | 6.9 |
| 10... | 1414 | 95.0 | 3.3 | 23.7 | 648 | 8.2 | 6.8 |
| 10... | 1415 | 128 | 9.9 | 23.8 | 648 | 8.2 | 6.7 |
| 10... | 1416 | 110 | 3.3 | 23.8 | 648 | 8.2 | 6.9 |
| 10... | 1417 | 152 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1418 | 110 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1419 | 160 | 3.3 | 23.8 | 649 | 8.2 | 6.9 |
| 10... | 1420 | 118 | 3.3 | 23.8 | 649 | 8.2 | 6.8 |
| 10... | 1421 | 160 | 9.9 | 23.8 | 648 | 8.2 | 6.5 |
| 10... | 1422 | 118 | 6.6 | 23.8 | 648 | 8.2 | 6.7 |
| 10... | 1423 | 167 | 6.6 | 23.8 | 649 | 8.2 | 6.8 |
| 10... | 1424 | 118 | 9.9 | 23.8 | 648 | 8.2 | 6.6 |
| 10... | 1425 | 175 | 3.3 | 23.8 | 649 | 8.2 | 6.8 |
| 10... | 1426 | 128 | 3.3 | 23.7 | 649 | 8.2 | 6.9 |
| 10... | 1427 | 175 | 9.9 | 23.8 | 649 | 8.2 | 6.9 |
| 10... | 1428 | 128 | 6.6 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1429 | 185 | 3.3 | 23.8 | 649 | 8.2 | 6.9 |
| 10... | 1430 | 128 | 9.9 | 23.8 | 648 | 8.2 | 6.7 |
| 10... | 1431 | 185 | 9.9 | 23.8 | 649 | 8.2 | 6.8 |
| 10... | 1432 | 185 | 13 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1433 | 191 | 3.3 | 23.8 | 649 | 8.2 | 6.9 |
| 10... | 1434 | 191 | 6.6 | 23.8 | 648 | 8.2 | 6.9 |
| 10... | 1435 | 191 | 9.9 | 23.8 | 648 | 8.2 | 6.9 |
| 10... | 1436 | 199 | 3.3 | 23.9 | 648 | 8.2 | 6.9 |
| 10... | 1437 | 199 | 6.6 | 23.9 | 648 | 8.2 | 6.9 |
| 10... | 1438 | 199 | 9.9 | 23.8 | 648 | 8.2 | 6.8 |
| 10... | 1439 | 206 | 3.3 | 23.9 | 648 | 8.1 | 6.9 |
| 10... | 1440 | 206 | 6.6 | 23.9 | 648 | 8.1 | 6.8 |
| 10... | 1441 | 206 | 9.9 | 23.8 | 648 | 8.1 | 6.7 |
| 10... | 1442 | 217 | 3.3 | 23.9 | 648 | 8.2 | 6.8 |
| 10... | 1443 | 217 | 6.6 | 23.9 | 648 | 8.1 | 6.7 |
| 10... | 1444 | 217 | 9.9 | 23.9 | 648 | 8.2 | 6.7 |
| 10... | 1445 | 228 | 3.3 | 23.8 | 649 | 8.2 | 7.1 |
| 10... | 1446 | 228 | 6.6 | 23.9 | 648 | 8.1 | 7.2 |
| 10... | 1447 | 242 | 3.3 | 23.9 | 647 | 8.1 | 7.0 |
| 10... | 1448 | 262 | 3.3 | 23.9 | 648 | 8.2 | 7.0 |

RED RIVER OF THE NORTH BASIN

05113360 LONG CREEK AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY, SASK.
(International gaging station)

LOCATION.--Lat 49°00'01", long 103°21'08", in SE¼ sec.1, T.1, R.11 W., 2d meridian, Hydrologic Unit 09010001, and on right bank 10 mi south of Outram.

DRAINAGE AREA.--1,320 mi².

PERIOD OF RECORD.--March 1959 to current year.

GAGE.--Water-stage recorder and artificial control. Datum of gage is 1,894.00 ft National Geodetic Vertical Datum of 1929, international boundary survey.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

AVERAGE DISCHARGE.--25 years, 40.3 ft³/s, 29,200 acre-ft/yr; median of yearly mean discharges, 31 ft³/s, 22,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,690 ft³/s Apr. 1, 1976, gage height, 12.05 ft; maximum gage height, 12.70 ft Mar. 31, 1976 backwater from ice; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 11.8 ft³/s Mar. 29; no flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-----|------|------|-------|-------|------|-----|-----|-----|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 8.0 | .67 | .00 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 6.1 | .21 | .00 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 4.5 | 1.2 | .00 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 3.3 | 1.6 | .00 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 2.5 | 1.1 | .00 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 2.0 | .64 | .00 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 1.6 | .35 | .00 | .00 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | .99 | .25 | .00 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | .85 | .18 | .00 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | .81 | .11 | .00 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | .78 | .07 | .00 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | .78 | .07 | .00 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | .60 | .04 | .00 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | .39 | .04 | .00 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | .25 | .04 | .00 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | .28 | .04 | .00 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | .25 | .07 | .00 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | .21 | .04 | .00 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | .14 | .04 | .00 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .04 | .00 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .04 | .00 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .04 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .00 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .04 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | .00 | .11 | .00 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .00 | .07 | .00 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | .00 | .46 | .00 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 6.4 | .71 | .00 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 11 | .64 | .00 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 11 | 1.0 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 9.3 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 37.70 | 37.87 | 6.92 | .00 | .00 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 1.22 | 1.26 | .22 | .00 | .00 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 11 | 8.0 | 1.6 | .00 | .00 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .07 | .00 | .00 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 15449.13 | | MEAN | 42.3 | MAX | 851 | MIN | .00 | | | |
| WTR YR 1984 | TOTAL | 82.49 | | MEAN | .23 | MAX | 11 | MIN | .00 | | | |

RED RIVER OF THE NORTH BASIN

161

05113600 LONG CREEK NEAR NOONAN, ND
(International gaging station)

LOCATION.--Lat 48°58'52", long 103°04'34", near north line of NE¼ sec.1, T.163 N., R.96 W., Divide County, Hydrologic Unit 09010001, on right bank 150 ft upstream from county highway bridge, 1.5 mi upstream from international boundary, and 7 mi northwest of Noonan.

DRAINAGE AREA.--1,790 mi², approximately, of which about 1,160 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 1,840 ft, from topographic map. Prior to Aug. 18, 1960, non-recording gage at same site and datum.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--25 years, 52.1 ft³/s, 37,750 acre-ft/yr; median of yearly mean discharges, 40 ft³/s, 29,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,310 ft³/s Mar. 31, 1976, gage height, 17.61 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12 ft³/s May 3, gage height, 3.71 ft; no peak above base of 200 ft³/s. No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|------|-------|-------|-------|--------|-------|-------|-----|-----|
| 1 | .00 | .06 | .20 | .10 | .22 | .36 | .24 | 8.9 | .72 | .26 | .00 | .00 |
| 2 | .01 | .05 | .18 | .12 | .22 | .34 | .20 | 9.5 | .64 | .21 | .00 | .00 |
| 3 | .02 | .10 | .18 | .14 | .20 | .34 | .75 | 11 | .55 | .18 | .00 | .00 |
| 4 | .03 | .20 | .17 | .16 | .20 | .34 | 6.1 | 9.7 | .44 | .18 | .00 | .00 |
| 5 | .03 | .22 | .16 | .23 | .16 | .32 | 5.4 | 9.2 | .37 | .17 | .00 | .00 |
| 6 | .02 | .14 | .16 | .28 | .16 | .32 | 3.7 | 9.6 | .36 | .15 | .00 | .00 |
| 7 | .02 | .16 | .15 | .24 | .14 | .30 | 2.8 | 8.3 | .43 | .15 | .00 | .00 |
| 8 | .02 | .12 | .15 | .22 | .18 | .30 | 2.5 | 6.7 | .37 | .16 | .00 | .00 |
| 9 | .03 | .10 | .14 | .20 | .25 | .28 | 1.8 | 4.8 | .30 | .12 | .00 | .00 |
| 10 | .03 | .08 | .14 | .18 | .30 | .28 | 1.8 | 3.7 | .24 | .10 | .00 | .00 |
| 11 | .02 | .08 | .14 | .16 | .35 | .26 | 1.5 | 2.7 | .18 | .08 | .00 | .00 |
| 12 | .02 | .09 | .13 | .16 | .40 | .26 | 1.1 | 1.9 | .36 | .07 | .00 | .00 |
| 13 | .02 | .13 | .13 | .15 | .45 | .24 | .82 | 1.7 | .43 | .06 | .00 | .00 |
| 14 | .01 | .14 | .13 | .14 | .59 | .24 | .65 | 2.6 | .38 | .04 | .00 | .00 |
| 15 | .02 | .14 | .12 | .13 | .86 | .22 | .60 | 2.1 | .38 | .03 | .00 | .00 |
| 16 | .03 | .12 | .12 | .12 | 1.1 | .20 | 1.1 | 1.8 | .34 | .02 | .00 | .00 |
| 17 | .02 | .14 | .12 | .11 | .94 | .20 | 1.4 | 1.9 | .31 | .00 | .00 | .00 |
| 18 | .02 | .14 | .11 | .10 | .67 | .20 | 1.5 | 1.6 | .28 | .00 | .00 | .00 |
| 19 | .03 | .14 | .11 | .10 | .54 | .63 | 2.0 | 1.3 | .25 | .00 | .00 | .00 |
| 20 | .04 | .14 | .10 | .08 | .51 | 1.6 | 2.3 | 1.1 | .21 | .00 | .00 | .00 |
| 21 | .06 | .14 | .10 | .07 | .63 | 3.1 | 2.5 | 1.1 | .50 | .00 | .00 | .00 |
| 22 | .06 | .15 | .10 | .06 | .76 | 5.0 | 2.7 | 1.3 | .77 | .00 | .00 | .00 |
| 23 | .06 | .15 | .09 | .06 | .72 | 3.7 | 2.9 | 1.3 | .66 | .00 | .00 | .00 |
| 24 | .06 | .16 | .08 | .07 | .63 | 2.8 | 3.3 | 1.0 | .55 | .00 | .00 | .00 |
| 25 | .05 | .16 | .08 | .08 | .64 | 4.8 | 3.3 | .97 | .53 | .00 | .00 | .00 |
| 26 | .05 | .17 | .08 | .08 | .59 | 4.7 | 3.7 | .98 | .55 | .00 | .00 | .00 |
| 27 | .06 | .17 | .08 | .08 | .52 | 2.4 | 6.1 | .91 | .50 | .00 | .00 | .00 |
| 28 | .05 | .18 | .08 | .10 | .46 | 1.2 | 6.3 | .82 | .46 | .00 | .00 | .00 |
| 29 | .05 | .18 | .08 | .20 | .40 | .69 | 7.5 | .76 | .43 | .00 | .00 | .00 |
| 30 | .05 | .20 | .08 | .25 | --- | .45 | 8.0 | .75 | .32 | .00 | .00 | .00 |
| 31 | .06 | --- | .09 | .25 | --- | .27 | --- | .77 | --- | .00 | .00 | --- |
| TOTAL | 1.05 | 4.15 | 3.78 | 4.42 | 13.79 | 36.34 | 84.56 | 110.76 | 12.81 | 1.98 | .00 | .00 |
| MEAN | .03 | .14 | .12 | .14 | .48 | 1.17 | 2.82 | 3.57 | .43 | .06 | .00 | .00 |
| MAX | .06 | .22 | .20 | .28 | 1.1 | 5.0 | 8.0 | 11 | .77 | .26 | .00 | .00 |
| MIN | .00 | .05 | .08 | .06 | .14 | .20 | .20 | .75 | .18 | .00 | .00 | .00 |
| AC-FT | 2.1 | 8.2 | 7.5 | 8.8 | 27 | 72 | 168 | 220 | 25 | 3.9 | .00 | .00 |
| CAL YR 1983 | TOTAL | 18351.79 | MEAN | 50.3 | MAX | 825 | MIN | .00 | AC-FT | 36400 | | |
| WTR YR 1984 | TOTAL | 273.64 | MEAN | .75 | MAX | 11 | MIN | .00 | AC-FT | 543 | | |

RED RIVER OF THE NORTH BASIN

05113600 LONG CREEK NEAR NOONAN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|---|--|--|--|--|---|--|---|---|---|
| MAR 27... | 1055 | 2.3 | 940 | 8.1 | 1.5 | 2.0 | 300 | 53 | 54 | 40 | 75 |
| | | | SODIUM AD- SORP- TION PERCENT SODIUM (00932) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SI02) (00955) | |
| MAR 27... | | 34 | 2 | 8.6 | 247 | 3.8 | 220 | 12 | .20 | 5.8 | |
| | | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| MAR 27... | | 594 | 560 | .81 | 3.7 | <.10 | .020 | 1 | 53 | 60 | |
| | | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | |
| MAR 27... | | 4 | 87 | 49 | 47 | 130 | .3 | <1 | 260 | 14 | |

05113750 EAST BRANCH SHORT CREEK RESERVOIR NEAR COLUMBUS, ND

LOCATION.--Lat 48°59'26", long 102°47'07", in SW1/4NW1/4 sec.32, T.164 N., R.93 W., Burke County, Hydrologic Unit 09010001, on left bank of reservoir on East Branch Short Creek, 0.5 mi south of international boundary, and 6.0 mi north of Columbus.

DRAINAGE AREA.--280 mi², of which 175 mi² is noncontributing.

PERIOD OF RECORD.--April 1963 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth-fill dam; storage began April 1963. Outlet of lake is a fixed-crest concrete dam; average crest elevation, 1,886.90 ft National Geodetic Vertical Datum of 1929. Reservoir capacity at crest elevation, 1,200 acre-ft. The reservoir is operated for water supply and recreation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,850 acre-ft Mar. 28, 1976, gage height, 32.13 ft; minimum, 890 acre-ft Dec. 10, 1977, gage height, 23.92 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,200 acre-ft May 15, gage height, 26.96 ft; minimum recorded, 990 acre-ft Dec. 29, gage height, 24.98 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Gage height (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|-----------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 25.39 | 1,030 | -- |
| Oct. 31----- | 25.33 | 1,020 | -10 |
| Nov. 30----- | 25.17 | 1,010 | -10 |
| Dec. 31----- | 25.02 | 990 | -20 |
| CAL YR 1983----- | -- | -- | -160 |
| Jan. 31----- | -- | *1,000 | +10 |
| Feb. 29----- | 25.49 | 1,040 | +40 |
| Mar. 31----- | 26.05 | 1,100 | +60 |
| Apr. 30----- | 26.22 | 1,110 | +10 |
| May 31----- | 26.68 | 1,160 | +50 |
| June 30----- | 26.45 | 1,140 | -20 |
| July 31----- | 25.83 | 1,070 | -70 |
| Aug. 31----- | 25.22 | 1,010 | -60 |
| Sept. 30----- | 25.06 | 1,000 | -10 |
| WTR YR 1984----- | -- | -- | -30 |

* - Estimated

RED RIVER OF THE NORTH BASIN

05113800 SHORT CREEK BELOW INTERNATIONAL BOUNDARY NEAR ROCHE PERCEE, SASK.
(International gaging station)

LOCATION.--LAT 49°01'42", long 102°51'00", in SW¼ sec.14, T.1, R.7 W., 2d meridian, Hydrologic Unit 09010001, 4 mi southwest of Roche Percee, Saskatchewan, and 5 mi upstream from mouth. international boundary, and 7 mi northwest of Noonan.

DRAINAGE AREA.--480 mi².

PERIOD OF RECORD.--March 1960 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Records good except those for the winter period, which are fair.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

AVERAGE DISCHARGE.--24 years, 13.2 ft³/s, 9,560 acre-ft/yr; median of yearly mean discharges, 4.8 ft³/s, 3,5000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,700 ft³/s Apr. 7, 1969, gage height, 14.33 ft; maximum gage height, 14.39 ft Mar. 28, 1960; no flow on many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39.2 ft³/s Mar. 26; no flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|-------|--------|------|--------|------|-----|-----|-----|
| 1 | .11 | .14 | .07 | .07 | .11 | 1.3 | 8.9 | 3.6 | .00 | .00 | .00 | .00 |
| 2 | .07 | .14 | .07 | .07 | .04 | 1.1 | 6.8 | 3.7 | .00 | .00 | .00 | .00 |
| 3 | .11 | .11 | .04 | .07 | .04 | .81 | 5.3 | 20 | .00 | .00 | .00 | .00 |
| 4 | .07 | .07 | .04 | .18 | .25 | .67 | 5.1 | 25 | .00 | .00 | .00 | .00 |
| 5 | .07 | .07 | .07 | .04 | 1.2 | .56 | 3.5 | 20 | .00 | .00 | .00 | .00 |
| 6 | .07 | .04 | .07 | .00 | 1.2 | .56 | 3.2 | 19 | .00 | .00 | .00 | .00 |
| 7 | .07 | .04 | .07 | .00 | .53 | .78 | 2.7 | 16 | .00 | .00 | .00 | .00 |
| 8 | .07 | .04 | .04 | .00 | .56 | .74 | 2.1 | 14 | .00 | .00 | .00 | .00 |
| 9 | .07 | .04 | .04 | .00 | .39 | .56 | 1.8 | 12 | .00 | .00 | .00 | .00 |
| 10 | .07 | .04 | .04 | .00 | .11 | .42 | 1.7 | 8.5 | .00 | .00 | .00 | .00 |
| 11 | .07 | .04 | .07 | .00 | .11 | .35 | 1.6 | 6.1 | .00 | .00 | .00 | .00 |
| 12 | .07 | .04 | .11 | .00 | .04 | .32 | 1.5 | 4.5 | .00 | .00 | .00 | .00 |
| 13 | .11 | .04 | .11 | .00 | .07 | .28 | 1.5 | 3.1 | .00 | .00 | .00 | .00 |
| 14 | .11 | .04 | .11 | .00 | .07 | .25 | 2.3 | 2.5 | .00 | .00 | .00 | .00 |
| 15 | .11 | .04 | .11 | .00 | .11 | .21 | 2.6 | 1.9 | .04 | .00 | .00 | .00 |
| 16 | .11 | .04 | .11 | .00 | .04 | .21 | 2.9 | 1.6 | .04 | .00 | .00 | .00 |
| 17 | .11 | .07 | .11 | .00 | .04 | .21 | 3.5 | 1.2 | .04 | .00 | .00 | .00 |
| 18 | .11 | .07 | .11 | .00 | .04 | .18 | 3.4 | .85 | .04 | .00 | .00 | .00 |
| 19 | .07 | .11 | .11 | .00 | .04 | .81 | 2.8 | .56 | .56 | .00 | .00 | .00 |
| 20 | .07 | .11 | .11 | .00 | .04 | 2.0 | 2.5 | .39 | .46 | .00 | .00 | .00 |
| 21 | .07 | .11 | .11 | .00 | .18 | 2.2 | 2.1 | .32 | .28 | .00 | .00 | .00 |
| 22 | .07 | .11 | .11 | .04 | .07 | 3.5 | 2.2 | .28 | .32 | .00 | .00 | .00 |
| 23 | .07 | .11 | .11 | .07 | .04 | 7.7 | 2.3 | .21 | .28 | .00 | .00 | .00 |
| 24 | .07 | .14 | .07 | .07 | .56 | 22 | 2.8 | .14 | .21 | .00 | .00 | .00 |
| 25 | .07 | .14 | .07 | .14 | 1.4 | 23 | 2.8 | .11 | .14 | .00 | .00 | .00 |
| 26 | .07 | .14 | .07 | .21 | 4.0 | 24 | 2.2 | .14 | .11 | .00 | .00 | .00 |
| 27 | .07 | .14 | .04 | .32 | 6.8 | 24 | 2.0 | .07 | .11 | .00 | .00 | .00 |
| 28 | .11 | .07 | .04 | .28 | 1.9 | 20 | 2.1 | .04 | .07 | .00 | .00 | .00 |
| 29 | .11 | .07 | .04 | .32 | 1.5 | 16 | 2.4 | .07 | .04 | .00 | .00 | .00 |
| 30 | .11 | .07 | .04 | .35 | --- | 13 | 2.9 | .07 | .00 | .00 | .00 | .00 |
| 31 | .11 | --- | .04 | .49 | --- | 11 | --- | .04 | --- | .00 | .00 | --- |
| TOTAL | 2.65 | 2.43 | 2.35 | 2.72 | 21.48 | 178.72 | 89.5 | 165.99 | 2.74 | .00 | .00 | .00 |
| MEAN | .08 | .08 | .08 | .09 | .74 | 5.77 | 2.98 | 5.35 | .09 | .00 | .00 | .00 |
| MAX | .11 | .14 | .11 | .49 | 6.8 | 24 | 8.9 | 25 | .56 | .00 | .00 | .00 |
| MIN | .07 | .04 | .04 | .00 | .04 | .18 | 1.5 | .04 | .00 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 5107.97 | | MEAN | 14.0 | MAX | 416 | MIN | .00 | | | |
| WTR YR 1984 | TOTAL | 468.58 | | MEAN | 1.28 | MAX | 25 | MIN | .00 | | | |

RED RIVER OF THE NORTH BASIN

165

05114000 SOURIS (MOUSE) RIVER NEAR SHERWOOD, ND
(International gaging station)

LOCATION.--Lat 48°59'24", long 101°57'28", in NW¼SE¼NE¼ sec.33, T.164 N., R.87 W., Renville County, Hydrologic Unit 09010001, on right bank 0.8 mi downstream from international boundary, 16 mi northwest of Sherwood, and at mile 511.4.

DRAINAGE AREA.--8,940 mi², approximately, of which about 5,900 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1930 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1934, 1945. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,603.73 ft National Geodetic Vertical Datum of 1929. Prior to Apr. 8, 1935, nonrecording gage at same site and datum.

REMARKS.--Records fair. Some regulation by reservoirs in Canada. Some small diversions for irrigation and municipal supply.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--54 years, 141 ft³/s, 103,600 acre-ft/yr; median of yearly mean discharges, 78 ft³/s, 57,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft³/s Apr. 10, 1976, gage height, 25.15 ft; no flow at times in some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1927 reached a stage of about 22 ft and flood in 1904 reached a stage of about 25.8 ft from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 320 ft³/s Mar. 26, gage height, 6.35 ft; minimum daily, 0.05 ft³/s Aug. 25-Sept. 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|------|-------|------|-------|--------|------|
| 1 | 1.3 | 2.2 | 6.0 | 3.2 | 3.2 | 22 | 112 | 22 | 4.1 | 1.2 | 1.0 | .05 |
| 2 | 1.4 | 2.0 | 5.2 | 3.3 | 3.2 | 18 | 104 | 25 | 4.3 | 1.2 | .83 | .05 |
| 3 | 1.4 | 2.6 | 5.6 | 3.4 | 3.2 | 14 | 83 | 24 | 4.2 | 1.2 | .27 | .05 |
| 4 | 1.2 | 2.7 | 5.0 | 3.4 | 3.1 | 12 | 76 | 22 | 3.9 | 1.1 | .12 | .05 |
| 5 | 1.1 | 2.7 | 4.6 | 3.5 | 2.9 | 11 | 67 | 22 | 4.1 | 1.1 | .26 | .05 |
| 6 | 1.0 | 2.6 | 4.3 | 3.6 | 3.0 | 11 | 56 | 21 | 4.5 | 1.1 | .36 | .05 |
| 7 | 1.2 | 2.7 | 4.1 | 3.8 | 3.1 | 11 | 52 | 21 | 4.8 | 1.0 | .34 | .20 |
| 8 | 1.4 | 2.4 | 3.7 | 3.8 | 3.3 | 10 | 48 | 21 | 5.0 | 1.3 | .29 | .30 |
| 9 | 1.6 | 2.5 | 3.4 | 3.9 | 3.4 | 9.4 | 49 | 21 | 4.6 | 1.3 | .25 | .40 |
| 10 | 1.8 | 2.4 | 3.3 | 4.6 | 3.6 | 8.6 | 50 | 26 | 4.3 | 1.2 | .23 | .40 |
| 11 | 1.8 | 2.3 | 3.5 | 5.0 | 3.8 | 7.8 | 47 | 24 | 4.1 | 1.3 | .24 | .40 |
| 12 | 1.7 | 2.3 | 3.5 | 4.8 | 4.0 | 7.4 | 49 | 21 | 3.6 | 1.2 | .24 | .50 |
| 13 | 1.7 | 2.3 | 3.6 | 4.2 | 4.2 | 7.5 | 50 | 18 | 3.4 | 1.1 | .23 | .60 |
| 14 | 1.8 | 2.3 | 3.8 | 4.1 | 5.1 | 7.4 | 49 | 17 | 3.2 | .87 | .23 | .60 |
| 15 | 1.9 | 2.5 | 4.0 | 3.8 | 5.3 | 6.7 | 48 | 15 | 2.8 | .76 | .20 | .50 |
| 16 | 2.0 | 2.7 | 4.0 | 3.9 | 6.1 | 7.6 | 43 | 13 | 2.2 | .70 | .19 | .50 |
| 17 | 1.7 | 3.5 | 4.1 | 3.5 | 5.5 | 8.1 | 39 | 15 | 2.0 | .65 | .17 | .40 |
| 18 | 1.8 | 3.9 | 3.9 | 3.2 | 4.5 | 7.8 | 35 | 14 | 1.8 | .64 | .15 | .40 |
| 19 | 2.0 | 2.3 | 3.8 | 3.0 | 4.0 | 8.1 | 31 | 14 | 1.7 | .53 | .16 | .40 |
| 20 | 1.8 | 2.5 | 3.8 | 2.9 | 4.5 | 21 | 28 | 12 | 1.6 | .49 | .15 | .30 |
| 21 | 1.8 | 2.4 | 3.9 | 2.9 | 6.2 | 92 | 25 | 11 | 1.6 | .44 | .10 | .30 |
| 22 | 1.6 | 2.3 | 3.8 | 2.9 | 8.7 | 60 | 24 | 9.3 | 1.5 | .37 | .10 | .30 |
| 23 | 1.5 | 14 | 3.5 | 3.2 | 10 | 93 | 21 | 8.5 | 1.5 | .31 | .10 | .35 |
| 24 | 1.6 | 18 | 3.3 | 3.3 | 14 | 280 | 20 | 8.4 | 1.5 | .37 | .08 | .35 |
| 25 | 1.6 | 27 | 3.4 | 3.2 | 25 | 270 | 19 | 8.3 | 1.5 | .44 | .05 | .30 |
| 26 | 1.6 | 20 | 3.2 | 3.1 | 35 | 310 | 18 | 7.4 | 1.5 | .45 | .05 | .30 |
| 27 | 1.8 | 14 | 3.3 | 3.1 | 35 | 295 | 19 | 6.6 | 1.3 | .46 | .05 | .30 |
| 28 | 2.4 | 11 | 3.3 | 3.1 | 30 | 262 | 18 | 6.5 | 1.3 | .52 | .05 | .30 |
| 29 | 3.0 | 9.1 | 3.3 | 3.1 | 25 | 283 | 20 | 6.0 | 1.3 | .64 | .05 | .30 |
| 30 | 2.6 | 7.2 | 3.2 | 3.1 | --- | 209 | 21 | 5.2 | 1.3 | .76 | .05 | .30 |
| 31 | 2.3 | --- | 3.2 | 3.1 | --- | 129 | --- | 4.4 | --- | 2.0 | .05 | --- |
| TOTAL | 53.4 | 176.4 | 120.6 | 109.0 | 267.9 | 2499.4 | 1321 | 469.6 | 84.5 | 26.70 | 6.64 | 9.30 |
| MEAN | 1.72 | 5.88 | 3.89 | 3.52 | 9.24 | 80.6 | 44.0 | 15.1 | 2.82 | .86 | .21 | .31 |
| MAX | 3.0 | 27 | 6.0 | 5.0 | 35 | 310 | 112 | 26 | 5.0 | 2.0 | 1.0 | .60 |
| MIN | 1.0 | 2.0 | 3.2 | 2.9 | 2.9 | 6.7 | 18 | 4.4 | 1.3 | .31 | .05 | .05 |
| AC-FT | 106 | 350 | 239 | 216 | 531 | 4960 | 2620 | 931 | 168 | 53 | 13 | 18 |
| CAL YR 1983 | TOTAL | 72965.2 | | MEAN | 200 | MAX | 1960 | MIN | 1.0 | AC-FT | 144700 | |
| WTR YR 1984 | TOTAL | 5144.44 | | MEAN | 14.1 | MAX | 310 | MIN | .05 | AC-FT | 10200 | |

RED RIVER OF THE NORTH BASIN

05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970, 1972 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: August 1983 to current year.

SPECIFIC CONDUCTANCE: August 1983 to current year.

INSTRUMENTATION.--Water quality monitor since August 1983.

EXTREMES FOR CURRENT PERIOD.--

WATER TEMPERATURES: Maximum 25.5°C July 30, 1984; minimum 0.0°C several days during winter months.

SPECIFIC CONDUCTANCE: 2,190 micromhos, December 15, 1983; minimum 410 micromhos, March 30, 1984.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED SATUR- ATION) (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|-------|------|--|--|---|--|--|---|--|--|---|---|
| OCT | | | | | | | | | | | |
| 12... | 1555 | 1.7 | 1000 | 7.8 | 8.0 | 6.0 | 10 | 6.5 | 52 | 60 | 94 |
| NOV | | | | | | | | | | | |
| 29... | 1515 | 9.1 | 1270 | 8.3 | - .9 | .0 | 25 | 11.2 | 77 | -- | -- |
| JAN | | | | | | | | | | | |
| 04... | 1415 | 3.5 | 1470 | 7.6 | 2.0 | .0 | 15 | 3.9 | 27 | -- | -- |
| FEB | | | | | | | | | | | |
| 14... | 1800 | 5.4 | 1430 | 7.4 | .0 | .0 | 30 | 5.1 | -- | -- | -- |
| MAR | | | | | | | | | | | |
| 13... | 1610 | 7.4 | 2030 | -- | - .4 | .0 | -- | -- | -- | -- | -- |
| 28... | 1730 | 251 | 515 | 7.8 | 5.0 | .0 | 70 | 11.0 | 75 | -- | -- |
| APR | | | | | | | | | | | |
| 04... | 1430 | 71 | 590 | 7.9 | 17.0 | 1.0 | 60 | 10.9 | 76 | -- | -- |
| 25... | 1030 | 19 | 865 | 8.0 | 11.5 | 10.5 | 60 | 8.3 | 75 | -- | -- |
| JUN | | | | | | | | | | | |
| 12... | 1230 | 3.9 | 1170 | 7.7 | 17.0 | 14.5 | -- | 5.1 | -- | -- | -- |
| JUL | | | | | | | | | | | |
| 17... | 1245 | .68 | 1160 | 8.1 | 22.0 | 21.0 | 49 | 5.1 | 57 | -- | -- |
| AUG | | | | | | | | | | | |
| 21... | 1100 | .10 | 690 | 7.9 | 21.0 | 18.5 | 55 | 3.6 | 38 | -- | -- |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
|-------|---|--|---|---|---|------------------------------|--|--|--|--|--|
| OCT | | | | | | | | | | | |
| 12... | 350 | 18 | 82 | 36 | 100 | 37 | 2 | 8.9 | 336 | 10 | 160 |
| NOV | | | | | | | | | | | |
| 29... | 390 | 0 | 87 | 43 | 150 | 45 | 3 | 9.1 | 397 | 3.8 | 210 |
| JAN | | | | | | | | | | | |
| 04... | 440 | 0 | 100 | 47 | 170 | 45 | 4 | 14 | 475 | 23 | 270 |
| FEB | | | | | | | | | | | |
| 14... | 410 | 0 | 94 | 43 | 170 | 46 | 4 | 13 | 481 | 37 | 240 |
| MAR | | | | | | | | | | | |
| 28... | 130 | 0 | 26 | 16 | 55 | 45 | 2 | 10 | 141 | 4.3 | 110 |
| APR | | | | | | | | | | | |
| 04... | 140 | 9 | 31 | 16 | 66 | 48 | 2 | 8.2 | 135 | 3.3 | 140 |
| 25... | 220 | 0 | 47 | 25 | 110 | 51 | 3 | 10 | 228 | 4.4 | 200 |
| JUL | | | | | | | | | | | |
| 17... | 320 | 0 | 67 | 37 | 150 | 49 | 4 | 12 | 373 | 5.7 | 200 |
| AUG | | | | | | | | | | | |
| 21... | 220 | 0 | 50 | 23 | 66 | 38 | 2 | 12 | 229 | 5.6 | 100 |

RED RIVER OF THE NORTH BASIN

167

05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) |
|-----------|--|---|---|---|--|--|--|---|---|---|---|
| OCT 12... | 47 | .20 | 9.5 | 650 | 650 | .88 | 3.0 | <.10 | .080 | <10 | 2 |
| NOV 29... | 80 | .20 | 11 | 834 | 830 | 1.1 | 20 | <.10 | .050 | -- | -- |
| JAN 04... | 62 | .30 | 10 | 985 | 960 | 1.3 | 9.3 | <.10 | .040 | -- | -- |
| FEB 14... | 66 | .30 | 14 | 948 | 930 | 1.3 | 14 | .24 | .100 | 20 | <1 |
| MAR 28... | 14 | .10 | 5.5 | 330 | 320 | .45 | 224 | .33 | .180 | -- | -- |
| APR 04... | 16 | .20 | 6.6 | 379 | 370 | .52 | 73 | .35 | .130 | 40 | 1 |
| 25... | 26 | .20 | 2.5 | 563 | 560 | .77 | 29 | <.10 | .070 | -- | -- |
| JUL 17... | 54 | .30 | 17 | 790 | 760 | 1.1 | 1.5 | <.10 | .740 | -- | -- |
| AUG 21... | 23 | .20 | 12 | 428 | 420 | .58 | .12 | <.10 | .410 | -- | -- |
| DATE | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) |
| OCT 12... | 110 | 220 | <1 | 10 | 2 | 2 | 36 | 2 | 66 | 250 | <.1 |
| NOV 29... | -- | 260 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JAN 04... | -- | 350 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| FEB 14... | 100 | 290 | <1 | <10 | <1 | 2 | 59 | <1 | 72 | 910 | <.1 |
| MAR 28... | -- | 130 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| APR 04... | 48 | 200 | 1 | <10 | <1 | <1 | 93 | <1 | 31 | 58 | <.1 |
| 25... | -- | 220 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL 17... | -- | 290 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| AUG 21... | -- | 160 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DATE | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | NICKEL, SUS- PENDED RECOV- ERABLE (UG/L AS NI) (01066) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092) | ZINC, SUS- PENDED RECOV- ERABLE (UG/L AS ZN) (01091) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | CYANIDE TOTAL (MG/L AS CN) (00720) | |
| OCT 12... | 2 | 5 | 5 | <1 | 440 | 2 | 20 | 10 | 6 | <.01 | |
| FEB 14... | 3 | 1 | 4 | <1 | 540 | <1 | 20 | 10 | 9 | <.01 | |
| APR 04... | 2 | 4 | 0 | <1 | 220 | 2 | 20 | 10 | 8 | <.01 | |

RED RIVER OF THE NORTH BASIN

05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

TEMPERATURE, WATER (DEG.C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|-----|------|----------|-----|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | 7.0 | 6.5 | 6.5 | 6.0 | 4.5 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 2 | 7.5 | 7.0 | 7.0 | 5.5 | 5.0 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 3 | 8.0 | 7.5 | 8.0 | 5.5 | 4.5 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 4 | 8.5 | 7.5 | 8.0 | 7.0 | 5.5 | 6.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 5 | 8.5 | 7.5 | 8.0 | 7.0 | 5.5 | 6.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 6 | 7.5 | 6.5 | 7.0 | 5.5 | 4.5 | 4.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 7 | 7.5 | 7.0 | 7.5 | 5.5 | 4.5 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 8 | 8.0 | 6.5 | 7.0 | 5.0 | 4.0 | 4.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 9 | 8.0 | 6.5 | 7.5 | 4.0 | 3.0 | 3.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 10 | 9.5 | 8.0 | 9.0 | 3.0 | 2.0 | 2.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 11 | 8.5 | 6.0 | 7.0 | 2.0 | 1.0 | 1.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 12 | 6.0 | 5.0 | 5.5 | 1.0 | .5 | 1.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 13 | 5.5 | 4.0 | 5.0 | 2.0 | 1.0 | 1.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 14 | 5.5 | 4.0 | 4.5 | 2.0 | 1.5 | 1.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 15 | 5.5 | 4.5 | 5.0 | 2.0 | 1.5 | 1.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 16 | 5.5 | 4.5 | 5.0 | 1.5 | 1.5 | 1.5 | .0 | .0 | .0 | .0 | .0 | .0 |
| 17 | 5.0 | 4.0 | 4.0 | 2.0 | 1.5 | 1.5 | 1.0 | .0 | .5 | .0 | .0 | .0 |
| 18 | 4.5 | 3.0 | 3.5 | 2.5 | 1.5 | 2.0 | 1.0 | 1.0 | 1.0 | .0 | .0 | .0 |
| 19 | 4.0 | 3.0 | 3.5 | 3.0 | 2.5 | 2.5 | 1.0 | .0 | .0 | .0 | .0 | .0 |
| 20 | 6.0 | 3.5 | 4.5 | 2.5 | 1.5 | 2.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 21 | 6.5 | 5.0 | 5.5 | 1.5 | 1.0 | 1.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 22 | 7.0 | 5.0 | 6.0 | 1.5 | .5 | 1.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 23 | 7.0 | 6.0 | 6.5 | .5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 24 | 7.0 | 5.0 | 6.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 25 | 6.0 | 4.5 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 26 | 6.0 | 4.5 | 5.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 27 | 7.0 | 5.5 | 6.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 28 | 6.5 | 5.0 | 5.5 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 29 | 4.5 | 4.0 | 4.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 30 | 5.0 | 4.0 | 4.0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 31 | 5.5 | 4.0 | 4.5 | | | | .0 | .0 | .0 | .0 | .0 | .0 |
| MONTH | 9.5 | 3.0 | 6.0 | 7.0 | .0 | 2.0 | 1.0 | .0 | .0 | .0 | .0 | .0 |

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|----------|-----|-----|-------|-----|-----|-------|------|------|------|------|------|------|
| FEBRUARY | | | MARCH | | | APRIL | | | MAY | | | |
| 1 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | 7.5 | 5.0 | 6.5 |
| 2 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | .0 | 9.5 | 6.0 | 7.5 |
| 3 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 9.5 | 7.5 | 8.5 |
| 4 | .0 | .0 | .0 | .0 | .0 | .0 | 1.0 | .0 | .5 | 10.0 | 8.0 | 9.0 |
| 5 | .0 | .0 | .0 | .0 | .0 | .0 | 3.0 | .0 | 1.0 | 11.5 | 8.5 | 10.0 |
| 6 | .0 | .0 | .0 | .0 | .0 | .0 | 6.0 | 1.5 | 3.5 | 11.5 | 8.0 | 9.5 |
| 7 | .0 | .0 | .0 | .0 | .0 | .0 | 8.0 | 4.5 | 6.0 | 10.0 | 7.0 | 8.5 |
| 8 | .0 | .0 | .0 | .0 | .0 | .0 | 9.5 | 5.5 | 7.5 | 11.5 | 8.5 | 10.0 |
| 9 | .0 | .0 | .0 | .0 | .0 | .0 | 8.5 | 7.5 | 8.0 | 11.0 | 10.0 | 10.5 |
| 10 | .0 | .0 | .0 | .0 | .0 | .0 | 8.5 | 7.5 | 7.5 | 12.5 | 9.5 | 11.0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.0 | 7.5 | 13.5 | 9.5 | 11.5 |
| 12 | .0 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.0 | 7.5 | 14.5 | 11.0 | 13.0 |
| 13 | .0 | .0 | .0 | .0 | .0 | .0 | 7.0 | 6.5 | 6.5 | 15.5 | 11.5 | 14.0 |
| 14 | .0 | .0 | .0 | .0 | .0 | .0 | 8.5 | 5.5 | 7.0 | 16.0 | 13.0 | 14.5 |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | 10.0 | 6.0 | 8.0 | 16.5 | 13.5 | 15.0 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | 11.5 | 7.0 | 9.5 | 19.5 | 15.0 | 17.0 |
| 17 | .0 | .0 | .0 | .0 | .0 | .0 | 12.0 | 8.0 | 10.0 | 19.0 | 15.5 | 17.0 |
| 18 | .0 | .0 | .0 | .0 | .0 | .0 | 12.0 | 8.5 | 10.5 | 16.5 | 14.5 | 15.5 |
| 19 | .0 | .0 | .0 | .0 | .0 | .0 | 12.5 | 9.0 | 11.0 | 18.0 | 14.5 | 16.0 |
| 20 | .0 | .0 | .0 | .0 | .0 | .0 | 13.5 | 10.0 | 12.0 | 16.5 | 14.5 | 15.5 |
| 21 | .0 | .0 | .0 | .0 | .0 | .0 | 14.0 | 10.5 | 12.5 | 16.0 | 13.0 | 14.5 |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | 14.0 | 11.5 | 13.0 | 15.0 | 13.0 | 14.0 |
| 23 | .0 | .0 | .0 | .0 | .0 | .0 | 14.0 | 12.0 | 13.0 | 14.5 | 12.5 | 13.5 |
| 24 | .0 | .0 | .0 | .0 | .0 | .0 | 13.0 | 11.5 | 12.0 | 14.0 | 12.0 | 13.0 |
| 25 | .0 | .0 | .0 | .0 | .0 | .0 | 11.5 | 10.0 | 11.0 | 12.0 | 11.0 | 11.5 |
| 26 | .0 | .0 | .0 | .0 | .0 | .0 | 10.5 | 5.5 | 8.5 | 14.0 | 10.0 | 11.5 |
| 27 | .0 | .0 | .0 | .0 | .0 | .0 | 5.0 | .0 | 2.0 | 15.5 | 11.5 | 13.0 |
| 28 | .0 | .0 | .0 | .0 | .0 | .0 | 2.0 | .0 | .5 | 14.5 | 12.5 | 13.5 |
| 29 | .0 | .0 | .0 | .0 | .0 | .0 | 5.0 | 1.5 | 3.5 | 16.5 | 12.5 | 14.0 |
| 30 | | | | .0 | .0 | .0 | 6.5 | 3.5 | 5.0 | 19.5 | 14.5 | 16.5 |
| 31 | | | | .0 | .0 | .0 | | | | 19.5 | 17.5 | 18.5 |
| MONTH | .0 | .0 | .0 | .0 | .0 | .0 | 14.0 | .0 | 7.0 | 19.5 | 5.0 | 12.5 |

05114000 SOURIS RIVER NEAR SHERWOOD--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|------|------|------|------|------|------|--------|------|------|-----------|------|------|
| | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 18.0 | 16.0 | 17.0 | 20.5 | 17.5 | 19.0 | 24.0 | 22.5 | 23.5 | 14.5 | 13.5 | 14.0 |
| 2 | 17.5 | 15.0 | 16.5 | 20.5 | 18.0 | 19.0 | 24.0 | 21.5 | 22.5 | 15.5 | 13.0 | 14.0 |
| 3 | 18.0 | 14.5 | 16.5 | 21.5 | 19.0 | 20.0 | 24.0 | 22.0 | 22.5 | 15.5 | 12.5 | 14.0 |
| 4 | 17.0 | 15.5 | 16.0 | 20.5 | 18.5 | 19.5 | 23.5 | 22.5 | 23.0 | 14.5 | 11.5 | 13.0 |
| 5 | 19.5 | 15.5 | 17.0 | 19.5 | 19.0 | 19.5 | 25.5 | 23.0 | 23.5 | 14.5 | 12.0 | 13.0 |
| 6 | 18.5 | 17.0 | 17.5 | 19.5 | 18.0 | 18.5 | 24.0 | 22.5 | 23.0 | 16.0 | 13.5 | 14.5 |
| 7 | 19.5 | 15.5 | 17.5 | 19.0 | 18.5 | 18.5 | 25.0 | 23.0 | 24.0 | 15.0 | 13.5 | 14.0 |
| 8 | 18.0 | 17.0 | 17.5 | 19.5 | 18.0 | 18.5 | 24.0 | 21.0 | 22.0 | 14.0 | 12.5 | 13.5 |
| 9 | 17.5 | 15.5 | 16.5 | 20.0 | 18.5 | 19.5 | 21.5 | 19.5 | 20.5 | 13.0 | 12.0 | 12.5 |
| 10 | 17.0 | 14.0 | 15.5 | 21.0 | 19.0 | 20.0 | 21.5 | 20.0 | 20.5 | 12.0 | 11.5 | 11.5 |
| 11 | 16.5 | 14.0 | 15.0 | 21.0 | 19.0 | 20.5 | 21.5 | 19.5 | 20.5 | 12.0 | 10.5 | 11.5 |
| 12 | 16.5 | 14.5 | 15.5 | 22.0 | 20.5 | 21.0 | 22.5 | 21.0 | 21.5 | 13.0 | 11.5 | 12.0 |
| 13 | 17.5 | 14.5 | 15.5 | 23.5 | 22.0 | 22.5 | 24.0 | 21.5 | 22.0 | 12.5 | 11.5 | 12.0 |
| 14 | 18.0 | 16.5 | 17.0 | 22.5 | 20.0 | 21.5 | 24.0 | 22.0 | 23.0 | 12.0 | 10.5 | 11.0 |
| 15 | 19.0 | 15.5 | 16.5 | 21.0 | 19.0 | 20.0 | 23.0 | 20.0 | 21.0 | 11.5 | 10.0 | 10.5 |
| 16 | 21.5 | 18.0 | 19.0 | 22.0 | 20.0 | 20.5 | 21.5 | 20.0 | 20.5 | 13.0 | 10.0 | 11.0 |
| 17 | 22.5 | 19.5 | 21.0 | 21.0 | 19.0 | 20.0 | 22.0 | 20.5 | 21.0 | 14.0 | 11.0 | 12.5 |
| 18 | 20.0 | 18.0 | 19.0 | 21.0 | 19.5 | 20.0 | 21.5 | 20.0 | 21.0 | 13.5 | 12.5 | 13.0 |
| 19 | 19.5 | 18.5 | 19.0 | 21.0 | 19.5 | 20.5 | 22.0 | 20.0 | 21.0 | 14.5 | 13.0 | 13.5 |
| 20 | 19.5 | 19.0 | 19.5 | 22.0 | 20.0 | 21.0 | 22.0 | 20.0 | 21.0 | 13.5 | 11.5 | 12.5 |
| 21 | 21.0 | 19.5 | 20.5 | 23.0 | 21.5 | 22.0 | 21.0 | 18.5 | 19.0 | 11.5 | 11.0 | 11.5 |
| 22 | 22.0 | 20.0 | 21.0 | 23.5 | 22.0 | 22.5 | 18.5 | 17.0 | 17.5 | 11.0 | 9.0 | 10.0 |
| 23 | 22.0 | 18.0 | 20.0 | 22.0 | 20.0 | 21.0 | 19.5 | 16.0 | 17.5 | 9.0 | 7.0 | 7.5 |
| 24 | 20.0 | 18.5 | 19.5 | 22.0 | 20.5 | 21.5 | 21.0 | 18.5 | 19.5 | 7.0 | 5.5 | 6.0 |
| 25 | 21.0 | 19.5 | 20.0 | 22.0 | 21.0 | 21.5 | 23.0 | 19.0 | 21.0 | 6.5 | 5.0 | 5.5 |
| 26 | 22.5 | 20.0 | 21.0 | 22.0 | 20.0 | 21.0 | 22.5 | 20.0 | 21.0 | 6.5 | 5.0 | 5.5 |
| 27 | 21.0 | 19.0 | 19.5 | 22.5 | 20.5 | 21.5 | 21.5 | 19.5 | 20.5 | 6.0 | 5.0 | 5.5 |
| 28 | 20.0 | 18.5 | 19.5 | 23.0 | 21.0 | 22.0 | 21.0 | 18.5 | 19.5 | 6.5 | 4.5 | 5.0 |
| 29 | 21.5 | 19.5 | 20.5 | 23.0 | 21.5 | 22.5 | 18.5 | 16.5 | 17.0 | 6.5 | 4.5 | 5.5 |
| 30 | 21.5 | 19.5 | 20.5 | 25.5 | 23.0 | 24.0 | 17.0 | 14.5 | 16.0 | 6.5 | 4.5 | 5.5 |
| 31 | | | | 24.5 | 23.5 | 24.0 | 15.5 | 14.0 | 14.5 | | | |
| MONTH | 22.5 | 14.0 | 18.0 | 25.5 | 17.5 | 20.5 | 25.5 | 14.0 | 20.5 | 16.0 | 4.5 | 10.5 |
| YEAR | 25.5 | .0 | 8.0 | | | | | | | | | |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|------|------|----------|------|------|----------|------|------|---------|------|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | 990 | 970 | 980 | 1030 | 1010 | 1020 | 1370 | 1320 | 1350 | 1490 | 1480 | 1490 |
| 2 | 980 | 970 | 973 | 1030 | 1010 | 1020 | 1430 | 1380 | 1400 | 1490 | 1480 | 1480 |
| 3 | 980 | 970 | 974 | 1020 | 1000 | 1010 | 1490 | 1430 | 1460 | 1490 | 1480 | 1480 |
| 4 | 980 | 970 | 975 | 1010 | 990 | 1010 | 1550 | 1490 | 1520 | 1480 | 1470 | 1480 |
| 5 | 980 | 970 | 972 | 1020 | 1000 | 1010 | 1620 | 1550 | 1590 | 1470 | 1460 | 1470 |
| 6 | 980 | 970 | 970 | 1010 | 1000 | 1010 | 1690 | 1620 | 1660 | 1470 | 1450 | 1460 |
| 7 | 980 | 960 | 970 | 1010 | 1000 | 1010 | 1760 | 1690 | 1730 | 1460 | 1440 | 1450 |
| 8 | 980 | 970 | 972 | 1010 | 1000 | 1000 | 1850 | 1760 | 1810 | 1450 | 1440 | 1450 |
| 9 | 990 | 970 | 978 | 1010 | 1000 | 1010 | 1930 | 1860 | 1900 | 1450 | 1440 | 1450 |
| 10 | 1000 | 980 | 990 | 1020 | 1000 | 1010 | 2010 | 1930 | 1970 | 1460 | 1440 | 1450 |
| 11 | 1000 | 980 | 989 | 1020 | 1010 | 1010 | 2050 | 2010 | 2030 | 1450 | 1440 | 1440 |
| 12 | 1000 | 990 | 995 | 1020 | 1010 | 1010 | 2100 | 2050 | 2080 | 1440 | 1430 | 1440 |
| 13 | 1010 | 990 | 998 | 1020 | 1010 | 1020 | 2140 | 2100 | 2120 | 1440 | 1430 | 1430 |
| 14 | 1010 | 990 | 999 | 1030 | 1010 | 1020 | 2180 | 2140 | 2170 | 1440 | 1430 | 1440 |
| 15 | 1010 | 990 | 996 | 1030 | 1020 | 1030 | 2190 | 2140 | 2180 | 1440 | 1430 | 1440 |
| 16 | 1000 | 990 | 995 | 1030 | 1020 | 1030 | 2130 | 1940 | 2030 | 1460 | 1440 | 1450 |
| 17 | 1000 | 990 | 996 | 1030 | 1020 | 1030 | 1930 | 1810 | 1860 | 1470 | 1450 | 1460 |
| 18 | 1010 | 990 | 999 | 1040 | 1030 | 1030 | 1800 | 1700 | 1750 | 1490 | 1470 | 1480 |
| 19 | 1010 | 1000 | 1000 | 1040 | 1030 | 1030 | 1700 | 1630 | 1660 | 1520 | 1500 | 1510 |
| 20 | 1020 | 1000 | 1010 | 1040 | 1030 | 1040 | 1630 | 1590 | 1610 | 1550 | 1520 | 1540 |
| 21 | 1040 | 1010 | 1020 | 1050 | 1030 | 1040 | 1590 | 1560 | 1580 | 1560 | 1540 | 1550 |
| 22 | 1040 | 1010 | 1030 | 1070 | 1050 | 1060 | 1560 | 1540 | 1550 | 1580 | 1560 | 1570 |
| 23 | 1040 | 1020 | 1030 | 1080 | 1060 | 1070 | 1540 | 1520 | 1530 | 1600 | 1580 | 1590 |
| 24 | 1030 | 1020 | 1020 | 1100 | 1060 | 1080 | 1530 | 1520 | 1520 | 1610 | 1590 | 1600 |
| 25 | 1040 | 1020 | 1030 | 1170 | 1100 | 1130 | 1520 | 1500 | 1510 | 1610 | 1590 | 1600 |
| 26 | 1040 | 1020 | 1030 | 1200 | 1170 | 1180 | 1510 | 1490 | 1500 | 1610 | 1600 | 1610 |
| 27 | 1040 | 1030 | 1040 | 1230 | 1190 | 1210 | 1490 | 1480 | 1490 | 1630 | 1610 | 1620 |
| 28 | 1040 | 1020 | 1030 | 1260 | 1230 | 1240 | 1490 | 1480 | 1480 | 1640 | 1630 | 1640 |
| 29 | 1030 | 1020 | 1030 | 1280 | 1250 | 1270 | 1500 | 1480 | 1490 | 1640 | 1630 | 1640 |
| 30 | 1030 | 1010 | 1020 | 1330 | 1280 | 1300 | 1500 | 1490 | 1500 | 1640 | 1620 | 1630 |
| 31 | 1030 | 1010 | 1020 | | | | 1500 | 1490 | 1500 | 1640 | 1620 | 1630 |
| MONTH | 1040 | 960 | 1000 | 1330 | 990 | 1060 | 2190 | 1320 | 1690 | 1640 | 1430 | 1510 |

RED RIVER OF THE NORTH BASIN

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05115500 LAKE DARLING NEAR FOXHOLM, ND

LOCATION.--Lat 48°27'27", long 101°35'14", in NE¼NE¼ sec.1, T.157 N., R.85 W., Ward County, Hydrologic Unit 09010001, on control structure of Lake Darling Dam, reservoir of Fish and Wildlife Service, on Souris River about 6 mi north of Foxholm, and at mile 430.0.

DRAINAGE AREA.--9,450 mi², approximately, of which about 6,200 mi² is probably noncontributing.

PERIOD OF RECORD.--April 1936 to current year (no winter records 1936-39).

REVISED RECORDS.--WSP 1338: 1942. WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,577.00 ft National Geodetic Vertical Datum of 1929. April 1936 to Aug. 8, 1963, nonrecording gages at same site and datum.

REMARKS.--Gage heights frequently affected by wind. Reservoir is formed by earth dam; storage began in April 1936; dam completed in July 1936. Usable capacity, 108,500 acre-ft between gage heights of 0.0 ft, sill of control gages, and 21.0 ft, crest of spillway. Dead storage, 3,500 acre-ft. Figures given herein represent total contents based on capacity table dated June 7, 1943. Water is used during periods of low flow at wildlife refuge downstream.

COOPERATION.--Supplementary gage readings furnished by Fish and Wildlife Service.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 145,400 acre-ft Apr. 17, 1976, gage height, 24.24 ft; minimum observed since April 1943 when reservoir was first filled to spillway level, 31,200 acre-ft Feb. 18, 25, 1963, gage height, 10.04 ft.

EXTREMES FOR CURRENT YEAR (to Sept. 30).--Maximum contents observed, 89,500 acre-ft May 10, gage height, 18.61 ft; maximum gage height, 19.90 ft Apr. 27, affected by wind; minimum, 67,800 acre-ft Sept. 30, gage height, 16.10 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Gage height (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|-----------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 18.20 | 85,800 | -- |
| Oct. 31----- | 17.98 | 83,800 | -2,000 |
| Nov. 30----- | 17.80 | 82,300 | -1,500 |
| Dec. 31----- | 17.70 | 81,400 | -900 |
| CAL YR 1983----- | -- | -- | -2,300 |
| Jan. 31----- | 17.62 | 80,800 | -600 |
| Feb. 29----- | 17.60 | 80,600 | -200 |
| Mar. 31----- | 18.21 | 85,900 | +5,300 |
| Apr. 30----- | 18.52 | 88,700 | +2,800 |
| May 31----- | 18.42 | 87,800 | -900 |
| June 30----- | 18.12 | 85,100 | -2,700 |
| July 31----- | 17.54 | 80,100 | -5,000 |
| Aug. 31----- | 16.46 | 70,900 | -9,200 |
| Sept. 30----- | 16.09 | 67,800 | -3,100 |
| WTR YR 1984----- | -- | -- | -18,000 |

RED RIVER OF THE NORTH BASIN

05116000 SOURIS (MOUSE) RIVER NEAR FOXHOLM, ND

LOCATION.--Lat 48°22'20", long 101°30'18", in SW1/4SE1/4 sec.34, T.157 N., R.84 W., Ward County, Hydrologic Unit 09010001, on left bank 30 ft upstream from county highway bridge, 3 mi east of Foxholm, 19 mi upstream from Des Lacs River, and at mile 414.5.

DRAINAGE AREA.--9,470 mi², approximately, of which about 6,200 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1904 to November 1905, March to July 1906 (gage heights only), October 1936 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River near Foxholm, 1904-6.

REVISED RECORDS.--WSP 1308: 1905. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,560.73 ft National Geodetic Vertical Datum of 1929. June 23, 1904, to July 31, 1906, nonrecording gage at site 3.2 mi upstream at different datum. Apr. 1, 1937, to Mar. 25, 1938, nonrecording gage at site 600 ft downstream at datum about 0.5 ft higher.

REMARKS.--Records good. Flow almost completely regulated since 1936 by Lake Darling (station 05115500) 15 mi upstream and several small reservoirs, combined capacity, about 184,000 acre-ft. Some small diversions for irrigation and municipal supply.

AVERAGE DISCHARGE.--49 years, 146 ft³/s, 105,800 acre-ft/yr; median of yearly mean discharges, 65 ft³/s 47,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,600 ft³/s Apr. 17, 1976, gage height, 17.17 ft; maximum reverse flow, 25 ft³/s Apr. 4, 1949 caused by backwater from the Des Lacs River; no flow at times in many years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 165 ft³/s Apr. 7, gage height, 6.05 ft; minimum daily, 0.15 ft³/s June 2-4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|------|------|--------|-------|--------|-------|---------|-------|
| 1 | 12 | 22 | 17 | 22 | 21 | 17 | 26 | 4.7 | .32 | 1.9 | .61 | 22 |
| 2 | 12 | 22 | 17 | 22 | 21 | 14 | 27 | 4.7 | .15 | 1.7 | .43 | 22 |
| 3 | 11 | 23 | 17 | 22 | 21 | 12 | 26 | 5.0 | .15 | 2.6 | .80 | 22 |
| 4 | 11 | 23 | 17 | 22 | 21 | 12 | 26 | 6.5 | .15 | 2.8 | 1.35 | 22 |
| 5 | 11 | 26 | 17 | 22 | 20 | 12 | 26 | 6.1 | .25 | 2.0 | 1.18 | 23 |
| 6 | 11 | 25 | 17 | 22 | 20 | 12 | 73 | 6.1 | .48 | 1.6 | 1.06 | 27 |
| 7 | 11 | 27 | 17 | 22 | 20 | 12 | 164 | 6.1 | .59 | 1.9 | 1.00 | 26 |
| 8 | 11 | 24 | 16 | 22 | 20 | 12 | 162 | 4.9 | 1.1 | 2.9 | 1.01 | 23 |
| 9 | 11 | 21 | 15 | 21 | 20 | 12 | 148 | 4.0 | .68 | 2.5 | 1.02 | 21 |
| 10 | 11 | 20 | 15 | 21 | 20 | 12 | 130 | 4.5 | .76 | 2.1 | 1.01 | 20 |
| 11 | 11 | 18 | 15 | 21 | 20 | 12 | 94 | 4.0 | .72 | 1.5 | 1.01 | 19 |
| 12 | 11 | 18 | 15 | 22 | 20 | 13 | 5.9 | 3.2 | 2.6 | .99 | 1.01 | 22 |
| 13 | 11 | 19 | 16 | 22 | 20 | 13 | 21 | 3.1 | 4.6 | 1.0 | .74 | 24 |
| 14 | 11 | 19 | 17 | 22 | 20 | 13 | 26 | 3.1 | 7.2 | 1.4 | .22 | 23 |
| 15 | 11 | 18 | 17 | 22 | 20 | 13 | 17 | 2.9 | 11 | .93 | .26 | 22 |
| 16 | 11 | 17 | 17 | 22 | 20 | 13 | 13 | 2.8 | 12 | .83 | .25 | 22 |
| 17 | 11 | 17 | 17 | 22 | 20 | 13 | 10 | 2.4 | 15 | .97 | .25 | 23 |
| 18 | 10 | 17 | 17 | 22 | 19 | 13 | 8.1 | 1.8 | 12 | .78 | .25 | 24 |
| 19 | 10 | 17 | 17 | 22 | 19 | 14 | 5.9 | .86 | 11 | .58 | .25 | 24 |
| 20 | 11 | 19 | 17 | 22 | 19 | 17 | 5.2 | .72 | 11 | .49 | .24 | 22 |
| 21 | 11 | 18 | 17 | 22 | 19 | 25 | 4.6 | .86 | 15 | .73 | .23 | 21 |
| 22 | 11 | 16 | 17 | 22 | 18 | 25 | 4.1 | 1.2 | 18 | 1.1 | .22 | 21 |
| 23 | 11 | 15 | 17 | 22 | 18 | 27 | 3.7 | 1.1 | 18 | .76 | .22 | 20 |
| 24 | 12 | 15 | 17 | 22 | 18 | 35 | 4.6 | 1.8 | 14 | .39 | .22 | 18 |
| 25 | 11 | 14 | 17 | 22 | 17 | 33 | 2.9 | 1.1 | 12 | .28 | .23 | 17 |
| 26 | 12 | 14 | 17 | 22 | 17 | 31 | 2.5 | .63 | 15 | .31 | .24 | 16 |
| 27 | 16 | 14 | 20 | 22 | 17 | 29 | 2.0 | .63 | 8.7 | .48 | .23 | 14 |
| 28 | 16 | 14 | 23 | 22 | 17 | 28 | 9.1 | .64 | 7.0 | .60 | .22 | 14 |
| 29 | 15 | 15 | 22 | 21 | 17 | 27 | 65 | .47 | 4.3 | .75 | .22 | 12 |
| 30 | 16 | 17 | 22 | 21 | --- | 26 | 48 | .24 | 3.1 | .88 | .22 | 6.7 |
| 31 | 17 | --- | 22 | 21 | --- | 25 | --- | .36 | --- | .91 | .22 | --- |
| TOTAL | 368 | 564 | 541 | 676 | 559 | 572 | 1160.6 | 86.51 | 206.85 | 38.66 | 1539.04 | 612.7 |
| MEAN | 11.9 | 18.8 | 17.5 | 21.8 | 19.3 | 18.5 | 38.7 | 2.79 | 6.89 | 1.25 | 49.6 | 20.4 |
| MAX | 17 | 27 | 23 | 22 | 21 | 35 | 164 | 6.5 | 18 | 2.9 | 135 | 27 |
| MIN | 10 | 14 | 15 | 21 | 17 | 12 | 2.0 | .24 | .15 | .28 | .43 | 6.7 |
| AC-FT | 730 | 1120 | 1070 | 1340 | 1110 | 1130 | 2300 | 172 | 410 | 77 | 3050 | 1220 |
| CAL YR 1983 | TOTAL | 71663.1 | | MEAN | 196 | MAX | 1750 | MIN | 5.6 | AC-FT | 142100 | |
| WTR YR 1984 | TOTAL | 6924.36 | | MEAN | 18.9 | MAX | 164 | MIN | .15 | AC-FT | 13730 | |

RED RIVER OF THE NORTH BASIN

173

05116000 SOURIS RIVER NEAR FOXHOLM, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 15... | 1335 | 11 | 665 | -- | 6.0 | 6.0 | -- | -- | -- | -- | -- |
| DEC 06... | 1425 | 17 | 730 | -- | -2.0 | 1.0 | -- | -- | -- | -- | -- |
| JAN 04... | 1010 | 21 | 770 | -- | -5.5 | 1.0 | -- | -- | -- | -- | -- |
| FEB 14... | 1300 | 20 | 780 | -- | 3.5 | 3.0 | -- | -- | -- | -- | -- |
| MAR 28... | 1155 | 29 | 660 | -- | 6.0 | 5.0 | -- | -- | -- | -- | -- |
| APR 04... | 0920 | 26 | 625 | 8.5 | 10.0 | 6.5 | 210 | 2 | 48 | 21 | 59 |
| MAY 03... | 1150 | 5.0 | -- | -- | 13.0 | 8.0 | -- | -- | -- | -- | -- |
| JUN 01... | 0815 | .50 | 760 | -- | 12.0 | 17.5 | -- | -- | -- | -- | -- |
| JUL 20... | 0915 | .30 | 760 | -- | 24.0 | 23.0 | -- | -- | -- | -- | -- |
| AUG 22... | 1640 | 23 | 730 | 8.1 | 26.0 | 21.0 | 230 | 0 | 50 | 26 | 73 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| APR 04... | 37 | 2 | 13 | 250 | .000 | 413 | 1.3 | 110 | 13 | .20 | 14 | 413 |
| AUG 22... | 39 | 2 | 13 | 310 | .000 | 250 | 3.9 | 110 | 19 | .20 | 4.9 | 493 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|--|--|--|---|---|---|---|---|---|---|--|---|
| APR 04... | 400 | .56 | 29 | 7 | 350 | 20 | 0 | 26 | 230 | .0 | 0 | 130 |
| AUG 22... | 450 | .67 | 30 | 16 | 270 | 20 | 1 | 35 | 130 | .1 | 0 | 340 |

RED RIVER OF THE NORTH BASIN

05116500 DES LACS RIVER AT FOXHOLM, ND

LOCATION.--Lat 48°22'14", long 101°34'11", in NW1/4NE1/4NW1/4 sec.2, T.156 N., R.85 W., Ward County, Hydrologic Unit 09010002, on left bank 200 ft upstream from county highway bridge in Foxholm, and at mile 23.0.

DRAINAGE AREA.--939 mi², of which about 400 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1904 to July 1906, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,632.98 ft National Geodetic Vertical Datum of 1929. June 14 to Oct. 23, 1955, nonrecording gage at site 200 ft downstream from present gage at same datum. See WSP 1728 or 1913 for history of changes prior to June 14, 1955.

REMARKS.--Records fair. Some regulation at low flow by a series of wildlife refuge ponds, beginning about 53 mi upstream, combined capacity about 64,000 acre-ft. Some small diversions for irrigation above station.

AVERAGE DISCHARGE.--41 years, 31.0 ft³/s, 22,440 acre-ft/yr; median of yearly mean discharges, 17 ft³/s, 12,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,260 ft³/s Apr. 19, 1979, gage height, 21.23 ft, from highwater mark; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 360 ft³/s Mar. 22, gage height, 8.77 ft, minimum daily, 0.07 ft³/s Sept. 5, 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|-------|-------|--------|-------|--------|-------|-------|-------|-------|
| 1 | 8.1 | 12 | 5.1 | 1.7 | 1.0 | 5.0 | 19 | 8.1 | 5.1 | 3.5 | .53 | .11 |
| 2 | 8.3 | 12 | 5.0 | 1.7 | 1.1 | 4.4 | 17 | 14 | 5.0 | 3.5 | .92 | .11 |
| 3 | 8.3 | 11 | 4.8 | 1.7 | 1.1 | 4.1 | 17 | 21 | 4.7 | 3.6 | 1.1 | .10 |
| 4 | 8.1 | 11 | 4.5 | 1.6 | 1.1 | 3.8 | 17 | 48 | 5.0 | 2.1 | .89 | .08 |
| 5 | 7.9 | 11 | 4.4 | 1.6 | 1.1 | 3.6 | 16 | 199 | 5.8 | 1.8 | .65 | .07 |
| 6 | 7.7 | 10 | 4.2 | 1.7 | 1.1 | 3.1 | 15 | 209 | 6.3 | 2.0 | .56 | .07 |
| 7 | 7.7 | 10 | 4.0 | 1.8 | 1.1 | 2.9 | 15 | 153 | 6.8 | 2.5 | .93 | .09 |
| 8 | 7.9 | 9.7 | 3.9 | 1.9 | 1.1 | 2.9 | 14 | 99 | 8.3 | 2.9 | 1.1 | .20 |
| 9 | 7.5 | 9.5 | 3.6 | 1.8 | 1.1 | 2.8 | 14 | 73 | 7.8 | 3.3 | 1.2 | .47 |
| 10 | 5.2 | 9.2 | 3.4 | 1.8 | 1.4 | 2.8 | 13 | 68 | 7.2 | 2.2 | 1.1 | .60 |
| 11 | 4.2 | 8.9 | 3.3 | 1.8 | 2.2 | 2.6 | 13 | 63 | 6.6 | 1.7 | .97 | .59 |
| 12 | 3.5 | 8.8 | 3.1 | 1.8 | 2.6 | 2.5 | 14 | 55 | 6.6 | 1.7 | .92 | .54 |
| 13 | 3.3 | 8.4 | 3.0 | 1.8 | 3.0 | 2.5 | 16 | 39 | 6.8 | 1.5 | .98 | .59 |
| 14 | 3.0 | 8.2 | 3.0 | 1.8 | 3.5 | 2.5 | 22 | 27 | 6.9 | 1.2 | .98 | .57 |
| 15 | 2.8 | 8.5 | 2.9 | 1.7 | 4.7 | 2.5 | 24 | 19 | 6.1 | 1.1 | 1.0 | .60 |
| 16 | 2.6 | 8.3 | 2.9 | 1.7 | 6.4 | 2.5 | 21 | 14 | 4.8 | .97 | .93 | .60 |
| 17 | 2.6 | 8.2 | 2.9 | 1.7 | 6.5 | 2.4 | 18 | 12 | 4.2 | .93 | .83 | .63 |
| 18 | 2.4 | 8.0 | 2.9 | 1.6 | 5.8 | 2.4 | 15 | 9.5 | 3.7 | 1.2 | .83 | .63 |
| 19 | 2.4 | 8.0 | 2.8 | 1.5 | 5.0 | 6.0 | 13 | 9.1 | 3.5 | .91 | .80 | .60 |
| 20 | 2.3 | 7.8 | 2.7 | 1.3 | 4.8 | 30 | 11 | 8.8 | 3.2 | .66 | .41 | .60 |
| 21 | 2.3 | 7.6 | 2.7 | 1.1 | 5.6 | 180 | 10 | 8.5 | 3.5 | .66 | .27 | .60 |
| 22 | 4.2 | 6.9 | 2.6 | 1.1 | 9.1 | 300 | 9.1 | 8.2 | 3.6 | .67 | .20 | .60 |
| 23 | 12 | 6.2 | 2.5 | 1.0 | 17 | 240 | 8.7 | 8.2 | 3.8 | .69 | .20 | .60 |
| 24 | 15 | 6.0 | 2.4 | .99 | 20 | 190 | 8.3 | 7.5 | 3.7 | .98 | .19 | .62 |
| 25 | 15 | 6.1 | 2.3 | .96 | 15 | 170 | 8.1 | 7.2 | 3.5 | 1.2 | .21 | .66 |
| 26 | 14 | 6.0 | 2.1 | .93 | 10 | 120 | 8.0 | 6.8 | 3.5 | .88 | .20 | .66 |
| 27 | 14 | 5.8 | 2.1 | .91 | 9.4 | 57 | 5.5 | 6.6 | 3.3 | .61 | .21 | .66 |
| 28 | 14 | 5.7 | 1.9 | .90 | 7.0 | 43 | 1.7 | 6.9 | 3.3 | .69 | .25 | .66 |
| 29 | 13 | 5.5 | 1.9 | .91 | 5.7 | 27 | 1.5 | 6.7 | 3.5 | .40 | .18 | .66 |
| 30 | 13 | 5.4 | 1.8 | .93 | --- | 23 | 6.8 | 5.8 | 3.3 | .20 | .13 | .66 |
| 31 | 12 | --- | 1.8 | .99 | --- | 20 | --- | 5.4 | --- | .19 | .12 | --- |
| TOTAL | 234.3 | 249.7 | 96.5 | 44.72 | 154.5 | 1461.3 | 391.7 | 1226.3 | 149.4 | 46.44 | 19.79 | 14.23 |
| MEAN | 7.56 | 8.32 | 3.11 | 1.44 | 5.33 | 47.1 | 13.1 | 39.6 | 4.98 | 1.50 | .64 | .47 |
| MAX | 15 | 12 | 5.1 | 1.9 | 20 | 300 | 24 | 209 | 8.3 | 3.6 | 1.2 | .66 |
| MIN | 2.3 | 5.4 | 1.8 | .90 | 1.0 | 2.4 | 1.5 | 5.4 | 3.2 | .19 | .12 | .07 |
| AC-FT | 465 | 495 | 191 | 89 | 306 | 2900 | 777 | 2430 | 296 | 92 | 39 | 28 |
| CAL YR 1983 | TOTAL | 11825.49 | | MEAN | 32.4 | MAX | 780 | MIN | .86 | AC-FT | 23460 | |
| WTR YR 1984 | TOTAL | 4088.88 | | MEAN | 11.2 | MAX | 300 | MIN | .07 | AC-FT | 8110 | |

RED RIVER OF THE NORTH BASIN

175

05116500 DES LACS RIVER AT FOXHOLM, ND--CONTINUED

PERIOD OF RECORD.--Water years 1950-51, 1969-70, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 15... | 1455 | 2.7 | 1270 | -- | 6.5 | 5.0 | -- | -- | -- | -- | -- | |
| DEC 06... | 1515 | 4.2 | 1590 | -- | -1.5 | .0 | -- | -- | -- | -- | -- | |
| JAN 03... | 1720 | 1.7 | 1950 | -- | 2.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 14... | 1040 | 3.2 | 1290 | -- | -.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 27... | 1745 | 69 | 320 | -- | 2.5 | .0 | -- | -- | -- | -- | -- | |
| APR 03... | 1740 | 17 | 620 | 7.7 | 10.0 | 6.0 | 170 | 9 | 38 | 19 | 67 | |
| 25... | 0725 | 8.0 | 1500 | -- | 4.0 | 11.0 | -- | -- | -- | -- | -- | |
| JUN 01... | 1015 | 5.1 | 1640 | -- | 16.5 | 17.5 | -- | -- | -- | -- | -- | |
| JUL 20... | 1040 | .72 | 1720 | -- | 25.0 | 21.0 | -- | -- | -- | -- | -- | |
| AUG 22... | 1430 | .22 | 1840 | 8.5 | 21.0 | 19.5 | 530 | 36 | 92 | 72 | 250 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 03... | 44 | 2 | 12 | 200 | .000 | 170 | 6.3 | 110 | 6.8 | .20 | 9.4 | 411 |
| AUG 22... | 50 | 5 | 17 | 600 | .000 | 490 | 3.0 | 540 | 35 | .40 | 25 | 1380 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 03... | 360 | .56 | 18 | 1 | 70 | 110 | 0 | 22 | 190 | .0 | 0 | 180 |
| AUG 22... | 1300 | 1.9 | .82 | 25 | 170 | 30 | 0 | 93 | 260 | .2 | 0 | 550 |

RED RIVER OF THE NORTH BASIN

05117500 SOURIS (MOUSE) RIVER ABOVE MINOT, ND

LOCATION.--Lat 48°14'45", long 101°22'15", in NW¼NW¼SE¼ sec.17, T.155 N., R.83 W., Ward County, Hydrologic Unit 09010001, on right bank 180 ft downstream from county highway bridge, 3.5 mi west of Minot, 7 mi downstream from Des Lacs River, and at mile 388.5.

DRAINAGE AREA.--10,600 mi², approximately, of which about 6,700 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River at Minot, 1903-24, Souris River at Minot, 1927-28, 1929-34, and Souris River near Minot, 1928-29.

REVISED RECORDS.--WSP 1308: 1905, 1909-14, 1918, 1924-25, 1927. WSP 1338: 1903-4, 1906, 1917, 1928, 1929(M). WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,545.75 ft National Geodetic Vertical Datum of 1929. May 5, 1903, to Sept. 30, 1928; Oct. 1, 1929, to Sept. 30, 1934; nonrecording gages at mile 377.6 in Minot, at datum 12.5 ft lower, Oct. 1, 1928, to Sept. 30, 1929, nonrecording gages at Saugstad bridge at mile 366.8, 5 mi southeast of Minot and at datum 19.2 ft lower than present datum. Records equivalent except those for periods of extreme low flow, as some industrial and sanitary waste enters river between the sites.

REMARKS.--Records good. Flow almost completely regulated by Lake Darling (station 05115500), 41 mi upstream and several smaller reservoirs; combined capacity, about 248,000 acre-ft. Some small diversions for irrigation and municipal supply.

AVERAGE DISCHARGE.--81 years, 169 ft³/s, 122,400 acre-ft/yr; median of yearly mean discharges, 89 ft³/s, 64,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,000 ft³/s Apr. 20, 1904, gage height, 21.9 ft at site in Minot, from rating curve extended above 8,100 ft³/s; no flow at times in some years. Maximum stage at present site, about 23 ft in April 1904.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage in Minot at least 3 ft higher than 1904 peak, in 1881, according to Apr. 20, 1904 issue of Minot Daily Optic. This peak probably occurred in 1882.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 370 ft³/s Mar. 23, gage height, 7.42 ft, no flow July 27-Aug 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|------|------|------|------|--------|-------|-------|---------|------|
| 1 | 31 | 40 | 23 | 23 | 19 | 24 | 57 | 30 | 8.5 | 7.7 | .00 | 19 |
| 2 | 29 | 41 | 24 | 23 | 19 | 21 | 53 | 42 | 7.4 | 6.5 | .00 | 21 |
| 3 | 29 | 47 | 23 | 23 | 19 | 19 | 49 | 42 | 6.6 | 6.4 | .00 | 22 |
| 4 | 27 | 47 | 22 | 24 | 19 | 15 | 46 | 27 | 7.3 | 5.4 | .00 | 22 |
| 5 | 26 | 47 | 21 | 24 | 18 | 14 | 46 | 135 | 9.1 | 5.0 | 79 | 21 |
| 6 | 27 | 45 | 20 | 24 | 18 | 18 | 44 | 305 | 11 | 4.2 | 115 | 20 |
| 7 | 26 | 44 | 20 | 23 | 18 | 18 | 83 | 285 | 13 | 2.9 | 109 | 25 |
| 8 | 25 | 43 | 19 | 23 | 18 | 19 | 181 | 197 | 45 | 2.6 | 100 | 29 |
| 9 | 27 | 42 | 21 | 23 | 18 | 19 | 193 | 146 | 51 | 2.2 | 97 | 27 |
| 10 | 25 | 39 | 19 | 23 | 19 | 19 | 183 | 121 | 25 | 2.4 | 99 | 24 |
| 11 | 20 | 37 | 18 | 23 | 20 | 20 | 168 | 112 | 15 | 2.7 | 98 | 19 |
| 12 | 18 | 37 | 19 | 23 | 22 | 20 | 153 | 99 | 13 | 2.8 | 98 | 19 |
| 13 | 16 | 36 | 20 | 23 | 24 | 18 | 97 | 86 | 11 | 2.5 | 99 | 20 |
| 14 | 15 | 35 | 19 | 23 | 26 | 17 | 76 | 68 | 10 | 2.1 | 92 | 26 |
| 15 | 16 | 34 | 20 | 23 | 29 | 17 | 81 | 54 | 10 | 1.4 | 47 | 30 |
| 16 | 16 | 34 | 20 | 23 | 30 | 16 | 64 | 47 | 9.9 | 1.1 | 26 | 30 |
| 17 | 16 | 33 | 19 | 23 | 27 | 16 | 50 | 42 | 17 | .75 | 23 | 29 |
| 18 | 15 | 34 | 19 | 22 | 26 | 16 | 38 | 32 | 18 | .49 | 22 | 29 |
| 19 | 15 | 33 | 19 | 22 | 27 | 16 | 31 | 27 | 19 | .32 | 22 | 30 |
| 20 | 15 | 32 | 18 | 22 | 27 | 80 | 26 | 25 | 17 | .17 | 24 | 30 |
| 21 | 16 | 32 | 18 | 22 | 31 | 180 | 23 | 24 | 17 | .08 | 25 | 30 |
| 22 | 16 | 31 | 18 | 22 | 51 | 260 | 21 | 20 | 19 | .05 | 23 | 27 |
| 23 | 15 | 28 | 18 | 22 | 52 | 340 | 18 | 17 | 21 | .03 | 22 | 27 |
| 24 | 35 | 25 | 18 | 22 | 45 | 320 | 18 | 16 | 21 | .02 | 21 | 27 |
| 25 | 44 | 24 | 18 | 22 | 47 | 250 | 16 | 15 | 20 | .02 | 20 | 27 |
| 26 | 43 | 23 | 18 | 21 | 43 | 190 | 15 | 13 | 18 | .01 | 19 | 26 |
| 27 | 43 | 22 | 18 | 21 | 37 | 161 | 14 | 12 | 16 | .00 | 19 | 24 |
| 28 | 42 | 22 | 18 | 21 | 31 | 124 | 13 | 13 | 16 | .00 | 19 | 22 |
| 29 | 43 | 23 | 20 | 21 | 28 | 54 | 12 | 11 | 12 | .00 | 18 | 21 |
| 30 | 42 | 22 | 22 | 20 | --- | 54 | 15 | 11 | 9.6 | .00 | 18 | 20 |
| 31 | 41 | --- | 23 | 20 | --- | 62 | --- | 9.6 | --- | .00 | 18 | --- |
| TOTAL | 814 | 1032 | 612 | 694 | 808 | 2417 | 1884 | 2083.6 | 493.4 | 59.84 | 1372.00 | 743 |
| MEAN | 26.3 | 34.4 | 19.7 | 22.4 | 27.9 | 78.0 | 62.8 | 67.2 | 16.4 | 1.93 | 44.3 | 24.8 |
| MAX | 44 | 47 | 24 | 24 | 52 | 340 | 193 | 305 | 51 | 7.7 | 115 | 30 |
| MIN | 15 | 22 | 18 | 20 | 18 | 14 | 12 | 9.6 | 6.6 | .00 | .00 | 19 |
| AC-FT | 1610 | 2050 | 1210 | 1380 | 1600 | 4790 | 3740 | 4130 | 979 | 119 | 2720 | 1470 |
| CAL YR 1983 | TOTAL | 82939.7 | | MEAN | 227 | MAX | 1880 | MIN | 6.8 | AC-FT | 164500 | |
| WTR YR 1984 | TOTAL | 13012.84 | | MEAN | 35.6 | MAX | 340 | MIN | .00 | AC-FT | 25810 | |

RED RIVER OF THE NORTH BASIN

177

05117500 SOURIS RIVER ABOVE MINOT, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 11... | 1820 | 18 | 1100 | -- | 4.5 | 9.0 | -- | -- | -- | -- | -- | |
| DEC 06... | 1300 | 19 | 1020 | -- | -3.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 03... | 1605 | 23 | 880 | -- | 3.5 | .0 | -- | -- | -- | -- | -- | |
| FEB 14... | 0915 | 26 | 1050 | -- | -4.0 | .0 | -- | -- | -- | -- | -- | |
| MAR 27... | 1625 | 175 | 305 | -- | 2.5 | .0 | -- | -- | -- | -- | -- | |
| APR 03... | 1540 | 48 | 520 | 7.9 | 12.5 | 4.0 | 170 | 12 | 39 | 17 | 44 | |
| 24... | 1625 | 17 | 890 | -- | 14.5 | 14.0 | -- | -- | -- | -- | -- | |
| JUN 15... | 0935 | 11 | 1080 | -- | 17.5 | 17.5 | -- | -- | -- | -- | -- | |
| JUL 20... | 0840 | .15 | 965 | -- | 20.0 | 23.0 | -- | -- | -- | -- | -- | |
| AUG 23... | 1515 | 24 | 750 | 8.0 | 26.5 | 21.5 | 230 | 0 | 49 | 27 | 76 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 03... | 34 | 2 | 12 | 190 | .000 | 160 | 3.8 | 94 | 10 | .20 | 9.7 | 340 |
| AUG 23... | 40 | 2 | 14 | 310 | .000 | 260 | 5.0 | 120 | 18 | .20 | 4.0 | 489 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 03... | 320 | .46 | 44 | 3 | 210 | 90 | 1 | 26 | 160 | .0 | 0 | 210 |
| AUG 23... | 460 | .67 | 31 | 17 | 260 | 20 | 0 | 37 | 370 | .0 | 0 | 340 |

RED RIVER OF THE NORTH BASIN

05120000 SOURIS (MOUSE) RIVER NEAR VERENDRYE, ND

LOCATION.--Lat 48°09'35", long 100°43'45", in NW¼SW¼ sec.17, T.154 N., R.78 W., McHenry County, Hydrologic Unit 09010003, on left bank 2.7 mi north of Verendrye, 19 mi upstream from mouth of Wintering River and at mile 302.0.

DRAINAGE AREA.--11,300 mi², approximately, of which about 6,900 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February to June 1933 (gage heights only), April 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,464.87 ft National Geodetic Vertical Datum of 1929. February to June 1933, at site 4 mi upstream at datum 1.65 ft higher. April 1, 1937, to Mar. 3, 1938, nonrecording gage at present site, at datum 1.97 ft higher.

REMARKS.--Records good. Flow regulated by reservoirs on Souris and Des Lacs Rivers, the largest of which is Lake Darling (station 05115500), 128 mi upstream, combined capacity about 248,000 acre-ft. Some small diversions for irrigation and municipal supply.

AVERAGE DISCHARGE.--47 years, 217 ft³/s, 157,200 acre-ft/yr; median of yearly mean discharges, 120 ft³/s, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,900 ft³/s Apr. 19, 1976, gage height, 17.84 ft; minimum daily flows of 0.3 ft³/s or less occurred in Aug., Sept. 1937, Oct. 1939 and Feb. 1963.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,380 ft³/s May 7, gage height, 12.09 ft; maximum gage height 12.22 ft Mar. 25, backwater from ice, minimum daily discharge 7.3 ft³/s July 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|------|-------|-------|-------|------|-------|--------|------|
| 1 | 35 | 60 | 32 | 28 | 34 | 64 | 320 | 139 | 45 | 41 | 8.5 | 30 |
| 2 | 36 | 57 | 32 | 28 | 36 | 47 | 270 | 169 | 41 | 38 | 8.5 | 31 |
| 3 | 41 | 47 | 32 | 28 | 38 | 37 | 240 | 235 | 40 | 33 | 8.4 | 32 |
| 4 | 48 | 44 | 32 | 28 | 40 | 30 | 193 | 424 | 40 | 35 | 7.9 | 33 |
| 5 | 46 | 44 | 32 | 28 | 40 | 27 | 159 | 856 | 41 | 29 | 7.8 | 30 |
| 6 | 46 | 52 | 31 | 28 | 40 | 33 | 144 | 1200 | 46 | 25 | 8.1 | 29 |
| 7 | 40 | 51 | 30 | 27 | 40 | 33 | 132 | 1370 | 50 | 23 | 9.5 | 29 |
| 8 | 37 | 49 | 30 | 26 | 40 | 34 | 122 | 1310 | 65 | 21 | 9.0 | 24 |
| 9 | 37 | 49 | 30 | 25 | 40 | 26 | 127 | 1090 | 68 | 19 | 8.4 | 24 |
| 10 | 35 | 51 | 30 | 25 | 42 | 24 | 179 | 866 | 75 | 18 | 33 | 25 |
| 11 | 33 | 55 | 30 | 25 | 44 | 28 | 276 | 702 | 73 | 17 | 89 | 25 |
| 12 | 33 | 48 | 30 | 25 | 46 | 30 | 336 | 600 | 78 | 15 | 90 | 25 |
| 13 | 34 | 50 | 30 | 25 | 48 | 30 | 456 | 487 | 90 | 14 | 90 | 29 |
| 14 | 33 | 60 | 30 | 25 | 50 | 29 | 679 | 393 | 81 | 14 | 92 | 30 |
| 15 | 33 | 61 | 30 | 25 | 54 | 30 | 835 | 317 | 71 | 12 | 93 | 30 |
| 16 | 33 | 61 | 29 | 25 | 54 | 30 | 753 | 257 | 62 | 11 | 97 | 27 |
| 17 | 32 | 59 | 29 | 24 | 50 | 30 | 528 | 213 | 56 | 10 | 109 | 25 |
| 18 | 30 | 58 | 29 | 23 | 53 | 30 | 336 | 180 | 50 | 10 | 95 | 23 |
| 19 | 38 | 50 | 28 | 23 | 65 | 30 | 241 | 157 | 45 | 11 | 69 | 23 |
| 20 | 40 | 42 | 28 | 23 | 80 | 30 | 192 | 138 | 40 | 9.2 | 53 | 27 |
| 21 | 35 | 41 | 28 | 23 | 70 | 70 | 160 | 120 | 36 | 7.9 | 44 | 32 |
| 22 | 30 | 40 | 28 | 23 | 60 | 140 | 136 | 108 | 34 | 8.2 | 40 | 32 |
| 23 | 28 | 35 | 27 | 23 | 70 | 720 | 119 | 94 | 34 | 8.8 | 40 | 29 |
| 24 | 34 | 32 | 27 | 23 | 120 | 910 | 110 | 83 | 38 | 8.6 | 41 | 29 |
| 25 | 39 | 34 | 27 | 24 | 170 | 960 | 100 | 75 | 46 | 8.3 | 40 | 30 |
| 26 | 39 | 41 | 27 | 25 | 160 | 960 | 84 | 68 | 53 | 8.9 | 39 | 32 |
| 27 | 40 | 39 | 27 | 26 | 130 | 880 | 92 | 64 | 50 | 10 | 39 | 33 |
| 28 | 52 | 35 | 27 | 27 | 90 | 760 | 58 | 60 | 46 | 8.6 | 37 | 33 |
| 29 | 60 | 33 | 27 | 28 | 70 | 590 | 72 | 55 | 44 | 7.3 | 29 | 33 |
| 30 | 61 | 33 | 28 | 30 | --- | 400 | 132 | 51 | 43 | 9.0 | 23 | 31 |
| 31 | 60 | --- | 28 | 32 | --- | 370 | --- | 46 | --- | 8.7 | 27 | --- |
| TOTAL | 1218 | 1411 | 905 | 798 | 1874 | 7412 | 7581 | 11927 | 1581 | 499.5 | 1385.1 | 865 |
| MEAN | 39.3 | 47.0 | 29.2 | 25.7 | 64.6 | 239 | 253 | 385 | 52.7 | 16.1 | 44.7 | 28.8 |
| MAX | 61 | 61 | 32 | 32 | 170 | 960 | 835 | 1370 | 90 | 41 | 109 | 33 |
| MIN | 28 | 32 | 27 | 23 | 34 | 24 | 58 | 46 | 34 | 7.3 | 7.8 | 23 |
| AC-FT | 2420 | 2800 | 1800 | 1580 | 3720 | 14700 | 15040 | 23660 | 3140 | 991 | 2750 | 1720 |
| CAL YR 1983 | TOTAL | 114633 | | MEAN | 314 | MAX | 2300 | MIN | 15 | AC-FT | 227400 | |
| WTR YR 1984 | TOTAL | 37456.6 | | MEAN | 102 | MAX | 1370 | MIN | 7.3 | AC-FT | 74300 | |

RED RIVER OF THE NORTH BASIN

05120500 WINTERING RIVER NEAR KARLSRUHE, ND

LOCATION.--Lat 48°10'14", long 100°32'20", on line between secs.10 and 11, T.154 N., R.77 W., McHenry County, Hydrologic Unit 09010003, on left bank 30 ft upstream from county highway bridge, 4 mi upstream from mouth, and 7 mi northeast of Karlsruhe.

DRAINAGE AREA.--705 mi², of which about 420 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 1,480 ft, from river-profile map.

REMARKS.--Records good except those for winter period, which are fair. Some regulation by Fish and Wildlife Service dams on Cottonwood and Wintering Lakes; controlled capacity, about 850 acre-ft.

AVERAGE DISCHARGE.--47 years, 13.3 ft³/s, 9,640 acre-ft/yr; median of yearly mean discharges, 12 ft³/s, 8,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,000 ft³/s Apr. 7, 1949, by velocity-area studies; maximum gage height, 12.0 ft Apr. 7, 1949, channel choked by packed snow; no flow at times in many years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 189 ft³/s May 11, gage height, 6.46 ft, maximum gage height, 7.01 ft May 1, backwater from ice; minimum daily, 0.45 ft³/s Aug. 30, 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|-------|-------|--------|------|------|-------|-------|-------|
| 1 | 8.8 | 4.2 | 3.8 | 2.7 | 1.8 | 10 | 10 | 80 | 36 | 17 | 8.2 | .63 |
| 2 | 10 | 4.5 | 3.5 | 2.7 | 1.8 | 8.0 | 8.5 | 95 | 34 | 17 | 5.9 | 1.2 |
| 3 | 11 | 7.0 | 3.5 | 3.0 | 1.8 | 7.0 | 6.5 | 105 | 32 | 16 | 4.6 | 1.1 |
| 4 | 9.2 | 8.2 | 3.4 | 3.0 | 1.8 | 6.0 | 20 | 110 | 31 | 15 | 3.9 | 1.3 |
| 5 | 8.1 | 7.6 | 3.2 | 3.5 | 1.8 | 5.5 | 76 | 113 | 34 | 14 | 3.9 | 1.3 |
| 6 | 6.6 | 6.5 | 3.1 | 3.6 | 1.8 | 4.7 | 99 | 114 | 36 | 14 | 3.2 | 1.3 |
| 7 | 5.8 | 6.3 | 3.0 | 3.6 | 1.8 | 4.4 | 100 | 109 | 43 | 13 | 3.5 | 1.5 |
| 8 | 5.5 | 5.5 | 2.8 | 3.6 | 1.8 | 4.2 | 99 | 101 | 49 | 14 | 3.3 | 1.6 |
| 9 | 5.2 | 5.3 | 2.9 | 3.4 | 1.8 | 4.5 | 94 | 108 | 64 | 13 | 3.1 | 2.6 |
| 10 | 4.8 | 5.4 | 3.1 | 3.0 | 2.0 | 5.0 | 90 | 164 | 62 | 13 | 3.0 | 3.7 |
| 11 | 5.3 | 5.3 | 3.1 | 2.8 | 2.4 | 5.3 | 96 | 178 | 55 | 11 | 2.8 | 5.7 |
| 12 | 5.0 | 5.2 | 2.9 | 2.8 | 2.6 | 5.6 | 110 | 174 | 52 | 11 | 3.4 | 3.7 |
| 13 | 6.6 | 5.5 | 3.1 | 2.8 | 2.8 | 5.7 | 124 | 156 | 50 | 9.3 | 1.9 | 3.7 |
| 14 | 6.2 | 5.8 | 3.2 | 2.8 | 3.6 | 5.9 | 123 | 147 | 48 | 8.4 | 1.5 | 3.7 |
| 15 | 6.5 | 5.8 | 3.2 | 2.8 | 4.4 | 5.6 | 112 | 142 | 47 | 7.9 | 1.4 | 3.5 |
| 16 | 5.2 | 6.0 | 3.2 | 2.6 | 5.2 | 5.6 | 97 | 134 | 44 | 7.4 | 1.5 | 3.2 |
| 17 | 5.2 | 6.0 | 3.2 | 2.4 | 4.4 | 5.3 | 84 | 130 | 40 | 6.9 | 1.5 | 2.8 |
| 18 | 5.2 | 5.8 | 3.1 | 2.0 | 5.0 | 5.0 | 73 | 110 | 36 | 6.3 | 1.6 | 2.5 |
| 19 | 5.0 | 5.9 | 3.1 | 1.8 | 5.0 | 5.6 | 65 | 92 | 33 | 5.7 | 1.5 | 2.4 |
| 20 | 5.0 | 6.0 | 2.9 | 1.6 | 6.0 | 8.0 | 61 | 85 | 31 | 5.2 | 1.5 | 2.8 |
| 21 | 4.7 | 6.5 | 2.8 | 1.6 | 8.0 | 20 | 66 | 80 | 29 | 4.6 | 1.5 | 2.7 |
| 22 | 5.2 | 5.5 | 2.8 | 1.6 | 10 | 18 | 77 | 71 | 29 | 4.4 | 1.5 | 2.9 |
| 23 | 6.0 | 5.3 | 2.6 | 1.6 | 12 | 20 | 84 | 61 | 27 | 4.2 | 1.5 | 2.7 |
| 24 | 5.7 | 4.9 | 2.6 | 1.6 | 12 | 90 | 83 | 55 | 26 | 4.2 | 1.5 | 3.1 |
| 25 | 5.2 | 4.4 | 2.6 | 1.6 | 14 | 100 | 78 | 49 | 24 | 4.1 | 1.8 | 3.7 |
| 26 | 4.6 | 3.9 | 2.1 | 1.6 | 18 | 80 | 73 | 47 | 22 | 3.9 | 1.4 | 4.2 |
| 27 | 4.1 | 4.2 | 1.9 | 1.6 | 20 | 60 | 71 | 42 | 21 | 3.6 | .75 | 4.2 |
| 28 | 4.0 | 4.2 | 2.0 | 1.6 | 18 | 50 | 70 | 41 | 20 | 3.3 | .65 | 4.2 |
| 29 | 4.6 | 4.2 | 2.0 | 1.6 | 13 | 40 | 69 | 42 | 19 | 3.3 | .62 | 4.2 |
| 30 | 4.6 | 4.3 | 2.0 | 1.6 | --- | 21 | 70 | 41 | 18 | 3.5 | .45 | 4.1 |
| 31 | 4.0 | --- | 2.2 | 1.6 | --- | 14 | --- | 38 | --- | 5.0 | .45 | --- |
| TOTAL | 182.9 | 165.2 | 88.9 | 74.1 | 184.6 | 629.9 | 2289.0 | 3014 | 1092 | 269.2 | 73.32 | 86.23 |
| MEAN | 5.90 | 5.51 | 2.87 | 2.39 | 6.37 | 20.3 | 76.3 | 97.2 | 36.4 | 8.68 | 2.37 | 2.87 |
| MAX | 11 | 8.2 | 3.8 | 3.6 | 20 | 100 | 124 | 178 | 64 | 17 | 8.2 | 5.7 |
| MIN | 4.0 | 3.9 | 1.9 | 1.6 | 1.8 | 4.2 | 6.5 | 38 | 18 | 3.3 | .45 | .63 |
| AC-FT | 363 | 328 | 176 | 147 | 366 | 1250 | 4540 | 5980 | 2170 | 534 | 145 | 171 |
| CAL YR 1983 | TOTAL | 7665.9 | | MEAN | 21.0 | MAX | 168 | MIN | 1.0 | AC-FT | 15210 | |
| WTR YR 1984 | TOTAL | 8149.35 | | MEAN | 22.3 | MAX | 178 | MIN | .45 | AC-FT | 16160 | |

RED RIVER OF THE NORTH BASIN

181

05120500 WINTERING RIVER NEAR KARLSRUHE, ND--CONTINUED

PERIOD OF RECORD.--Water years 1954-56, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 19... | 1400 | 5.0 | 720 | -- | 6.5 | 4.0 | -- | -- | -- | -- | -- |
| DEC 01... | 1115 | 3.9 | 950 | -- | -12.0 | .0 | -- | -- | -- | -- | -- |
| JAN 05... | 1140 | 3.4 | 1080 | -- | 5.0 | .0 | -- | -- | -- | -- | -- |
| FEB 16... | 1535 | 4.8 | 585 | -- | 1.5 | .0 | -- | -- | -- | -- | -- |
| MAR 30... | 1225 | 29 | 425 | -- | 5.0 | .5 | -- | -- | -- | -- | -- |
| APR 09... | 1731 | 92 | 570 | 7.8 | 9.0 | 8.0 | 120 | 0 | 25 | 15 | 77 |
| APR 23... | 1635 | 84 | -- | -- | 21.0 | 16.0 | -- | -- | -- | -- | -- |
| MAY 31... | 1345 | 38 | 1340 | -- | 29.5 | 20.5 | -- | -- | -- | -- | -- |
| JUL 16... | 1430 | 7.4 | 1390 | -- | 24.0 | 22.0 | -- | -- | -- | -- | -- |
| AUG 23... | 1305 | 1.7 | 775 | 7.7 | 27.0 | 20.5 | 280 | 0 | 58 | 32 | 79 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|
| APR 09... | 55 | 3 | 9.8 | -- | -- | 200 | 6.1 | 100 | 10 | .20 |
| AUG 23... | 38 | 2 | 5.8 | 440 | .000 | 360 | 14 | 67 | 9.1 | .20 |

| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|--------------|--|---|---|--|--|--|---|---|---|---|
| APR 09... | 15 | 394 | 370 | .54 | 98 | <.10 | .040 | 1 | 74 | 180 |
| AUG 23... | 16 | 515 | 480 | .70 | 2.4 | -- | -- | 1 | -- | 140 |

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|---|---|---|---|--|---|---|
| APR 09... | 1 | 210 | <1 | 27 | 21 | <.1 | <1 | 100 | 17 |
| AUG 23... | -- | 30 | 0 | 29 | 70 | .0 | 0 | 200 | -- |

RED RIVER OF THE NORTH BASIN

05122000 SOURIS (MOUSE) RIVER NEAR BANTRY, ND

LOCATION.--Lat 48°30'20", long 100°26'04", in SE1/4NW1/4SE1/4 sec.14, T.158 N., R.76 W., McHenry County, Hydrologic Unit 09010003, on left bank 200 ft upstream from Nelson bridge, 8 mi east of Bantry, 18 mi upstream from Willow Creek, and at mile 228.0.

DRAINAGE AREA.--12,300 mi² approximately, of which about 7,600 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,427.56 ft National Geodetic Vertical Datum of 1929. Prior to Mar. 16, 1938, nonrecording gage at same site at datum 0.17 ft lower.

REMARKS.--Records good except those for the winter periods, which are fair. Flow regulated by reservoirs on Souris, Des Lacs, and Wintering Rivers, total capacity, about 249,000 acre-ft. Diversions for irrigation of about 7,600 acres at Eaton Dam about 42 mi above station and other small diversions for irrigation and municipal supply.

AVERAGE DISCHARGE.--47 years, 236 ft³/s, 171,000 acre-ft/yr; median of yearly mean discharges, 140 ft³/s, 101,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,330 ft³/s Apr. 23, 1976, gage height, 14.59 ft; no flow at times each year 1937-40, 1963.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 956 ft³/s May 14, gage height, 10.16 ft, minimum daily discharge, 9.0 ft³/s Aug. 13.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|------|------|-------|-------|------|-------|--------|------|
| 1 | 45 | 54 | 50 | 26 | 30 | 150 | 430 | 660 | 226 | 79 | 15 | 33 |
| 2 | 46 | 61 | 48 | 26 | 30 | 160 | 420 | 683 | 200 | 79 | 14 | 31 |
| 3 | 47 | 69 | 46 | 26 | 30 | 150 | 410 | 685 | 176 | 75 | 14 | 29 |
| 4 | 47 | 75 | 44 | 26 | 30 | 140 | 400 | 690 | 158 | 73 | 14 | 25 |
| 5 | 50 | 77 | 42 | 27 | 28 | 130 | 350 | 684 | 147 | 69 | 14 | 24 |
| 6 | 53 | 78 | 40 | 26 | 26 | 110 | 290 | 673 | 135 | 66 | 14 | 23 |
| 7 | 55 | 79 | 38 | 26 | 26 | 100 | 244 | 689 | 134 | 66 | 14 | 24 |
| 8 | 58 | 79 | 38 | 25 | 26 | 90 | 212 | 770 | 139 | 65 | 14 | 25 |
| 9 | 60 | 77 | 37 | 24 | 28 | 80 | 190 | 852 | 162 | 59 | 14 | 27 |
| 10 | 63 | 76 | 36 | 23 | 30 | 70 | 182 | 898 | 167 | 54 | 12 | 28 |
| 11 | 62 | 76 | 35 | 22 | 32 | 65 | 183 | 933 | 174 | 51 | 10 | 29 |
| 12 | 59 | 75 | 34 | 21 | 34 | 64 | 202 | 948 | 183 | 49 | 10 | 28 |
| 13 | 55 | 76 | 34 | 20 | 36 | 61 | 240 | 951 | 189 | 46 | 9.0 | 28 |
| 14 | 52 | 76 | 34 | 20 | 38 | 58 | 294 | 954 | 193 | 43 | 9.0 | 26 |
| 15 | 51 | 76 | 33 | 20 | 40 | 56 | 345 | 950 | 193 | 39 | 22 | 25 |
| 16 | 48 | 78 | 33 | 20 | 40 | 54 | 383 | 924 | 191 | 36 | 47 | 25 |
| 17 | 47 | 80 | 33 | 20 | 39 | 54 | 441 | 881 | 188 | 33 | 62 | 25 |
| 18 | 46 | 81 | 32 | 20 | 40 | 54 | 543 | 837 | 179 | 31 | 71 | 25 |
| 19 | 45 | 81 | 32 | 20 | 41 | 54 | 607 | 773 | 167 | 29 | 77 | 26 |
| 20 | 45 | 82 | 32 | 20 | 43 | 56 | 543 | 702 | 153 | 26 | 82 | 26 |
| 21 | 45 | 81 | 31 | 20 | 45 | 60 | 443 | 638 | 139 | 25 | 84 | 26 |
| 22 | 45 | 78 | 31 | 20 | 47 | 74 | 370 | 588 | 124 | 24 | 85 | 25 |
| 23 | 46 | 75 | 30 | 20 | 52 | 86 | 321 | 545 | 111 | 22 | 82 | 23 |
| 24 | 46 | 70 | 30 | 20 | 59 | 106 | 280 | 505 | 101 | 21 | 74 | 23 |
| 25 | 48 | 65 | 29 | 20 | 75 | 139 | 245 | 467 | 93 | 19 | 64 | 23 |
| 26 | 48 | 60 | 29 | 20 | 100 | 170 | 210 | 425 | 86 | 19 | 55 | 24 |
| 27 | 48 | 58 | 28 | 20 | 120 | 220 | 190 | 384 | 81 | 18 | 48 | 27 |
| 28 | 47 | 56 | 28 | 21 | 130 | 240 | 200 | 350 | 79 | 17 | 43 | 29 |
| 29 | 47 | 54 | 27 | 23 | 140 | 270 | 250 | 320 | 79 | 16 | 39 | 30 |
| 30 | 48 | 52 | 26 | 25 | --- | 340 | 450 | 287 | 79 | 16 | 36 | 32 |
| 31 | 50 | --- | 26 | 27 | --- | 410 | --- | 255 | --- | 17 | 34 | --- |
| TOTAL | 1552 | 2155 | 1066 | 694 | 1435 | 3871 | 9868 | 20901 | 4426 | 1282 | 1182.0 | 794 |
| MEAN | 50.1 | 71.8 | 34.4 | 22.4 | 49.5 | 125 | 329 | 674 | 148 | 41.4 | 38.1 | 26.5 |
| MAX | 63 | 82 | 50 | 27 | 140 | 410 | 607 | 954 | 226 | 79 | 85 | 33 |
| MIN | 45 | 52 | 26 | 20 | 26 | 54 | 182 | 255 | 79 | 16 | 9.0 | 23 |
| AC-FT | 3080 | 4270 | 2110 | 1380 | 2850 | 7680 | 19570 | 41460 | 8780 | 2540 | 2340 | 1570 |
| CAL YR 1983 | TOTAL | 129256 | | MEAN | 354 | MAX | 1940 | MIN | 22 | AC-FT | 256400 | |
| WTR YR 1984 | TOTAL | 49226.0 | | MEAN | 134 | MAX | 954 | MIN | 9.0 | AC-FT | 97640 | |

05122000 SOURIS RIVER NEAR BANTRY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1971 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-------|------|--|--|---|--|--|---|--|---|---|---|
| OCT | | | | | | | | | | | |
| 14... | 1900 | 52 | 875 | -- | 5.0 | 7.0 | -- | -- | -- | -- | -- |
| DEC | | | | | | | | | | | |
| 07... | 1115 | 38 | 1210 | -- | -8.5 | .0 | -- | -- | -- | -- | -- |
| JAN | | | | | | | | | | | |
| 05... | 1745 | 27 | 1240 | -- | -- | .0 | -- | -- | -- | -- | -- |
| FEB | | | | | | | | | | | |
| 16... | 1315 | 40 | 1110 | -- | 1.0 | .5 | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 10... | 0930 | 183 | 435 | 7.8 | 7.5 | 8.5 | 150 | 18 | 34 | 15 | 33 |
| 26... | 1430 | 210 | 670 | -- | 2.0 | 10.5 | -- | -- | -- | -- | -- |
| JUN | | | | | | | | | | | |
| 13... | 1405 | 190 | 1050 | -- | 21.0 | 18.0 | -- | -- | -- | -- | -- |
| JUL | | | | | | | | | | | |
| 19... | 1045 | 28 | 1290 | -- | 23.0 | 23.0 | -- | -- | -- | -- | -- |
| AUG | | | | | | | | | | | |
| 20... | 1740 | 84 | 1240 | 8.2 | 25.0 | 24.5 | 360 | 0 | 73 | 44 | 160 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|-------|------------------------------|--|--|---|--|--|--|--|--|---|
| APR | | | | | | | | | | |
| 10... | 31 | 1 | 11 | 160 | .000 | 130 | 4.0 | 81 | 5.8 | .10 |
| AUG | | | | | | | | | | |
| 20... | 47 | 4 | 12 | 510 | .000 | 410 | 5.1 | 240 | 38 | .30 |

| DATE | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|-------|--|---|--|--|--|--|---|---|---|---|
| APR | | | | | | | | | | |
| 10... | 9.0 | 279 | 270 | .38 | 138 | -- | -- | 2 | -- | 110 |
| AUG | | | | | | | | | | |
| 20... | 19 | 860 | 840 | 1.2 | 194 | <.10 | .580 | 19 | 110 | 250 |

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|-------|---|---|---|---|---|---|--|---|---|
| APR | | | | | | | | | |
| 10... | -- | 180 | 1 | 18 | 40 | .1 | 0 | 120 | -- |
| AUG | | | | | | | | | |
| 20... | 3 | 30 | 1 | 58 | 20 | .3 | 0 | 430 | 4 |

RED RIVER OF THE NORTH BASIN

05123000 LAKE METIGOSHE NEAR BOTTINEAU, ND

LOCATION.--Lat 48°59'05", long 100°20'52", in SE1/4SW1/4 sec.35, T.164 N., R.75 W., Bottineau County, Hydrologic Unit 09010004, 25 ft east from northeast corner of bridge over Lake Metigoshe, and 11.7 mi northeast of Bottineau.

DRAINAGE AREA.--59 mi².

PERIOD OF RECORD.--June 1931 to September 1932, September 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,130.00 ft National Geodetic Vertical Datum of 1929. 1931-32, nonrecording gage on north abutment of bridge at datum 6.32 ft lower (reduced to elevations NGVD). Sept. 4, 1953, to Jan. 19, 1955, nonrecording gage at present datum on east end of south abutment of bridge.

REMARKS.--Outlet of lake is a concrete dam with removable stoplogs; average crest elevation without stoplogs about 2,138.0 ft National Geodetic Vertical Datum of 1929. Lake level regulated since 1959 by dam and control works in the outlet of Sharpe Lake located on the principal tributary in Manitoba.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 9.70 ft May 3, 1975; minimum, 4.28 ft Sept. 17, 1932, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 8.75 ft May 14; minimum, 7.20 ft Sept. 30.

MONTHEND GAGE HEIGHT, IN FEET, AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | | | | | | |
|--------------|-------|--------------|-------|--------------|------|---------------|------|
| Oct. 31----- | 7.82 | Jan. 31----- | *7.87 | Apr. 30----- | 8.57 | July 31----- | 7.87 |
| Nov. 30----- | 7.80 | Feb. 29----- | 7.91 | May 31----- | 8.61 | Aug. 31----- | 7.30 |
| Dec. 31----- | *7.84 | Mar. 31----- | 8.08 | June 30----- | 8.38 | Sept. 30----- | 7.20 |

* - Estimate

05123400 WILLOW CREEK NEAR WILLOW CITY, ND

LOCATION.--Lat 48°35'20", long 100°26'30", in NE¼NW¼ sec.23, T.159 N., R.76 W., McHenry County, Hydrologic Unit 09010004, on left bank 50 ft downstream from bridge on county road, 1.5 mi upstream from Snake Creek, and 7 mi west of Willow City.

DRAINAGE AREA.--1,160 mi², approximately, of which about 430 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1956 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,430 ft, from topographic map. Prior to Oct. 5, 1956, non-recording gage at site 50 ft upstream at same datum.

REMARKS.--Records fair except those for June and July, which are poor.

AVERAGE DISCHARGE.--28 years, 45.5 ft³/s, 32,960 acre-ft/yr; median of yearly mean discharges, 25 ft³/s, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,900 ft³/s Apr. 12, 1969, gage height, 16.76 ft; no flow at times each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|------|-----------------------------------|---------------------|
| Mar. 30 | 1200 | 232 | a*9.37 | May 6 | 1800 | 184 | 8.16 |
| Apr. 16 | 0200 | *235 | 8.82 | | | | |

No flow for many days.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-----|------|------|---------|------|------|-------|-------|-------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 190 | 70 | 26 | 6.4 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 185 | 106 | 22 | 5.6 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 175 | 124 | 20 | 5.6 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 155 | 154 | 18 | 4.6 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 140 | 169 | 18 | 4.6 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 120 | 179 | 18 | 4.3 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 110 | 183 | 26 | 4.8 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 100 | 177 | 28 | 5.3 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | 95 | 163 | 31 | 4.3 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | 93 | 144 | 34 | 3.8 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | 90 | 141 | 34 | 2.7 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 105 | 132 | 32 | 2.0 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 140 | 127 | 30 | 1.4 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | 200 | 118 | 28 | .97 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | 230 | 111 | 26 | .58 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | 230 | 105 | 24 | .30 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | 220 | 98 | 22 | .05 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | 210 | 92 | 20 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | 200 | 88 | 19 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | 190 | 83 | 18 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .20 | 170 | 79 | 17 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .40 | 130 | 74 | 16 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | 2.0 | 105 | 71 | 15 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | 3.0 | 90 | 66 | 14 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 60 | 80 | 63 | 13 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | 180 | 74 | 59 | 12 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | 210 | 65 | 55 | 11 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 220 | 35 | 51 | 10 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 210 | 40 | 44 | 9.0 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 210 | 55 | 36 | 8.0 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 200 | --- | 30 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 1295.60 | 4022 | 3192 | 619.0 | 57.30 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 41.8 | 134 | 103 | 20.6 | 1.85 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 220 | 230 | 183 | 34 | 6.4 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | 35 | 30 | 8.0 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | 2570 | 7980 | 6330 | 1230 | 114 | .00 | .00 |
| CAL YR 1983 | TOTAL | 22391.29 | | MEAN | 61.3 | MAX | 740 | MIN | .00 | AC-FT | 44410 | |
| WTR YR 1984 | TOTAL | 9185.90 | | MEAN | 25.1 | MAX | 230 | MIN | .00 | AC-FT | 18220 | |

RED RIVER OF THE NORTH BASIN

05123400 WILLOW CREEK NR WILLOW CITY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1960-62, 1964-65, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| MAR 29... | 1540 | 210 | 460 | -- | 6.5 | .0 | -- | -- | -- | -- | -- | |
| APR 10... | 1020 | 95 | 780 | 7.8 | 7.5 | 7.0 | 260 | 66 | 48 | 33 | 69 | |
| 26... | 1140 | 74 | 1100 | -- | 2.0 | 4.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 10... | 35 | 2 | 15 | 220 | | 190 | 5.5 | 200 | 19 | .10 | 18 | 533 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 10... | 520 | .72 | 137 | 2 | 150 | 80 | 0 | 70 | 30 | .6 | 0 | 200 |

RED RIVER OF THE NORTH BASIN

187

05124000 SOURIS (MOUSE) RIVER NEAR WESTHOPE, ND
(International gaging station)
(Radiochemical station)

LOCATION.--Lat 48°59'47", long 100°57'29", in SW1/4SE1/4 sec.30, T.164 N., R.79 W., Bottineau County, Hydrologic Unit 09010003, on left bank 1,200 ft upstream from second crossing of international boundary, 1 mi downstream from Fish and Wildlife Service Dam 357, 7 mi northeast of Westhope, 11 mi downstream from Boundary Creek, and at mile 154.5.

DRAINAGE AREA.--16,900 mi², approximately, of which about 10,300 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July to October 1929, April 1930 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1338: 1932. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,402.45 ft National Geodetic Vertical Datum of 1929. Prior to Mar. 28, 1938, nonrecording gage at site 6.3 mi upstream at datum 2.52 ft higher.

REMARKS.--Records good. Flow regulated by dams on Souris River and tributaries, combined capacity, about 321,000 acre-ft. Diversion at Eaton Dam for irrigation of about 7,600 acres and other small diversions for irrigation and municipal supply above station.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--54 years (1930-84), 265 ft³/s, 191,992 acre-ft/yr, median of yearly mean discharges 140 ft³/s, 101,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,600 ft³/s Apr. 26, 1976, gage height, 19.16 ft; maximum daily reverse flow, 35 ft³/s Apr. 8, 1943, caused by backwater from downstream tributary inflow; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 1,100 ft³/s May 30, gage height, 7.99 ft, minimum daily 4.5 ft³/s Apr. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|----------|------|------|------|------|--------|-------|-------|-------|--------|------|
| 1 | 276 | 252 | 58 | 20 | 22 | 28 | 92 | 820 | 1030 | 199 | 240 | 57 |
| 2 | 258 | 135 | 57 | 20 | 24 | 35 | 65 | 827 | 1010 | 242 | 216 | 57 |
| 3 | 220 | 241 | 55 | 22 | 26 | 43 | 75 | 787 | 959 | 245 | 197 | 54 |
| 4 | 170 | 223 | 54 | 25 | 28 | 51 | 165 | 767 | 943 | 223 | 180 | 52 |
| 5 | 85 | 117 | 52 | 26 | 28 | 60 | 241 | 775 | 935 | 192 | 162 | 50 |
| 6 | 106 | 114 | 49 | 26 | 27 | 75 | 167 | 771 | 925 | 150 | 152 | 50 |
| 7 | 117 | 126 | 46 | 25 | 26 | 100 | 72 | 759 | 915 | 122 | 142 | 48 |
| 8 | 141 | 71 | 43 | 24 | 26 | 200 | 57 | 811 | 880 | 131 | 133 | 45 |
| 9 | 144 | 135 | 40 | 23 | 26 | 190 | 48 | 857 | 814 | 131 | 124 | 42 |
| 10 | 80 | 164 | 37 | 23 | 28 | 160 | 39 | 872 | 740 | 123 | 112 | 40 |
| 11 | 36 | 129 | 37 | 22 | 30 | 150 | 47 | 821 | 676 | 111 | 101 | 39 |
| 12 | 46 | 80 | 37 | 22 | 33 | 140 | 72 | 842 | 610 | 101 | 100 | 38 |
| 13 | 78 | 141 | 37 | 21 | 33 | 130 | 82 | 825 | 528 | 98 | 98 | 37 |
| 14 | 82 | 160 | 35 | 20 | 34 | 110 | 96 | 846 | 466 | 99 | 98 | 36 |
| 15 | 53 | 157 | 34 | 20 | 36 | 79 | 127 | 864 | 429 | 99 | 93 | 36 |
| 16 | 19 | 187 | 30 | 19 | 35 | 57 | 139 | 875 | 386 | 108 | 84 | 36 |
| 17 | 9.1 | 144 | 28 | 18 | 35 | 50 | 89 | 836 | 341 | 116 | 84 | 37 |
| 18 | 7.0 | 94 | 26 | 17 | 34 | 43 | 73 | 721 | 276 | 132 | 79 | 40 |
| 19 | 4.9 | 87 | 23 | 17 | 30 | 39 | 69 | 687 | 260 | 173 | 72 | 42 |
| 20 | 8.0 | 64 | 20 | 16 | 27 | 36 | 70 | 781 | 255 | 213 | 68 | 45 |
| 21 | 60 | 60 | 20 | 15 | 24 | 45 | 70 | 837 | 242 | 276 | 58 | 51 |
| 22 | 322 | 60 | 20 | 15 | 22 | 54 | 74 | 855 | 208 | 328 | 60 | 51 |
| 23 | 361 | 60 | 20 | 15 | 18 | 66 | 52 | 891 | 170 | 332 | 65 | 49 |
| 24 | 299 | 60 | 20 | 15 | 15 | 120 | 18 | 927 | 122 | 329 | 72 | 45 |
| 25 | 302 | 60 | 20 | 15 | 18 | 180 | 4.5 | 935 | 110 | 326 | 73 | 44 |
| 26 | 342 | 60 | 20 | 15 | 18 | 220 | 22 | 995 | 100 | 326 | 73 | 45 |
| 27 | 361 | 60 | 20 | 15 | 18 | 320 | 39 | 1040 | 88 | 322 | 72 | 46 |
| 28 | 335 | 60 | 20 | 16 | 21 | 310 | 35 | 1070 | 91 | 296 | 70 | 45 |
| 29 | 419 | 60 | 20 | 18 | 25 | 280 | 91 | 1090 | 105 | 276 | 68 | 43 |
| 30 | 380 | 60 | 20 | 19 | --- | 240 | 492 | 1100 | 154 | 270 | 64 | 43 |
| 31 | 325 | --- | 20 | 20 | --- | 200 | --- | 1080 | --- | 267 | 59 | --- |
| TOTAL | 5446.0 | 3421 | 1018 | 604 | 767 | 3811 | 2782.5 | 26964 | 14768 | 6356 | 3269 | 1343 |
| MEAN | 176 | 114 | 32.8 | 19.5 | 26.4 | 123 | 92.7 | 870 | 492 | 205 | 105 | 44.8 |
| MAX | 419 | 252 | 58 | 26 | 36 | 320 | 492 | 1100 | 1030 | 332 | 240 | 57 |
| MIN | 4.9 | 60 | 20 | 15 | 15 | 28 | 4.5 | 687 | 88 | 98 | 58 | 36 |
| AC-FT | 10800 | 6790 | 2020 | 1200 | 1520 | 7560 | 5520 | 53480 | 29290 | 12610 | 6480 | 2660 |
| CAL YR 1983 | TOTAL | 193406.0 | | MEAN | 530 | MAX | 2700 | MIN | 4.9 | AC-FT | 383600 | |
| WTR YR 1984 | TOTAL | 70549.5 | | MEAN | 193 | MAX | 1100 | MIN | 4.5 | AC-FT | 139900 | |

RED RIVER OF THE NORH BASIN

05124000 SOURIS RIVER NEAR WESTHOPE, ND--CONTINUED
(International gaging station)
(Radiochemical station)

PERIOD OF RECORD.--Water years 1954-64, 1966 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|--------------|------|--|--|---|--|--|---|---|--|---|---|---|
| OCT 13... | 1740 | 90 | 1160 | 8.3 | 12.5 | 7.5 | 45 | 92 | 8.9 | 74 | 760 | 8300 |
| NOV 30... | 1115 | 58 | 1540 | 8.0 | - .4 | .0 | -- | -- | 18.4 | -- | -- | -- |
| JAN 05... | 1220 | 26 | 1550 | 7.4 | -- | .0 | -- | -- | 9.0 | -- | -- | -- |
| FEB 15... | 1400 | 37 | 1260 | 7.6 | 3.0 | .0 | -- | 4.0 | 5.6 | 38 | <2 | 96 |
| APR 05... | 1230 | 187 | 660 | 7.6 | 16.0 | 4.0 | -- | 22 | 12.1 | 91 | <5 | 130 |
| 25... | 1510 | 4.0 | 775 | 8.7 | 16.5 | 12.0 | -- | -- | 11.7 | -- | K20 | K220 |
| JUN 14... | 1200 | 490 | 965 | 8.3 | 17.5 | 18.5 | -- | -- | 8.9 | -- | K10 | K26 |
| JUL 18... | 1330 | 126 | 980 | 9.7 | 29.0 | 22.5 | -- | 21 | 11.5 | 131 | 80 | 310 |
| AUG 21... | 1735 | 56 | 1230 | 8.9 | 20.5 | 20.5 | -- | -- | 9.9 | 109 | 50 | 200 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
|--------------|---|--|---|---|---|------------------------------|--|--|--|--|--|
| OCT 13... | 360 | 0 | 70 | 46 | 130 | 43 | 3 | 14 | 420 | 4.0 | 200 |
| FEB 15... | 430 | 0 | 95 | 47 | 130 | 39 | 3 | 12 | 449 | 22 | 240 |
| APR 05... | 140 | 16 | 29 | 17 | 44 | 39 | 2 | 7.8 | 127 | 6.2 | 100 |
| JUL 18... | 270 | 14 | 34 | 44 | 130 | 50 | 4 | 10 | 253 | .0 | 240 |

| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) |
|--------------|--|---|--|---|--|--|--|--|--|---|--|
| OCT 13... | 29 | .30 | 13 | 783 | 760 | 1.1 | 190 | .15 | 2.3 | 7.5 | .530 |
| FEB 15... | 29 | .30 | 14 | 867 | 840 | 1.2 | 87 | .24 | .35 | 1.2 | .120 |
| APR 05... | 10 | .10 | 8.7 | 304 | 290 | .41 | 153 | <.10 | .35 | 1.6 | .270 |
| JUL 18... | 24 | .20 | 3.5 | 685 | 640 | .93 | 233 | <.10 | .06 | 1.9 | .170 |

| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) |
|--------------|--|---|--|---|--|--|--|--|--|---|--|
| OCT 13... | 29 | .30 | 13 | 783 | 760 | 1.1 | 190 | .15 | 2.3 | 7.5 | .530 |
| FEB 15... | 29 | .30 | 14 | 867 | 840 | 1.2 | 87 | .24 | .35 | 1.2 | .120 |
| APR 05... | 10 | .10 | 8.7 | 304 | 290 | .41 | 153 | <.10 | .35 | 1.6 | .270 |
| JUL 18... | 24 | .20 | 3.5 | 685 | 640 | .93 | 233 | <.10 | .06 | 1.9 | .170 |

| DATE | PHOS- PHORUS TOTAL (MG/L AS P) (71886) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) |
|--------------|---|---|---|--|--|---|---|---|---|--|---|
| OCT 13... | 1.6 | .030 | .020 | .06 | 20 | 4 | 190 | 190 | <1 | <1 | <3 |
| FEB 15... | .37 | .060 | .070 | .21 | <10 | <1 | 120 | -- | <1 | <1 | <3 |
| APR 05... | .83 | .130 | .060 | .18 | <10 | 2 | 60 | -- | <1 | <1 | <3 |
| JUL 18... | -- | .130 | .120 | .37 | <10 | 5 | 35 | -- | <1 | <1 | <3 |

05124000 SOURIS RIVER NEAR WESTHOPE, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) |
|--------------|---|---|---|---|---|--|--|---|---|--|
| OCT 13... | <1 | 11 | <1 | 69 | 720 | <.1 | <10 | 5 | <1 | <1 |
| FEB 15... | 1 | 17 | <1 | 64 | 420 | <.1 | <10 | <1 | <1 | <1 |
| APR 05... | 1 | 17 | <1 | 21 | 44 | <.1 | <10 | 4 | <1 | <1 |
| JUL 18... | <1 | 9 | 3 | 59 | 6 | <.1 | <10 | 5 | <1 | <1 |
| DATE | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030) | GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040) | GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515) | GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516) | GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050) | GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060) | RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511) |
| OCT 13... | 370 | <6 | 8 | -- | -- | -- | -- | -- | -- | -- |
| FEB 15... | 460 | <6 | 43 | -- | -- | -- | -- | -- | -- | -- |
| APR 05... | 540 | <6 | 44 | 9.7 | 2.4 | 13 | 2.2 | 11 | 1.9 | .06 |
| JUL 18... | 220 | <6 | 14 | -- | -- | -- | -- | -- | -- | -- |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) |
|--------------|------|--|--|--|--|
| OCT 13... | 1740 | 90 | 205 | 50 | 98 |
| FEB 15... | 1400 | 37 | 36 | 3.6 | -- |
| APR 05... | 1230 | 187 | 34 | 17 | 100 |
| JUL 18... | 1230 | 126 | 78 | 27 | -- |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|--------------|------|--|---|--|--|---|--|
| OCT 13... | 1710 | 10.0 | .20 | 7.0 | 1160 | 8.3 | 8.9 |
| 13... | 1715 | 25.0 | .40 | 7.0 | 1160 | 8.3 | 8.9 |
| 13... | 1720 | 40.0 | .50 | 7.5 | 1160 | 8.3 | 8.9 |
| 13... | 1725 | 55.0 | .50 | 7.5 | 1160 | 8.3 | 8.9 |
| 13... | 1730 | 70.0 | .50 | 7.5 | 1160 | 8.3 | 8.9 |
| 13... | 1735 | 85.0 | .50 | 7.0 | 1160 | 8.3 | 8.9 |
| 13... | 1740 | 100 | .50 | 7.5 | 1160 | 8.3 | 8.9 |
| 13... | 1745 | 110 | .20 | 7.0 | 1160 | 8.3 | 8.9 |
| FEB 15... | 1530 | .00 | .50 | .0 | 1260 | 7.6 | 4.6 |
| 15... | 1535 | 4.00 | 1.3 | .0 | 1260 | 7.6 | 5.6 |
| 15... | 1540 | 8.00 | 1.1 | .0 | 1260 | 7.6 | 5.6 |
| 15... | 1545 | 12.0 | .90 | .0 | 1260 | 7.6 | 5.6 |
| 15... | 1550 | 16.0 | .90 | .0 | 1260 | 7.6 | 5.6 |
| 15... | 1555 | 20.0 | 1.1 | .0 | 1260 | 7.6 | 5.6 |
| 15... | 1610 | 40.0 | .50 | .0 | 1260 | 7.6 | 5.4 |

RED RIVER OF THE NORTH BASIN

05124000 SOURIS RIVER NEAR WESTHOPE, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| APR | | | | | | | |
| 05... | 1230 | 10.0 | .60 | 4.0 | -- | 7.6 | 12.1 |
| 05... | 1235 | 20.0 | .50 | 4.0 | -- | 7.8 | 12.1 |
| 05... | 1240 | 30.0 | .70 | 4.0 | -- | 8.3 | 12.1 |
| 05... | 1245 | 40.0 | .70 | 4.0 | -- | 8.5 | 12.1 |
| 05... | 1250 | 50.0 | .80 | 4.0 | -- | 8.5 | 12.1 |
| 05... | 1255 | 60.0 | 1.0 | 4.0 | -- | 8.5 | 12.1 |
| 05... | 1300 | 70.0 | 1.2 | 4.0 | -- | 8.5 | 12.1 |
| 05... | 1301 | 80.0 | .60 | 4.0 | -- | 8.5 | 12.1 |
| 05... | 1305 | 90.0 | .40 | 4.0 | -- | 8.5 | 12.1 |
| JUL | | | | | | | |
| 18... | 1230 | 10.0 | .30 | 22.0 | 980 | 9.8 | 10.8 |
| 18... | 1235 | 20.0 | .30 | 22.5 | 980 | 9.8 | 11.0 |
| 18... | 1240 | 30.0 | .30 | 22.5 | 980 | 9.7 | 11.2 |
| 18... | 1245 | 40.0 | .30 | 22.5 | 980 | 9.7 | 11.3 |
| 18... | 1250 | 50.0 | .40 | 22.5 | 980 | 9.7 | 11.3 |
| 18... | 1255 | 60.0 | .40 | 22.5 | 980 | 9.7 | 11.5 |
| 18... | 1300 | 70.0 | .40 | 22.5 | 980 | 9.7 | 11.5 |
| 18... | 1310 | 80.0 | .40 | 22.5 | 980 | 9.7 | 11.1 |

MISSOURI RIVER MAIN STEM

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06185500 MISSOURI RIVER NEAR CULBERTSON, MT

LOCATION.--Lat 48°07'30", long 104°28'20", in SE¼NW¼ sec.3, T.27 N., R.56 E., Richland County, Hydrologic Unit 10060005, on right bank at downstream side of bridge on State Highway 16, 2.5 mi southeast of Culbertson, 10 mi downstream from Big Muddy Creek, and at mile 1,620.76.

DRAINAGE AREA.--91,557 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,883.4 ft National Geodetic Vertical Datum of 1929, (U.S. Army Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at datum 0.11 ft. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present datum. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present datum. Apr. 1, 1958, to Nov. 1, 1967, water-stage recorder at site 580 ft downstream at present datum.

REMARKS.--Water-discharge records good except those for winter periods, which are fair. Flow partly regulated by Fort Peck Lake (station number 06131500) and many other reservoirs above station. Diversions for irrigation of about 1,030,400 acres above station. Water quality records for the current year are also available. These records which have been published in U.S. Geological Survey Report MT-84-1, can also be accessed through the U.S. Geological Survey's WATSTORE data system.

AVERAGE DISCHARGE.--34 years (1943-51, 1958-84, after operational level at Fort Peck Lake was reached), 10,970 ft³/s, 7,950,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,200 ft³/s Mar. 26, 1943, gage height, 14.80 ft, from rating curve extended above 30,000 ft³/s; maximum gage height observed, 19.66 ft Apr. 14, 1979 (backwater from ice jam); minimum daily discharge, 575 ft³/s Nov. 22, 1941.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 15,000 ft³/s Feb. 12; maximum gage height, 10.82 ft Jan. 2 (backwater from ice); minimum daily discharge, 5,470 ft³/s Oct. 26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| 1 | 7650 | 6550 | 9800 | 13000 | 14000 | 14000 | 6900 | 8910 | 9240 | 10800 | 10300 | 9920 |
| 2 | 7420 | 6340 | 10000 | 12500 | 13500 | 14000 | 6850 | 8890 | 9270 | 11000 | 10500 | 10200 |
| 3 | 7470 | 6760 | 10000 | 12000 | 13000 | 14000 | 7150 | 8780 | 8930 | 10700 | 10700 | 10100 |
| 4 | 6710 | 6590 | 10500 | 13000 | 13500 | 13000 | 7110 | 8870 | 8920 | 10400 | 10600 | 10000 |
| 5 | 6310 | 6520 | 11500 | 13000 | 14000 | 12000 | 6920 | 8920 | 8920 | 9570 | 10400 | 9500 |
| 6 | 6290 | 6820 | 12000 | 13000 | 14000 | 11000 | 6740 | 9270 | 8940 | 8720 | 10400 | 9380 |
| 7 | 6210 | 7640 | 11500 | 13500 | 14000 | 10500 | 6760 | 10400 | 9510 | 8240 | 10200 | 9720 |
| 8 | 6510 | 7700 | 12000 | 13500 | 14000 | 10500 | 6650 | 11100 | 9670 | 8520 | 9820 | 10300 |
| 9 | 6550 | 8100 | 12000 | 13500 | 13500 | 11000 | 6650 | 11000 | 9080 | 8400 | 9910 | 10200 |
| 10 | 6480 | 8610 | 12500 | 13500 | 13500 | 10500 | 6520 | 10500 | 9130 | 8230 | 10200 | 10100 |
| 11 | 6230 | 8000 | 12000 | 14000 | 13500 | 11000 | 6620 | 11000 | 9340 | 8490 | 10300 | 9850 |
| 12 | 6120 | 7810 | 11500 | 14000 | 15000 | 10500 | 6600 | 11000 | 9580 | 8350 | 10300 | 9640 |
| 13 | 6260 | 8460 | 11500 | 14000 | 14000 | 10500 | 6950 | 10900 | 9610 | 8180 | 10700 | 9310 |
| 14 | 6300 | 8660 | 11500 | 14000 | 13500 | 10500 | 7530 | 10600 | 9780 | 8200 | 10400 | 9120 |
| 15 | 6390 | 8680 | 11500 | 14000 | 13500 | 11000 | 7510 | 9490 | 9350 | 8270 | 10300 | 9400 |
| 16 | 6250 | 8870 | 11500 | 14000 | 13500 | 11000 | 7430 | 9150 | 9770 | 8320 | 10600 | 9260 |
| 17 | 6400 | 8890 | 11500 | 14000 | 13500 | 11000 | 6920 | 9110 | 9790 | 8300 | 10500 | 9060 |
| 18 | 6430 | 9040 | 11500 | 14000 | 13500 | 10500 | 6520 | 8610 | 9490 | 8240 | 10700 | 9100 |
| 19 | 6310 | 8960 | 11500 | 13500 | 13500 | 11000 | 7140 | 8890 | 9130 | 8200 | 10800 | 9030 |
| 20 | 6290 | 8870 | 11500 | 12500 | 13500 | 10500 | 7290 | 8790 | 9110 | 8200 | 10900 | 9050 |
| 21 | 6280 | 8810 | 11500 | 12500 | 14000 | 10000 | 7330 | 8940 | 9860 | 8250 | 10500 | 9030 |
| 22 | 6480 | 8740 | 11500 | 13000 | 14500 | 9000 | 7430 | 9010 | 12000 | 8260 | 10200 | 9120 |
| 23 | 6550 | 8850 | 12000 | 13000 | 14500 | 8500 | 8470 | 9220 | 13900 | 8320 | 9640 | 9070 |
| 24 | 6410 | 8910 | 11500 | 13000 | 14500 | 8500 | 8890 | 9330 | 12200 | 8330 | 9640 | 8990 |
| 25 | 5590 | 8940 | 12000 | 13500 | 14500 | 8500 | 9120 | 9180 | 11000 | 8500 | 9580 | 8980 |
| 26 | 5470 | 8910 | 12500 | 13000 | 14000 | 8120 | 9450 | 9100 | 10800 | 9840 | 9240 | 9320 |
| 27 | 6240 | 9010 | 13000 | 13000 | 14000 | 7800 | 9710 | 9230 | 10800 | 10200 | 9720 | 9920 |
| 28 | 6340 | 9380 | 13000 | 13500 | 14000 | 7500 | 9250 | 9450 | 10900 | 10400 | 9920 | 9340 |
| 29 | 6290 | 9350 | 12500 | 14000 | 14000 | 7340 | 9640 | 9250 | 10400 | 10500 | 9850 | 8950 |
| 30 | 6460 | 9670 | 13000 | 14000 | --- | 7080 | 9120 | 9010 | 10600 | 10200 | 10200 | 8990 |
| 31 | 6690 | --- | 13500 | 14000 | --- | 6910 | --- | 9070 | --- | 10300 | 9640 | --- |
| TOTAL | 199380 | 248440 | 363300 | 415000 | 402000 | 317250 | 227170 | 294970 | 299020 | 280430 | 316660 | 283950 |
| MEAN | 6432 | 8281 | 11720 | 13390 | 13860 | 10230 | 7572 | 9515 | 9967 | 9046 | 10210 | 9465 |
| MAX | 7650 | 9670 | 13500 | 14000 | 15000 | 14000 | 9710 | 11100 | 13900 | 11000 | 10900 | 10300 |
| MIN | 5470 | 6340 | 9800 | 12000 | 13000 | 6910 | 6520 | 8610 | 8920 | 8180 | 9240 | 8950 |
| AC-FT | 395500 | 492800 | 720600 | 823200 | 797400 | 629300 | 450600 | 585100 | 593100 | 556200 | 628100 | 563200 |
| CAL YR 1983 | TOTAL | 3495870 | MEAN | 9578 | MAX | 15000 | MIN | 5470 | AC-FT | 6934000 | | |
| WTR YR 1984 | TOTAL | 3647570 | MEAN | 9966 | MAX | 15000 | MIN | 5470 | AC-FT | 7235000 | | |

MISSOURI RIVER MAIN STEM

06185600 MISSOURI RIVER STAGE GAGE NO. 4 NEAR NOHLY, MT

LOCATION.--Lat 48°02'10", long 104°09'40", in NE¼ sec.1, T.26 N., R.58 E., Richland County, Hydrologic Unit 10060005, on right bank 4.5 mi northwest of Nohly, and at mile 1,595.7.

DRAINAGE AREA.--93,000 mi², approximately.

PERIOD OF RECORD.--March 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft National Geodetic Vertical Datum of 1929. Prior to Apr. 18, 1962 at datum 60.00 ft lower.

REMARKS.--Stage regulated by Fort Peck Reservoir.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 21.20 ft Mar. 23, 1960, present datum; minimum daily recorded, 6.87 ft Apr. 18, 1963.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-----|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|
| 1 | | | | | | | | --- | 11.44 | 12.58 | 12.35 | --- |
| 2 | | | | | | | | --- | 11.48 | 12.68 | 12.41 | --- |
| 3 | | | | | | | | --- | 11.48 | 12.66 | 12.44 | --- |
| 4 | | | | | | | | --- | --- | 12.53 | 12.57 | --- |
| 5 | | | | | | | | --- | --- | --- | 12.43 | --- |
| 6 | | | | | | | | --- | --- | --- | 12.34 | --- |
| 7 | | | | | | | | --- | --- | --- | 12.36 | --- |
| 8 | | | | | | | | --- | --- | --- | 12.29 | --- |
| 9 | | | | | | | | --- | --- | --- | 12.29 | --- |
| 10 | | | | | | | | --- | --- | --- | 12.41 | --- |
| 11 | | | | | | | | --- | --- | --- | 12.49 | --- |
| 12 | | | | | | | | --- | --- | --- | 12.49 | --- |
| 13 | | | | | | | | --- | 11.72 | --- | 12.57 | --- |
| 14 | | | | | | | | --- | 11.82 | --- | 12.55 | --- |
| 15 | | | | | | | | --- | 11.90 | --- | 12.38 | --- |
| 16 | | | | | | | | --- | 11.85 | --- | 12.54 | --- |
| 17 | | | | | | | | --- | 12.05 | 11.49 | 12.57 | --- |
| 18 | | | | | | | | --- | 12.09 | 11.43 | 12.53 | 11.90 |
| 19 | | | | | | | | --- | 11.87 | 11.39 | 12.58 | 11.89 |
| 20 | | | | | | | | --- | 11.87 | 11.39 | 12.65 | --- |
| 21 | | | | | | | | --- | 11.94 | 11.42 | 12.66 | --- |
| 22 | | | | | | | | --- | 12.59 | 11.43 | 12.44 | --- |
| 23 | | | | | | | | --- | 13.60 | 11.45 | 12.35 | --- |
| 24 | | | | | | | | 11.60 | 13.59 | 11.45 | 12.19 | --- |
| 25 | | | | | | | | 11.51 | 12.90 | 11.45 | 12.26 | --- |
| 26 | | | | | | | | 11.45 | 12.78 | 11.86 | 12.19 | --- |
| 27 | | | | | | | | 11.39 | 12.67 | 12.31 | 12.14 | --- |
| 28 | | | | | | | | 11.55 | 12.66 | 12.42 | 12.43 | --- |
| 29 | | | | | | | | 11.54 | 12.48 | 12.53 | 12.34 | --- |
| 30 | | | | | | | | 11.37 | 12.48 | 12.45 | 12.46 | --- |
| 31 | | | | | | | | 11.41 | --- | 12.45 | --- | --- |
| MEAN | | | | | | | | --- | --- | --- | --- | --- |
| MAX | | | | | | | | --- | --- | --- | --- | --- |
| MIN | | | | | | | | --- | --- | --- | --- | --- |

MISSOURI RIVER MAIN STEM

193

06185650 MISSOURI RIVER STAGE GAGE NO. 5 AT NOHLY, MT

LOCATION.--Lat 48°00'10", long 104°05'30", in SE¼ sec.16, T.26 N., R.59 E., Richland County, Hydrologic Unit 10060005, at downstream side of bridge, 0.2 mi northwest of Nohly, and at mile 1,587.7.

DRAINAGE AREA.--93,000 mi², approximately.

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,800.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated by Fort Peck Reservoir.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 77.22 ft Mar. 15, 1972; minimum daily recorded, 59.12 ft Nov. 22, 1964.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1 | 63.87 | 63.40 | | | | | --- | 64.41 | 64.57 | 66.83 | 65.42 | 65.12 |
| 2 | 63.82 | 63.30 | | | | | --- | 64.38 | 64.57 | 66.84 | 65.49 | 65.16 |
| 3 | 63.80 | 63.40 | | | | | --- | 64.35 | 64.78 | 66.91 | 65.52 | 65.27 |
| 4 | 63.55 | 63.40 | | | | | --- | 64.36 | 65.50 | 66.96 | 65.67 | 65.17 |
| 5 | 63.36 | 63.32 | | | | | --- | 64.35 | 65.89 | 66.60 | 65.60 | 65.11 |
| 6 | 63.31 | 63.56 | | | | | --- | 64.41 | 65.57 | 65.91 | 65.51 | 64.92 |
| 7 | 63.29 | 63.82 | | | | | --- | 64.69 | 65.25 | 65.38 | 65.50 | 64.96 |
| 8 | 63.38 | 63.87 | | | | | --- | 65.05 | 65.28 | 65.21 | 65.39 | 65.14 |
| 9 | 63.43 | 64.03 | | | | | --- | 65.20 | 65.14 | 65.20 | 65.27 | 65.27 |
| 10 | 63.38 | 64.29 | | | | | --- | 65.11 | 64.99 | 65.04 | 65.30 | 65.17 |
| 11 | 63.29 | 64.33 | | | | | --- | 65.05 | 65.07 | 65.06 | 65.45 | 65.15 |
| 12 | 63.21 | --- | | | | | --- | 65.21 | 65.18 | 65.15 | 65.42 | 65.06 |
| 13 | 63.24 | --- | | | | | --- | 65.13 | 65.19 | 65.96 | 65.50 | 64.96 |
| 14 | 63.27 | --- | | | | | --- | 65.12 | 65.25 | 64.77 | 65.57 | 64.78 |
| 15 | 63.32 | --- | | | | | --- | 64.82 | 65.25 | 64.69 | 65.39 | 64.76 |
| 16 | 63.27 | --- | | | | | --- | 64.55 | 65.12 | 64.66 | 65.47 | 64.87 |
| 17 | 63.32 | --- | | | | | --- | 64.45 | 65.26 | 64.64 | 65.54 | 64.79 |
| 18 | 63.35 | --- | | | | | 63.35 | 64.49 | 65.42 | 64.60 | 65.52 | 64.72 |
| 19 | 63.29 | --- | | | | | 63.51 | 65.05 | 65.73 | 64.58 | 65.58 | 64.73 |
| 20 | 63.27 | --- | | | | | 63.74 | 65.09 | 66.31 | 64.57 | 65.61 | 64.76 |
| 21 | 63.30 | --- | | | | | 63.79 | 64.93 | 66.59 | 64.55 | 65.62 | 64.70 |
| 22 | 63.38 | --- | | | | | 63.78 | --- | 67.02 | 64.58 | 65.38 | 64.74 |
| 23 | 63.40 | --- | | | | | 64.00 | --- | 67.49 | 64.58 | 65.28 | 64.70 |
| 24 | 63.31 | --- | | | | | 64.37 | 65.13 | 67.70 | 64.59 | 65.08 | 64.73 |
| 25 | 62.98 | --- | | | | | 64.51 | 65.52 | 67.40 | 64.59 | 65.12 | 64.65 |
| 26 | 62.92 | --- | | | | | 64.63 | 65.31 | 67.14 | 64.87 | 65.05 | 64.71 |
| 27 | 63.20 | --- | | | | | 64.78 | 65.04 | 66.81 | 65.29 | 64.92 | 64.90 |
| 28 | 63.28 | --- | | | | | 64.70 | 65.15 | 66.71 | 65.40 | 65.20 | 64.99 |
| 29 | 63.26 | --- | | | | | 64.61 | 65.15 | 66.74 | 65.49 | 65.11 | 64.69 |
| 30 | 63.32 | --- | | | | | 64.68 | 64.85 | 66.71 | 65.49 | 65.28 | 64.65 |
| 31 | 63.42 | --- | | | | | --- | 64.63 | --- | 65.43 | 65.15 | --- |
| MEAN | 63.35 | --- | | | | | --- | --- | 65.85 | 65.30 | 65.38 | 64.91 |
| MAX | 63.87 | --- | | | | | --- | --- | 67.70 | 66.96 | 65.67 | 65.27 |
| MIN | 62.92 | --- | | | | | --- | --- | 64.57 | 64.55 | 64.92 | 64.65 |

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT

LOCATION.--Lat 47°40'42", long 104°09'22", in SW¹/₄NE¹/₄SW¹/₄ sec.9, T.22 N., R.59 E., Richland County, Hydrologic Unit 10100004, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mi downstream from bridge on State Highway 23, 2.5 mi south of Sidney, 3.0 mi downstream from Fox Creek, and at mile 29.2.

DRAINAGE AREA.--69,103 mi². Area at site 4.5 mi upstream, 68,812 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversions to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in WSP 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, 1966-70 published in WSP 2116, and 1971 to current year are published in annual reports.

GAGE.--Water-stage recorder. Datum of gage is 1,881.3 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 mi upstream at different datum. Apr. 9, 1934, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mi upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at datum 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 mi upstream at different datum.

REMARKS.--Water-discharge records good except those for the winter periods, which are poor. Some regulation on tributary streams. Diversion for irrigation of about 1,250,000 acres above station. Lower Yellowstone Project Main Canal diverts from left bank in NW¹/₄ sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 mi upstream from irrigation of about 52,000 acres of which about one-third lies above station (see table below). Water quality records for the current year are also available. These records which have been published in U.S. Geological Survey Report MT-84-1, can also be accessed through the U.S. Geological Survey's WATSTORE data system.

AVERAGE DISCHARGE.--72 years, 13,080 ft³/s, 9,476,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 159,000 ft³/s June 2, 1921, gage height, 12.6 ft, site and datum then in use; maximum gage height observed, 21.85 ft Mar. 22, 1947, site and datum then in use (backwater from ice); minimum discharge, 470 ft³/s May 17, 1961, gage height, 2.73 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 44,200 ft³/s June 21, gage height, 13.09 ft; minimum daily 5,400 ft³/s Dec. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|
| 1 | 10000 | 10800 | 9000 | 8600 | 9400 | 8200 | 8380 | 10900 | 20800 | 39800 | 13500 | 6810 |
| 2 | 10800 | 10800 | 8800 | 9000 | 9000 | 8200 | 8200 | 10300 | 21500 | 40200 | 13200 | 6730 |
| 3 | 11200 | 10700 | 8600 | 9200 | 8600 | 8400 | 8050 | 10300 | 30100 | 41900 | 13400 | 6860 |
| 4 | 11800 | 10600 | 8400 | 9400 | 8400 | 8400 | 8070 | 10800 | 39000 | 41500 | 13700 | 6920 |
| 5 | 12100 | 10600 | 8400 | 9800 | 8200 | 8200 | 7950 | 11600 | 37100 | 35800 | 13800 | 6780 |
| 6 | 12200 | 10600 | 8200 | 10300 | 8000 | 8000 | 7870 | 12600 | 32800 | 32400 | 13300 | 6800 |
| 7 | 12200 | 10600 | 8000 | 10800 | 8000 | 8000 | 7760 | 14200 | 29100 | 30600 | 13300 | 6760 |
| 8 | 11800 | 10700 | 8200 | 10500 | 8000 | 7800 | 7620 | 14500 | 27600 | 29900 | 13000 | 6790 |
| 9 | 11600 | 10700 | 8400 | 10500 | 8000 | 7600 | 7480 | 14300 | 26400 | 29500 | 12400 | 6880 |
| 10 | 11300 | 10800 | 8600 | 10000 | 8000 | 7400 | 7520 | 14900 | 25600 | 29300 | 12100 | 6920 |
| 11 | 11000 | 10900 | 8400 | 9600 | 8200 | 7400 | 7670 | 14600 | 25500 | 30500 | 11600 | 7120 |
| 12 | 11000 | 11300 | 8400 | 9200 | 8200 | 7400 | 7910 | 14600 | 25800 | 29500 | 11100 | 7460 |
| 13 | 10900 | 11600 | 8400 | 8600 | 8400 | 7400 | 8000 | 15000 | 24900 | 27300 | 10600 | 7490 |
| 14 | 11000 | 11100 | 8400 | 8200 | 8600 | 7400 | 8430 | 15700 | 24800 | 24700 | 10200 | 7690 |
| 15 | 11500 | 11000 | 8200 | 7800 | 8400 | 7600 | 8200 | 15300 | 24500 | 22800 | 9680 | 7770 |
| 16 | 11400 | 11000 | 8000 | 7400 | 8200 | 7600 | 8050 | 15500 | 24400 | 21800 | 9210 | 7630 |
| 17 | 11200 | 11000 | 7800 | 7200 | 8400 | 7400 | 7810 | 17300 | 25500 | 20800 | 8960 | 7750 |
| 18 | 11600 | 10800 | 7000 | 7000 | 8800 | 7400 | 7620 | 23300 | 29700 | 19700 | 8820 | 7780 |
| 19 | 11700 | 10700 | 7000 | 7000 | 8800 | 7600 | 7500 | 30100 | 36900 | 18600 | 8730 | 7800 |
| 20 | 11400 | 10700 | 6600 | 6600 | 8800 | 7800 | 7280 | 31600 | 40600 | 16900 | 8600 | 7710 |
| 21 | 11100 | 10700 | 6400 | 6000 | 8800 | 8000 | 7410 | 28500 | 43000 | 15700 | 8240 | 7520 |
| 22 | 11100 | 10600 | 6000 | 6400 | 8600 | 8200 | 8040 | 26700 | 41700 | 14600 | 7640 | 7260 |
| 23 | 9590 | 10600 | 5800 | 7000 | 8600 | 8600 | 8870 | 27000 | 41400 | 14000 | 7440 | 7250 |
| 24 | 9010 | 10600 | 5600 | 7600 | 8600 | 8800 | 9330 | 32800 | 42400 | 13900 | 7250 | 7720 |
| 25 | 10800 | 10400 | 5400 | 7800 | 8400 | 9130 | 9770 | 33300 | 42700 | 14300 | 7230 | 8220 |
| 26 | 11100 | 10400 | 6000 | 8200 | 8400 | 9130 | 9440 | 28700 | 40000 | 15800 | 7130 | 8930 |
| 27 | 11300 | 10300 | 6400 | 8600 | 8400 | 8980 | 9650 | 28000 | 36600 | 16400 | 7090 | 9360 |
| 28 | 11300 | 10100 | 7000 | 8800 | 8200 | 8770 | 10600 | 29600 | 37400 | 15700 | 7000 | 9500 |
| 29 | 11300 | 10000 | 7400 | 9000 | 8200 | 8670 | 11600 | 27300 | 39200 | 14500 | 6960 | 9760 |
| 30 | 11000 | 9600 | 7600 | 9200 | --- | 8600 | 11400 | 25000 | 39700 | 14000 | 6940 | 10100 |
| 31 | 11000 | --- | 8000 | 9400 | --- | 8420 | --- | 23100 | --- | 13700 | 6910 | --- |
| (†) | 0 | 0 | 0 | 0 | 0 | 0 | 13920 | 74040 | 69510 | 76630 | 78710 | 59960 |
| TOTAL | 346300 | 320300 | 234400 | 264700 | 244600 | 250500 | 253480 | 627400 | 976700 | 746100 | 309030 | 230070 |
| MEAN | 11170 | 10680 | 7561 | 8539 | 8434 | 8081 | 8449 | 20240 | 32560 | 24070 | 9969 | 7669 |
| MAX | 12200 | 11600 | 9000 | 10800 | 9400 | 9130 | 11600 | 33300 | 43000 | 41900 | 13800 | 10100 |
| MIN | 9010 | 9600 | 5400 | 6000 | 8000 | 7400 | 7280 | 10300 | 20800 | 13700 | 6910 | 6730 |
| CAL YR 1983 | TOTAL | 4690050 | MEAN | 12850 | MAX | 41300 | MIN | 5400 | AC-FT | 9303000 | | |
| WTR YR 1984 | TOTAL | 4803580 | MEAN | 13120 | MAX | 43000 | MIN | 5400 | AC-FT | 9528000 | | |

†Diversions, in acre-feet, by Lower Yellowstone Canal, furnished by the Bureau of Reclamation.

YELLOWSTONE RIVER BASIN

195

06329590 YELLOWSTONE RIVER STAGE GAGE NO. 1 NEAR FAIRVIEW, MT

LOCATION.--Lat 47°48'34", long 104°02'36", sec. 18, T.150 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on left bank 3 mi south of Fairview, and at mile 15.2.

DRAINAGE AREA.--70,000 mi², approximately.

PERIOD OF RECORD.--March 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft National Geodetic Vertical Datum of 1929. Prior to Feb. 19, 1962 at datum 60.00 ft lower.

REVISED RECORDS.--WDR ND-82: 1980-81.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 23.78 ft Mar. 21, 1960, present datum; minimum daily recorded, 9.10 ft May 16-17, Aug. 12-13, 1961, present datum.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-----|-----|-----|-----|-----|-------|-----|-------|-------|-------|-------|
| 1 | --- | | | | | | --- | | --- | 18.24 | --- | 10.95 |
| 2 | --- | | | | | | --- | | --- | 18.21 | --- | 10.90 |
| 3 | --- | | | | | | --- | | --- | 18.34 | --- | 10.90 |
| 4 | --- | | | | | | --- | | --- | 18.44 | --- | 10.95 |
| 5 | --- | | | | | | --- | | --- | 17.63 | --- | 10.88 |
| 6 | 12.48 | | | | | | --- | | --- | 17.03 | --- | 10.81 |
| 7 | 12.42 | | | | | | --- | | --- | 16.75 | --- | 10.80 |
| 8 | 12.37 | | | | | | --- | | --- | 16.52 | --- | 10.82 |
| 9 | 12.28 | | | | | | --- | | --- | 16.47 | 13.00 | 10.89 |
| 10 | 12.12 | | | | | | --- | | --- | 16.33 | 12.95 | 10.93 |
| 11 | 12.00 | | | | | | --- | | --- | 16.54 | 12.79 | 10.98 |
| 12 | --- | | | | | | --- | | --- | 16.44 | 12.62 | 11.12 |
| 13 | --- | | | | | | --- | | 16.02 | 16.06 | 12.47 | 11.12 |
| 14 | --- | | | | | | --- | | 16.04 | 15.55 | 12.32 | 11.18 |
| 15 | --- | | | | | | --- | | 15.92 | 15.15 | 12.16 | 11.25 |
| 16 | --- | | | | | | --- | | 15.88 | 14.86 | 12.01 | 11.19 |
| 17 | --- | | | | | | --- | | 16.05 | 14.63 | 11.89 | 11.20 |
| 18 | --- | | | | | | --- | | 16.70 | --- | 11.86 | 11.24 |
| 19 | --- | | | | | | --- | | 17.95 | --- | 11.76 | 11.27 |
| 20 | --- | | | | | | 10.15 | | 18.69 | --- | 11.73 | 11.26 |
| 21 | --- | | | | | | 10.19 | | 18.97 | --- | 11.63 | 11.16 |
| 22 | --- | | | | | | 10.32 | | 18.86 | --- | 11.42 | 11.04 |
| 23 | --- | | | | | | --- | | 18.74 | --- | 11.31 | 11.03 |
| 24 | --- | | | | | | --- | | 18.84 | --- | 11.21 | 11.21 |
| 25 | --- | | | | | | --- | | 18.89 | --- | 11.18 | 11.39 |
| 26 | --- | | | | | | --- | | 18.53 | --- | --- | 11.61 |
| 27 | --- | | | | | | --- | | 17.95 | --- | --- | 11.79 |
| 28 | --- | | | | | | --- | | 17.94 | --- | 10.99 | 11.84 |
| 29 | --- | | | | | | --- | | 18.21 | --- | 10.98 | 11.94 |
| 30 | --- | | | | | | --- | | 18.23 | --- | 10.99 | 12.00 |
| 31 | --- | | | | | | --- | | --- | --- | 10.96 | --- |
| MEAN | --- | | | | | | --- | | --- | --- | --- | 11.19 |
| MAX | --- | | | | | | --- | | --- | --- | --- | 12.00 |
| MIN | --- | | | | | | --- | | --- | --- | --- | 10.80 |

YELLOWSTONE RIVER BASIN

06329610 YELLOWSTONE RIVER STAGE GAGE NO. 2 NEAR CARTWRIGHT, ND

LOCATION.--Lat 47°51'50", long 103°58'06", on south line sec.26, T.151 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on bridge on State Highway 23, 2 mi west of Cartwright, and at mile 8.6.

DRAINAGE AREA.--70,000 mi², approximately.

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,800.00 ft National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 87.08 ft Mar. 23, 1978; minimum daily recorded, 58.58 ft July 26, 1974.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1 | 66.08 | | | | | | --- | 66.97 | 70.30 | 72.70 | 67.51 | 65.28 |
| 2 | 66.26 | | | | | | --- | 66.70 | 70.14 | 72.69 | 67.41 | 65.23 |
| 3 | 66.34 | | | | | | --- | 66.67 | 71.34 | 72.82 | 67.45 | 65.23 |
| 4 | 66.51 | | | | | | --- | 66.68 | 72.95 | 72.95 | 67.57 | 65.28 |
| 5 | 66.64 | | | | | | --- | 66.89 | --- | 72.18 | 67.62 | 65.28 |
| 6 | 66.77 | | | | | | --- | 67.00 | --- | 71.47 | 67.43 | 65.27 |
| 7 | 66.75 | | | | | | --- | 67.40 | --- | 71.16 | 67.07 | 65.21 |
| 8 | 66.70 | | | | | | --- | 67.66 | --- | 70.88 | 67.12 | 65.21 |
| 9 | 66.60 | | | | | | --- | 67.60 | --- | 70.86 | 67.19 | 65.21 |
| 10 | 65.55 | | | | | | --- | 67.77 | --- | 70.68 | 67.12 | 65.25 |
| 11 | 66.49 | | | | | | --- | 67.77 | --- | 70.94 | 67.03 | 65.27 |
| 12 | --- | | | | | | --- | 67.74 | --- | 70.85 | 66.87 | 65.43 |
| 13 | --- | | | | | | --- | 67.78 | 70.30 | 70.43 | 66.74 | 65.42 |
| 14 | --- | | | | | | --- | 68.13 | 70.36 | 69.89 | 66.52 | 65.48 |
| 15 | --- | | | | | | --- | 68.08 | 70.31 | 69.48 | 66.37 | 65.55 |
| 16 | --- | | | | | | --- | 68.15 | 70.29 | 69.25 | 66.26 | 65.54 |
| 17 | --- | | | | | | --- | 68.40 | 70.49 | 69.03 | 66.11 | 65.57 |
| 18 | --- | | | | | | --- | 69.54 | 71.06 | 68.89 | 66.07 | 65.60 |
| 19 | --- | | | | | | --- | 71.22 | 72.35 | 68.70 | 66.04 | 65.60 |
| 20 | --- | | | | | | 65.51 | 71.73 | 72.88 | 68.38 | 65.97 | 65.54 |
| 21 | --- | | | | | | 65.62 | 71.20 | 73.09 | 68.04 | 65.87 | 65.52 |
| 22 | --- | | | | | | 65.99 | 71.01 | 73.00 | 67.73 | 65.64 | 65.40 |
| 23 | --- | | | | | | 66.38 | 71.18 | 72.97 | 67.49 | 65.57 | 65.32 |
| 24 | --- | | | | | | 66.51 | 72.08 | 73.11 | 67.48 | 65.51 | 65.29 |
| 25 | --- | | | | | | 66.65 | 72.45 | 73.28 | 67.49 | 65.49 | 65.39 |
| 26 | --- | | | | | | 66.62 | 71.73 | 72.95 | 67.86 | 65.48 | 65.53 |
| 27 | --- | | | | | | 66.63 | 71.48 | 72.36 | 68.18 | 65.41 | 65.65 |
| 28 | --- | | | | | | 66.81 | 71.78 | 72.29 | 68.15 | 65.34 | 65.82 |
| 29 | --- | | | | | | 67.01 | 71.54 | 72.66 | 67.85 | 65.28 | 65.92 |
| 30 | --- | | | | | | 67.06 | 71.14 | 72.69 | 67.69 | 65.26 | 65.97 |
| 31 | --- | | | | | | --- | 70.81 | --- | 67.57 | 65.28 | --- |
| MEAN | --- | | | | | | --- | 69.23 | --- | 69.67 | 66.37 | 65.44 |
| MAX | --- | | | | | | --- | 72.45 | --- | 72.95 | 67.62 | 65.97 |
| MIN | --- | | | | | | --- | 66.67 | --- | 67.48 | 65.26 | 65.21 |

YELLOWSTONE RIVER BASIN

197

06329620 YELLOWSTONE RIVER STAGE GAGE NO. 3 NEAR BUFORD, ND

LOCATION.--Lat 47°56'16", long 103°57'52", in SW¼ sec.35, T.152 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on left bank 4 mi south of Buford, and at mile 3.3.

DRAINAGE AREA.--70,000 mi², approximately.

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,850.00 ft National Geodetic Vertical Datum of 1929. Prior to Apr. 19, 1962, at datum 50.00 ft lower.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 29.55 ft Mar. 15, 1972; minimum daily recorded, 6.18 ft Aug. 24, 1961, present datum.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1 | 11.00 | 11.34 | | | | | --- | 11.72 | 14.42 | 17.92 | 12.15 | 9.81 |
| 2 | 11.21 | 11.29 | | | | | --- | 11.39 | 14.26 | 17.91 | 12.10 | 9.74 |
| 3 | 11.39 | 11.29 | | | | | --- | 11.28 | 15.37 | 18.03 | 12.08 | 9.77 |
| 4 | 11.57 | 11.23 | | | | | --- | 11.33 | 17.32 | 18.20 | 12.18 | 9.84 |
| 5 | 11.70 | 11.20 | | | | | --- | 11.64 | 17.65 | 17.50 | 12.24 | 9.76 |
| 6 | 11.81 | 11.19 | | | | | --- | 11.91 | 16.95 | 16.58 | 12.17 | 9.65 |
| 7 | 11.83 | 11.20 | | | | | --- | 12.39 | 16.25 | 16.11 | 12.03 | 9.65 |
| 8 | 11.80 | 11.21 | | | | | --- | 12.77 | 15.85 | 15.79 | 12.03 | 9.72 |
| 9 | 11.69 | 11.25 | | | | | --- | 12.70 | 15.64 | 15.72 | 11.84 | 9.80 |
| 10 | 11.58 | 11.29 | | | | | --- | 12.81 | 15.44 | 15.55 | 11.69 | 9.88 |
| 11 | 11.47 | 11.37 | | | | | --- | 12.83 | 15.37 | 15.71 | 11.59 | 9.87 |
| 12 | 11.41 | 11.42 | | | | | --- | 12.75 | 15.50 | 15.72 | 11.43 | 10.05 |
| 13 | 11.40 | --- | | | | | --- | 12.74 | 15.33 | 15.36 | 11.28 | 10.10 |
| 14 | 11.36 | --- | | | | | --- | 13.03 | 15.30 | 14.82 | 11.15 | 10.13 |
| 15 | 11.41 | --- | | | | | --- | 13.00 | 15.24 | 14.38 | 11.03 | 10.24 |
| 16 | 11.50 | --- | | | | | --- | 12.94 | 15.19 | --- | 10.85 | 10.21 |
| 17 | 11.46 | --- | | | | | --- | 13.21 | 15.30 | 13.76 | 10.75 | 10.17 |
| 18 | 11.47 | --- | | | | | --- | 14.25 | 15.79 | 13.48 | 10.69 | 10.21 |
| 19 | 11.62 | --- | | | | | 9.80 | 16.01 | 17.08 | 13.26 | 10.64 | 10.25 |
| 20 | 11.53 | --- | | | | | 9.77 | --- | 18.00 | 12.95 | 10.61 | 10.24 |
| 21 | 11.47 | --- | | | | | 9.69 | --- | 18.38 | 12.58 | 10.51 | 10.15 |
| 22 | 11.41 | --- | | | | | 9.90 | --- | 18.52 | 12.32 | 10.31 | 10.04 |
| 23 | 11.18 | --- | | | | | 10.25 | --- | 18.48 | 12.05 | 10.12 | 9.93 |
| 24 | 10.47 | --- | | | | | 10.59 | 16.34 | 18.60 | 12.00 | 9.97 | 10.05 |
| 25 | 10.95 | --- | | | | | 10.93 | 16.99 | 18.71 | 11.99 | 9.92 | 10.32 |
| 26 | 11.31 | --- | | | | | 11.10 | 16.35 | 18.39 | 12.34 | 9.91 | 10.56 |
| 27 | 11.37 | --- | | | | | 11.12 | 15.82 | 17.72 | 12.75 | 9.90 | 10.83 |
| 28 | 11.46 | --- | | | | | 11.32 | 16.05 | 17.54 | 12.79 | 9.88 | 10.99 |
| 29 | 11.48 | --- | | | | | 11.67 | 15.85 | 17.77 | 12.51 | 9.85 | 11.00 |
| 30 | 11.43 | --- | | | | | 11.80 | 15.30 | 17.86 | 12.31 | 9.83 | 11.07 |
| 31 | 11.38 | --- | | | | | --- | 14.85 | --- | 12.19 | 9.82 | --- |
| MEAN | 11.42 | --- | | | | | --- | --- | 16.64 | --- | 10.99 | 10.13 |
| MAX | 11.83 | --- | | | | | --- | --- | 18.71 | --- | 12.24 | 11.07 |
| MIN | 10.47 | --- | | | | | --- | --- | 14.26 | --- | 9.82 | 9.65 |

MISSOURI RIVER MAIN STEM

06329640 MISSOURI RIVER STAGE GAGE NO. 5A AT BUFORD, ND

LOCATION.--Lat 47°59'06", long 103°59'05", in SE $\frac{1}{4}$ sec.15, T.152 N., R.104 W., Williams County, Hydrologic Unit 10110101, on left bank 1.5 mi southwest of Buford, and at mile 1,580.7.

DRAINAGE AREA.--164,000 mi², approximately.

PERIOD OF RECORD.--April 1960 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,850.00 ft National Geodetic Vertical Datum of 1929. Prior to Mar. 8, 1962 at datum 50.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 19.37 ft Mar. 23, 1978; minimum daily recorded, 2.63 ft Aug. 15-16, 1966.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-----|-----|-----|-----|-----|------|-------|-------|-------|-------|------|
| 1 | | | | | | | --- | 9.01 | --- | 15.31 | 9.90 | 8.07 |
| 2 | | | | | | | --- | 8.76 | --- | 15.31 | 9.90 | 8.07 |
| 3 | | | | | | | --- | 8.61 | --- | 15.39 | 9.92 | 8.19 |
| 4 | | | | | | | --- | --- | --- | 15.53 | 10.08 | --- |
| 5 | | | | | | | --- | --- | --- | 14.92 | 10.11 | --- |
| 6 | | | | | | | --- | --- | --- | 14.01 | 10.05 | --- |
| 7 | | | | | | | --- | --- | --- | 13.44 | --- | --- |
| 8 | | | | | | | --- | --- | --- | 13.08 | 9.81 | --- |
| 9 | | | | | | | --- | --- | --- | 13.02 | 9.69 | --- |
| 10 | | | | | | | --- | --- | --- | 12.81 | 9.60 | --- |
| 11 | | | | | | | --- | --- | --- | 13.92 | 9.60 | --- |
| 12 | | | | | | | --- | --- | --- | 12.94 | 9.44 | --- |
| 13 | | | | | | | --- | --- | --- | 12.54 | 9.33 | --- |
| 14 | | | | | | | --- | --- | 12.61 | 12.03 | 9.27 | --- |
| 15 | | | | | | | --- | --- | 12.55 | --- | 9.05 | --- |
| 16 | | | | | | | --- | --- | 12.45 | --- | 8.92 | --- |
| 17 | | | | | | | --- | --- | 12.58 | 10.95 | --- | --- |
| 18 | | | | | | | 7.01 | --- | 13.03 | 10.78 | --- | 8.27 |
| 19 | | | | | | | 6.97 | --- | 14.17 | 10.57 | --- | 8.26 |
| 20 | | | | | | | 7.05 | --- | 15.05 | 10.28 | --- | 8.29 |
| 21 | | | | | | | 7.04 | --- | 15.49 | 9.95 | --- | 8.22 |
| 22 | | | | | | | 7.15 | --- | 15.74 | 9.74 | --- | 8.10 |
| 23 | | | | | | | 7.50 | --- | 15.89 | 9.54 | --- | 8.09 |
| 24 | | | | | | | 8.00 | --- | 16.11 | 9.50 | --- | 8.18 |
| 25 | | | | | | | 8.30 | 13.83 | 16.06 | 9.48 | --- | 8.32 |
| 26 | | | | | | | 8.43 | 13.30 | 15.75 | 9.81 | --- | 8.49 |
| 27 | | | | | | | 8.46 | 12.72 | 15.20 | 10.38 | --- | 8.81 |
| 28 | | | | | | | 8.73 | 12.83 | 15.01 | 10.46 | --- | 9.07 |
| 29 | | | | | | | 8.98 | 12.80 | 15.15 | 10.27 | --- | --- |
| 30 | | | | | | | 9.16 | --- | 15.21 | 10.09 | 8.15 | --- |
| 31 | | | | | | | --- | --- | --- | 9.95 | 8.10 | --- |
| MEAN | | | | | | | --- | --- | --- | --- | --- | --- |
| MAX | | | | | | | --- | --- | --- | --- | --- | --- |
| MIN | | | | | | | --- | --- | --- | --- | --- | --- |

MISSOURI RIVER MAIN STEM

199

06329650 MISSOURI RIVER STAGE GAGE NO. 6 NEAR BUFORD, ND

LOCATION.--Lat 47°57'18", long 103°54'36", in SE¼ sec.30, T.152 N., R.103 W., Williams County, Hydrologic Unit 10110101, on right bank 5 mi southeast of Buford, and at mile 1,576.0.

DRAINAGE AREA.--164,000 mi², approximately.

PERIOD OF RECORD.--December 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,840.00 ft National Geodetic Vertical Datum of 1929. Prior to Apr. 17, 1962, at datum 40.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 24.15 ft June 29, 1975; minimum daily recorded, 8.23 ft Aug. 15 and 22, 1963.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1 | 15.21 | 15.21 | | | | | --- | 16.25 | 18.86 | 22.63 | 17.30 | 15.37 |
| 2 | 15.27 | 15.11 | | | | | --- | 16.00 | 18.57 | 22.66 | 17.29 | 15.35 |
| 3 | 15.38 | 15.06 | | | | | --- | 15.84 | 19.39 | 22.73 | 17.29 | 15.43 |
| 4 | 15.46 | 15.08 | | | | | --- | 15.83 | 21.33 | 22.92 | 17.42 | 15.45 |
| 5 | 15.42 | 15.02 | | | | | --- | 16.04 | 22.04 | 22.46 | 17.48 | 15.40 |
| 6 | 15.46 | 15.01 | | | | | --- | 16.25 | 21.53 | 21.50 | 17.41 | 15.25 |
| 7 | 15.51 | 15.17 | | | | | --- | 16.68 | 20.84 | 20.85 | 17.28 | 15.20 |
| 8 | 15.47 | 15.30 | | | | | --- | 17.30 | 20.42 | 20.44 | 17.20 | 15.32 |
| 9 | 15.46 | 15.43 | | | | | --- | 17.42 | 20.20 | 20.35 | 17.00 | 15.50 |
| 10 | 15.34 | 15.67 | | | | | --- | 17.43 | 19.90 | 20.17 | 16.90 | 15.51 |
| 11 | 15.22 | 15.85 | | | | | --- | 17.42 | 19.85 | 20.23 | 16.89 | 15.50 |
| 12 | 15.11 | 15.74 | | | | | --- | 17.45 | 20.00 | 20.34 | 16.78 | 15.59 |
| 13 | 15.09 | 15.79 | | | | | --- | 17.42 | 19.92 | 19.98 | 16.65 | 15.56 |
| 14 | 15.09 | 15.90 | | | | | --- | 17.59 | 19.89 | 19.46 | 16.58 | 15.48 |
| 15 | 15.11 | --- | | | | | --- | 17.52 | 19.83 | 18.96 | 16.38 | 15.51 |
| 16 | 15.23 | --- | | | | | --- | 17.25 | 19.73 | 18.67 | 16.25 | 15.57 |
| 17 | 15.28 | --- | | | | | --- | 17.30 | 19.84 | 18.41 | 16.21 | 15.51 |
| 18 | 15.38 | --- | | | | | --- | 18.02 | 20.21 | 18.15 | 16.15 | 15.49 |
| 19 | 15.42 | --- | | | | | 14.30 | 19.70 | 21.31 | 17.92 | 16.15 | 15.48 |
| 20 | 15.29 | --- | | | | | 14.35 | 20.69 | 22.32 | 17.65 | 16.17 | 15.50 |
| 21 | 15.22 | --- | | | | | 14.34 | 20.57 | 22.74 | 17.30 | 16.12 | 15.44 |
| 22 | 15.21 | --- | | | | | 14.42 | 20.09 | 23.09 | 17.08 | 15.84 | 15.31 |
| 23 | 15.15 | --- | | | | | 14.77 | 19.87 | 23.15 | 16.83 | 15.65 | 15.31 |
| 24 | 14.62 | --- | | | | | 15.21 | 20.29 | 23.33 | 16.80 | 15.45 | 15.38 |
| 25 | 14.65 | --- | | | | | 15.49 | 21.20 | 23.32 | 16.78 | 15.38 | 15.49 |
| 26 | 14.81 | --- | | | | | 15.72 | 20.93 | 23.09 | 17.12 | 15.35 | 15.62 |
| 27 | 14.93 | --- | | | | | 15.82 | 20.26 | 22.57 | 17.72 | 15.25 | 15.92 |
| 28 | 15.17 | --- | | | | | 15.91 | 20.36 | 22.32 | 17.78 | 15.26 | 16.16 |
| 29 | 15.21 | --- | | | | | 16.12 | 20.37 | 22.44 | 17.70 | 15.33 | 16.05 |
| 30 | 15.22 | --- | | | | | 16.33 | 19.79 | 22.56 | 17.50 | 15.36 | 16.02 |
| 31 | 15.20 | --- | | | | | --- | 19.31 | --- | 17.34 | 15.42 | --- |
| MEAN | 15.21 | --- | | | | | --- | 18.34 | 21.15 | 19.24 | 16.36 | 15.52 |
| MAX | 15.51 | --- | | | | | --- | 21.20 | 23.33 | 22.92 | 17.48 | 16.16 |
| MIN | 14.62 | --- | | | | | --- | 15.83 | 18.57 | 16.78 | 15.25 | 15.20 |

MISSOURI RIVER MAIN STEM

06329660 MISSOURI RIVER STAGE GAGE NO. 7 NEAR TRENTON, ND

LOCATION.--Lat 47°59'21", long 103°47'57", in NE¼ sec.13, T.152 N., R.103 W., McKenzie County, Hydrologic Unit 10110101, on right bank 5 mi south of Trenton, and at mile 1,566.7.

DRAINAGE AREA.--164,000 mi², approximately.

PERIOD OF RECORD.--March 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,840.00 ft National Geodetic Vertical Datum of 1929. Prior to Aug. 7, 1962, at site 0.8 mi upstream. Prior to May 29, 1963, at datum 40.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 21.56 ft July 10, 1975; minimum daily recorded, 4.34 ft Aug. 19, 22, 1963.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|
| 1 | 11.43 | 11.21 | | | | | --- | 12.24 | 14.90 | 18.56 | 13.82 | 12.06 |
| 2 | 11.43 | 11.21 | | | | | --- | 12.02 | 14.51 | 18.62 | 13.81 | 12.01 |
| 3 | 11.53 | 11.17 | | | | | --- | 11.78 | 15.04 | 18.69 | 13.80 | 12.01 |
| 4 | 11.61 | 11.16 | | | | | --- | 11.72 | 16.68 | 18.73 | 13.90 | 12.02 |
| 5 | 11.58 | 11.11 | | | | | --- | 11.88 | 17.67 | 18.58 | 13.95 | 12.00 |
| 6 | 11.59 | 11.10 | | | | | --- | 12.10 | 17.49 | 17.76 | 13.90 | 11.95 |
| 7 | 11.62 | 11.22 | | | | | --- | 12.49 | 16.92 | 17.12 | 13.79 | 11.73 |
| 8 | 11.59 | 11.37 | | | | | --- | 13.09 | 16.47 | 16.70 | 13.68 | 11.78 |
| 9 | 11.55 | 11.41 | | | | | --- | 13.21 | 16.25 | 16.53 | 13.52 | 11.95 |
| 10 | 11.46 | 11.58 | | | | | --- | 13.27 | 15.98 | 16.38 | 13.48 | 11.97 |
| 11 | 11.33 | 11.76 | | | | | --- | 13.24 | 15.88 | 16.37 | 13.47 | 11.99 |
| 12 | 11.23 | 11.75 | | | | | --- | 13.22 | 15.98 | 16.49 | 13.36 | 12.04 |
| 13 | 11.19 | 11.75 | | | | | --- | 13.20 | 15.96 | 16.24 | 13.23 | 11.92 |
| 14 | 11.15 | 11.87 | | | | | --- | 13.23 | 15.88 | 15.77 | 13.28 | 11.85 |
| 15 | 11.20 | 11.88 | | | | | --- | 13.29 | 15.88 | 15.32 | 13.01 | 11.83 |
| 16 | 11.29 | --- | | | | | --- | 13.06 | 15.79 | 15.04 | 12.90 | 11.88 |
| 17 | 11.25 | --- | | | | | --- | 13.05 | 15.82 | 14.81 | 12.84 | 11.80 |
| 18 | 11.26 | --- | | | | | --- | 13.62 | 16.07 | 14.65 | 12.76 | 11.78 |
| 19 | 11.33 | --- | | | | | 10.28 | --- | 17.00 | 14.48 | 12.78 | 11.77 |
| 20 | 11.30 | --- | | | | | 10.34 | --- | 17.98 | 14.28 | 12.77 | 11.78 |
| 21 | 11.25 | --- | | | | | 10.35 | --- | 18.55 | 13.95 | 12.67 | 11.83 |
| 22 | 11.20 | --- | | | | | 10.42 | --- | 18.87 | 13.70 | --- | 11.62 |
| 23 | 11.15 | --- | | | | | 10.69 | 15.62 | 18.94 | 13.53 | --- | 11.63 |
| 24 | 10.68 | --- | | | | | 11.16 | 15.89 | 19.11 | 13.50 | --- | 11.72 |
| 25 | 10.63 | --- | | | | | 11.42 | 16.71 | 19.18 | 13.52 | --- | 11.80 |
| 26 | 10.84 | --- | | | | | 11.74 | 16.63 | 18.95 | 13.68 | --- | 11.89 |
| 27 | 10.94 | --- | | | | | 11.92 | 16.08 | 18.55 | 14.16 | --- | 12.15 |
| 28 | 11.10 | --- | | | | | 12.06 | 16.02 | 18.28 | 14.32 | 12.00 | 12.32 |
| 29 | 11.19 | --- | | | | | 12.17 | 16.13 | 18.31 | 14.26 | 11.99 | 12.24 |
| 30 | 11.19 | --- | | | | | 12.38 | 15.72 | 18.48 | 14.00 | 11.98 | 12.20 |
| 31 | 11.19 | --- | | | | | --- | 15.31 | --- | 13.85 | 12.07 | --- |
| MEAN | 11.27 | --- | | | | | --- | --- | 17.05 | 15.60 | --- | 11.92 |
| MAX | 11.62 | --- | | | | | --- | --- | 19.18 | 18.73 | --- | 12.32 |
| MIN | 10.63 | --- | | | | | --- | --- | 14.51 | 13.50 | --- | 11.62 |

06330000 MISSOURI RIVER NEAR WILLISTON, ND

LOCATION.--Lat 48°06'45", long 103°43'04", in SE¼ sec.31, T.154 N., R.101 W., Williams County, Hydrologic Unit 10110101, at city waterplant on left bank, 5 mi southwest of Williston, 29.3 mi downstream from Yellowstone River, and at mile 1,552.7.

DRAINAGE AREA.--164,500 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1966 to current year. Operated as a stage-discharge station October 1897 to July 1965.

GAGE.--Water-stage recorder. Datum of gage is 1,830.20 ft National Geodetic Vertical Datum of 1929. See WSP 1917 for history of changes prior to April 1966.

REMARKS.--Stage regulated by upstream reservoirs and backwater from Lake Sakakawea.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 26.46 ft Mar. 26, 1978; minimum daily recorded, 7.80 ft Nov. 2, 1966.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 15.54 | 15.56 | 18.12 | 17.89 | 18.76 | 19.00 | 14.75 | 15.38 | 17.66 | 20.82 | 19.46 | 17.84 |
| 2 | 15.54 | 15.76 | 18.06 | 17.99 | 18.81 | 18.98 | 14.71 | 15.27 | 17.44 | 20.97 | 19.51 | 17.56 |
| 3 | 15.57 | 15.68 | 17.91 | 18.13 | 18.86 | 18.98 | 14.66 | 15.14 | 17.52 | 21.09 | 19.57 | 17.40 |
| 4 | 15.61 | 15.64 | 17.76 | 18.25 | 18.83 | 18.90 | 14.64 | 15.09 | 18.40 | 21.17 | 19.43 | 17.59 |
| 5 | 15.55 | 15.47 | 17.70 | 18.35 | 18.75 | 18.80 | 14.67 | 15.17 | 19.16 | 21.29 | 19.50 | 17.54 |
| 6 | 15.68 | 15.52 | 17.83 | 18.45 | 18.72 | 18.65 | 14.67 | 15.30 | 19.24 | 21.20 | 19.56 | 17.31 |
| 7 | 15.71 | 15.44 | 18.05 | 18.57 | 18.72 | 18.50 | 14.54 | 15.53 | 18.98 | 20.93 | 19.51 | 17.19 |
| 8 | 15.71 | 15.62 | 18.27 | 18.72 | 18.74 | 18.50 | 14.52 | 15.95 | 18.70 | 20.57 | 19.06 | 17.29 |
| 9 | 15.74 | 15.70 | 18.38 | 18.81 | 18.78 | 18.10 | 14.53 | 16.21 | 18.59 | 20.53 | 19.28 | 17.01 |
| 10 | 15.53 | 15.79 | 18.34 | 18.87 | 18.83 | 17.81 | 14.37 | 16.19 | 18.47 | 20.54 | 19.37 | 17.02 |
| 11 | 15.35 | 16.10 | 18.14 | 18.97 | 18.82 | 17.66 | 14.23 | 16.31 | 18.45 | 20.55 | 19.38 | 16.58 |
| 12 | 15.47 | 15.97 | 17.91 | 19.03 | 18.83 | 17.67 | 14.19 | 16.28 | 18.44 | 20.66 | 19.26 | 16.65 |
| 13 | 15.47 | 15.85 | 17.67 | 19.07 | 18.91 | 17.55 | 14.23 | 16.29 | 18.53 | 20.58 | 19.16 | 16.79 |
| 14 | 15.50 | 15.87 | 17.58 | 19.07 | 19.00 | 17.36 | 14.32 | 16.49 | 18.56 | 20.44 | 19.07 | 16.78 |
| 15 | 15.48 | 15.90 | 17.79 | 19.02 | 19.04 | 17.36 | 14.48 | 16.55 | 18.46 | 20.37 | 19.11 | 16.87 |
| 16 | 15.44 | 15.97 | 18.17 | 18.94 | 19.06 | 17.45 | 14.54 | 16.20 | 18.38 | 20.48 | 18.96 | 16.87 |
| 17 | 15.55 | 15.89 | 18.45 | 18.85 | 19.11 | 17.44 | 14.53 | 16.11 | 18.33 | 20.30 | 18.87 | 16.70 |
| 18 | 15.74 | 15.84 | 18.46 | 18.69 | 19.16 | 17.26 | 14.39 | 16.38 | 18.50 | 20.22 | 18.81 | 16.68 |
| 19 | 15.62 | 15.85 | 18.39 | 18.50 | 19.19 | 17.24 | 14.24 | 17.18 | 18.92 | 20.21 | 18.81 | 16.60 |
| 20 | 15.67 | 15.79 | 18.16 | 18.28 | 19.26 | 17.64 | 14.24 | 17.98 | 19.58 | 20.10 | 18.63 | 16.70 |
| 21 | 15.56 | 15.74 | 17.81 | 18.01 | 19.28 | 18.08 | 14.17 | 18.26 | 20.09 | 19.92 | 18.56 | 16.71 |
| 22 | 15.56 | 15.83 | 17.46 | 17.73 | 19.27 | 18.38 | 14.17 | 18.07 | 20.37 | 19.42 | 18.53 | 15.96 |
| 23 | 15.52 | 15.80 | 17.21 | 17.56 | 19.23 | 18.54 | 14.36 | 17.85 | 20.42 | 19.56 | 18.57 | 16.47 |
| 24 | 15.23 | 15.78 | 16.95 | 17.57 | 19.22 | 18.50 | 14.62 | 17.87 | 20.64 | 19.60 | 18.28 | 16.49 |
| 25 | 15.19 | 15.83 | 16.80 | 17.74 | 19.27 | 18.34 | 14.85 | 18.35 | 20.78 | 19.63 | 18.06 | 16.41 |
| 26 | 15.35 | 15.87 | 16.79 | 17.89 | 19.26 | 18.22 | 15.07 | 18.57 | 20.75 | 19.52 | 18.00 | 16.45 |
| 27 | 15.35 | 16.67 | 17.04 | 18.03 | 19.23 | 17.73 | 15.08 | 18.36 | 20.70 | 19.67 | 17.93 | 16.42 |
| 28 | 15.44 | 17.60 | 17.27 | 18.19 | 19.15 | 15.69 | 15.14 | 18.23 | 20.59 | 19.89 | 17.98 | 16.50 |
| 29 | 15.60 | 17.84 | 17.48 | 18.31 | 19.06 | 15.08 | 15.26 | 18.32 | 20.72 | 19.83 | 17.69 | 16.51 |
| 30 | 15.56 | 18.04 | 17.70 | 18.45 | --- | 14.93 | 15.37 | 18.18 | 20.84 | 19.51 | 17.60 | 16.54 |
| 31 | 15.55 | --- | 17.82 | 18.64 | --- | 14.83 | --- | 17.92 | --- | 19.42 | 17.76 | --- |
| MEAN | 15.53 | 16.01 | 17.79 | 18.41 | 19.01 | 17.71 | 14.58 | 16.81 | 19.21 | 20.29 | 18.82 | 16.85 |
| MAX | 15.74 | 18.04 | 18.46 | 19.07 | 19.28 | 19.00 | 15.37 | 18.57 | 20.84 | 21.29 | 19.57 | 17.84 |
| MIN | 15.19 | 15.44 | 16.79 | 17.56 | 18.72 | 14.83 | 14.17 | 15.09 | 17.44 | 19.42 | 17.60 | 15.96 |
| CAL YR 1983 | MEAN | 16.99 | MAX | 20.75 | MIN | 13.82 | | | | | | |
| WTR YR 1984 | MEAN | 17.59 | MAX | 21.29 | MIN | 14.17 | | | | | | |

MISSOURI RIVER MAIN STEM

06330110 MISSOURI RIVER STAGE GAGE NO. 9 AT WILLISTON, ND

LOCATION.--Lat 48°08'13", long 103°36'16", in NE¹/₄NE¹/₄ sec.25, T.154 N., R.101 W., Williams County, Hydrologic Unit 10110101, on left bank levee at southeast edge of Williston 0.5 mi upstream from Little Muddy Creek, and at mile 1,546.2.

DRAINAGE AREA.--164,500 mi², approximately.

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,820.00 ft National Geodetic Vertical Datum of 1929. Prior to May 13, 1969, at site 900 ft downstream. At datum 20.00 ft lower prior to Apr. 7, 1962.

REMARKS.--Stage regulated by upstream reservoirs and backwater from Lake Sakakawea.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 34.22 ft July 25, 28, 1975; minimum daily recorded, 5.44 ft Aug. 20, 1961, present datum.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 23.34 | 23.52 | 24.72 | --- | 25.94 | 26.10 | 22.09 | 22.66 | 24.57 | 28.61 | 29.19 | 27.64 |
| 2 | 23.41 | 24.12 | 24.87 | --- | 26.00 | 26.03 | 22.22 | 22.63 | 24.42 | 28.65 | 29.22 | 27.19 |
| 3 | 23.35 | 24.00 | 24.89 | --- | 26.03 | 25.98 | 22.50 | 22.61 | 24.50 | 28.89 | 29.19 | 27.02 |
| 4 | 23.33 | 23.88 | 24.85 | --- | 26.02 | 25.92 | 22.46 | 22.45 | 25.05 | 29.08 | 29.13 | 27.21 |
| 5 | 23.09 | 23.46 | 24.81 | 25.67 | 25.98 | 25.82 | 22.44 | 22.48 | 25.73 | 29.26 | 29.18 | 27.37 |
| 6 | 23.50 | --- | 24.89 | 25.72 | 25.94 | 25.73 | 22.45 | 22.49 | 25.98 | 29.62 | 29.21 | 26.98 |
| 7 | 23.47 | --- | 25.14 | 25.80 | 25.93 | 25.62 | 22.00 | 22.69 | 25.88 | 29.58 | 29.08 | 26.49 |
| 8 | 23.56 | --- | 25.31 | 25.88 | 25.95 | 25.43 | 22.00 | 23.01 | 25.61 | 29.37 | 28.75 | 26.17 |
| 9 | 23.69 | --- | 25.51 | 25.98 | 25.97 | 25.21 | 22.14 | 23.51 | 25.57 | 29.38 | 28.94 | 26.44 |
| 10 | 23.20 | --- | 25.57 | 26.05 | 26.00 | 24.93 | 21.88 | 23.26 | 25.57 | 29.46 | 29.10 | 26.45 |
| 11 | 22.95 | --- | 25.50 | 26.11 | 26.01 | 24.75 | 21.84 | 23.31 | 25.62 | 29.58 | 29.12 | 26.99 |
| 12 | 23.30 | --- | 25.37 | 26.17 | 26.02 | 24.72 | 22.01 | 23.41 | 25.56 | 29.68 | 28.90 | 26.44 |
| 13 | 23.38 | --- | 25.21 | 26.21 | 26.05 | 24.68 | 22.16 | 23.34 | 25.59 | 29.62 | 28.84 | 26.11 |
| 14 | 23.53 | --- | 25.06 | 26.23 | 26.11 | 24.50 | 21.79 | 24.00 | 25.94 | 29.50 | 28.74 | 26.14 |
| 15 | 23.45 | --- | 25.11 | 26.21 | 26.18 | 24.42 | 21.94 | 24.45 | 25.77 | 29.59 | 28.94 | 26.23 |
| 16 | 23.14 | 24.03 | 25.37 | 26.17 | 26.22 | 24.48 | 22.08 | 23.74 | 25.74 | 29.49 | 28.73 | 26.25 |
| 17 | 23.59 | 23.84 | 25.67 | 26.09 | 26.27 | 24.54 | 22.23 | 23.16 | 25.60 | 29.62 | 28.64 | 25.98 |
| 18 | 23.99 | 23.75 | 25.77 | 25.97 | 26.29 | 24.43 | 22.21 | 23.35 | 25.82 | 29.67 | 28.58 | 26.00 |
| 19 | 23.59 | 23.70 | --- | 25.81 | 26.30 | 24.38 | 22.12 | 23.95 | 26.24 | 29.72 | 28.60 | 25.76 |
| 20 | 23.86 | 23.52 | --- | 25.65 | 26.33 | 24.67 | 21.91 | 24.66 | 26.71 | 29.68 | 28.36 | 26.24 |
| 21 | 23.55 | 23.45 | --- | 25.42 | 26.37 | 24.98 | 21.81 | 24.88 | 26.98 | 29.58 | 28.06 | 26.37 |
| 22 | 23.58 | 23.71 | --- | 25.19 | 26.37 | 25.13 | 21.80 | 24.68 | 27.16 | 29.21 | 28.33 | 24.82 |
| 23 | 23.45 | 23.72 | --- | 25.00 | 26.32 | 25.13 | 21.83 | 24.65 | 27.26 | 29.35 | 28.42 | 25.63 |
| 24 | 23.22 | 23.65 | --- | 24.95 | 26.29 | 25.01 | 21.94 | 24.31 | 27.67 | 29.43 | 28.11 | 25.65 |
| 25 | 23.31 | 23.80 | --- | 25.03 | 26.29 | 24.81 | 22.07 | 24.79 | 27.90 | 29.41 | 27.94 | 25.47 |
| 26 | 23.40 | 23.86 | --- | 25.18 | 26.28 | 24.61 | 22.05 | 25.18 | 27.91 | 29.29 | 27.73 | 25.47 |
| 27 | 23.32 | 24.40 | --- | 25.31 | 26.26 | 24.30 | 22.15 | 25.14 | 28.08 | 29.42 | 27.67 | 25.28 |
| 28 | 23.36 | 24.68 | --- | 25.43 | 26.21 | 23.40 | 22.86 | 25.03 | 28.09 | 29.57 | 27.46 | 25.26 |
| 29 | 23.71 | 24.62 | --- | 25.57 | 26.17 | 22.38 | 22.62 | 25.12 | 28.50 | 29.46 | 27.37 | 25.30 |
| 30 | 23.53 | 24.59 | --- | 25.68 | --- | 22.17 | 22.55 | 25.16 | 28.52 | 29.11 | 27.29 | 25.39 |
| 31 | 23.58 | --- | --- | 25.82 | --- | 22.11 | --- | 24.77 | --- | 29.04 | 27.54 | --- |
| MEAN | 23.44 | --- | --- | --- | 26.14 | 24.72 | 22.14 | 23.83 | 26.32 | 29.38 | 28.53 | 26.19 |
| MAX | 23.99 | --- | --- | --- | 26.37 | 26.10 | 22.86 | 25.18 | 28.52 | 29.72 | 29.22 | 27.64 |
| MIN | 22.95 | --- | --- | --- | 25.93 | 22.11 | 21.79 | 22.45 | 24.42 | 28.61 | 27.29 | 24.82 |

06331000 LITTLE MUDDY RIVER BELOW COW CREEK NEAR WILLISTON, ND

LOCATION.--Lat 48°17'04", long 103°34'21", in NE1/4NW1/4 sec.5, T.155 N., R.100 W., Williams County, Hydrologic Unit 10110102, on left bank 37 ft downstream from centerline of highway, 1 mi downstream from Cow Creek, 4 mi upstream from Camp Creek, 10 mi northeast of Williston, and 13 mi upstream from mouth.

DRAINAGE AREA.--875 mi², approximately, of which about 100 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1954 to current year (seasonal records only since 1984).

GAGE.--Water-stage recorder. Datum of gage is 1,863.18 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Some small diversions for irrigation. Some regulation by Lake Zahl, Fish and Wildlife Service reservoir 22 mi upstream and Blacktail Dam about 15 mi upstream.

AVERAGE DISCHARGE.--29 years (water years 1955-1983), 38.8 ft³/s, 28,110 acre-ft/yr; median of yearly mean discharges, 31 ft³/s, 22,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,180 ft³/s Apr. 18, 1979, gage height, 12.77 ft; maximum gage height, 13.57 ft Mar. 27, 1960; minimum discharge, 0.20 ft³/s Nov. 27, 1960, Feb. 5, 1963, and June 4, 1968.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 91 ft³/s Feb. 17, gage height 6.38 ft, minimum daily, 2.9 ft³/s Aug. 30, but may have been less during period of nonoperation.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-------|------|------|-------|-------|-------|-------|-------|
| 1 | | | | | 6.0 | 18 | 20 | 39 | 6.5 | 6.0 | 3.5 | 3.5 |
| 2 | | | | | 6.0 | 17 | 19 | 33 | 6.0 | 5.6 | 3.6 | 3.6 |
| 3 | | | | | 5.5 | 17 | 18 | 28 | 6.1 | 4.8 | 3.8 | 3.8 |
| 4 | | | | | 5.2 | 16 | 17 | 25 | 6.4 | 4.5 | 4.0 | 3.8 |
| 5 | | | | | 5.0 | 15 | 17 | 23 | 6.1 | 4.8 | 4.5 | 4.3 |
| 6 | | | | | 5.2 | 15 | 18 | 22 | 7.0 | 4.6 | 5.0 | 6.4 |
| 7 | | | | | 5.6 | 14 | 18 | 20 | 7.7 | 5.3 | 4.8 | 5.6 |
| 8 | | | | | 6.0 | 14 | 17 | 18 | 8.0 | 5.8 | 4.2 | 5.2 |
| 9 | | | | | 7.0 | 13 | 17 | 18 | 8.3 | 4.9 | 3.9 | 5.0 |
| 10 | | | | | 10 | 13 | 17 | 17 | 8.1 | 4.4 | 3.9 | 5.0 |
| 11 | | | | | 15 | 13 | 17 | 15 | 8.1 | 4.3 | 3.8 | 4.9 |
| 12 | | | | | 20 | 12 | 17 | 15 | 9.1 | 4.2 | 3.8 | 7.1 |
| 13 | | | | | 40 | 12 | 17 | 13 | 12 | 4.2 | 4.0 | 5.3 |
| 14 | | | | | 55 | 11 | 17 | 13 | 14 | 4.2 | 4.3 | 5.0 |
| 15 | | | | | 70 | 11 | 16 | 13 | 16 | 4.3 | 4.0 | 4.9 |
| 16 | | | | | 81 | 10 | 15 | 12 | 22 | 4.6 | 3.8 | 5.1 |
| 17 | | | | | 85 | 10 | 15 | 12 | 19 | 4.3 | 3.7 | 5.1 |
| 18 | | | | | 71 | 11 | 14 | 11 | 15 | 4.3 | 3.6 | 4.6 |
| 19 | | | | | 49 | 14 | 14 | 11 | 13 | 3.8 | 3.7 | 4.4 |
| 20 | | | | | 39 | 18 | 13 | 9.9 | 11 | 4.0 | 4.1 | 4.3 |
| 21 | | | | | 36 | 28 | 13 | 9.4 | 11 | 3.7 | 3.9 | 4.9 |
| 22 | | | | | 38 | 44 | 12 | 8.9 | 12 | 3.5 | 3.7 | 5.4 |
| 23 | | | | | 38 | 47 | 11 | 9.1 | 13 | 3.5 | 3.7 | 5.1 |
| 24 | | | | | 35 | 46 | 11 | 9.3 | 12 | 3.7 | 3.7 | 7.1 |
| 25 | | | | | 32 | 55 | 11 | 8.5 | 11 | 3.6 | 3.5 | 6.9 |
| 26 | | | | | 27 | 51 | 12 | 8.9 | 11 | 3.5 | 3.5 | 5.6 |
| 27 | | | | | 24 | 36 | 17 | 8.6 | 9.3 | 3.5 | 3.4 | 5.1 |
| 28 | | | | | 21 | 31 | 19 | 7.9 | 8.2 | 3.5 | 3.4 | 5.0 |
| 29 | | | | | 18 | 29 | 21 | 7.4 | 7.1 | 3.5 | 3.1 | 5.2 |
| 30 | | | | | --- | 25 | 37 | 7.0 | 6.3 | 3.8 | 2.9 | 5.5 |
| 31 | | | | | --- | 22 | --- | 7.0 | --- | 3.6 | 3.1 | --- |
| TOTAL | | | | | 855.5 | 688 | 497 | 459.9 | 310.3 | 132.3 | 117.9 | 152.7 |
| MEAN | | | | | 29.5 | 22.2 | 16.6 | 14.8 | 10.3 | 4.27 | 3.80 | 5.09 |
| MAX | | | | | 85 | 55 | 37 | 39 | 22 | 6.0 | 5.0 | 7.1 |
| MIN | | | | | 5.0 | 10 | 11 | 7.0 | 6.0 | 3.5 | 2.9 | 3.5 |
| AC-FT | | | | | 1700 | 1360 | 986 | 912 | 615 | 262 | 234 | 303 |

LITTLE MUDDY RIVER BASIN

06331000 LITTLE MUDDY RIVER BELOW COW CREEK NEAR WILLISTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 04... | 1225 | 8.2 | 2150 | -- | 12.5 | 9.5 | -- | -- | -- | -- | -- | |
| FEB 16... | 1530 | 76 | 1300 | 7.2 | -- | .0 | 130 | 0 | 52 | .08 | 160 | |
| MAR 21... | 1310 | 26 | 1940 | -- | 2.5 | 1.0 | -- | -- | -- | -- | -- | |
| MAY 10... | 1140 | 17 | 1970 | -- | 12.0 | 10.5 | -- | -- | -- | -- | -- | |
| JUN 14... | 1540 | 14 | 2150 | -- | 18.0 | 16.0 | -- | -- | -- | -- | -- | |
| JUL 20... | 0840 | 4.1 | 2350 | 8.4 | -- | 21.0 | 410 | 0 | 50 | 68 | 390 | |
| AUG 30... | 0820 | 3.0 | 2400 | -- | 15.5 | 14.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| FEB 16... | 70 | 6 | 14 | 380 | .000 | 310 | 38 | 330 | 3.8 | .10 | 11 | 798 |
| JUL 20... | 67 | 9 | 11 | 750 | | 630 | 4.8 | 630 | 8.5 | .40 | 7.8 | 1630 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| FEB 16... | 760 | 1.1 | 164 | 1 | 180 | 170 | 0 | 50 | 80 | .2 | 0 | 490 |
| JUL 20... | 1600 | 2.2 | 18 | 2 | 310 | 40 | 0 | 80 | 10 | .6 | 2 | 1500 |

BEAR DEN CREEK BASIN

205

06332515 BEAR DEN CREEK NEAR MANDAREE, ND
(Hydrologic bench-mark station)

LOCATION.--Lat 47°47'14", long 102°46'05", in NW¼ sec.30, T.150 N., R.94 W., McKenzie County, Hydrologic Unit 10110101, on right bank 0.5 mi upstream from county highway culvert, and 5.5 mi northwest of Mandaree.

DRAINAGE AREA.--74 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,947.58 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--18 years, 8.82 ft³/s, 6,390 acre-ft/yr; median of yearly mean discharges, 8.6 ft³/s, 6,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,840 ft³/s Mar. 13, 1972, gage height, 9.02 ft; maximum gage height, 10.03 ft Apr. 6, 1969; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 65 ft³/s May 4, gage height, 3.64 ft, no peak above base of 100 ft³/s; maximum gage height, 5.00 ft Mar. 20 (backwater from ice); no flow Dec. 22 to Feb. 8.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|--------|--------|-------|--------|-------|-------|------|------|
| 1 | .26 | .29 | .14 | .00 | .00 | 1.1 | 1.8 | 2.6 | .20 | .12 | .09 | .11 |
| 2 | .36 | .26 | .12 | .00 | .00 | 1.0 | 1.6 | 7.0 | .19 | .11 | .10 | .11 |
| 3 | .28 | .28 | .12 | .00 | .00 | .95 | 1.6 | 18 | .20 | .09 | .10 | .10 |
| 4 | .21 | .30 | .10 | .00 | .00 | .90 | 1.3 | 38 | .23 | .09 | .10 | .09 |
| 5 | .18 | .29 | .10 | .00 | .00 | .85 | 1.2 | 23 | .32 | .09 | .10 | .09 |
| 6 | .12 | .30 | .09 | .00 | .00 | .80 | 1.5 | 10 | .50 | .10 | .12 | .08 |
| 7 | .12 | .29 | .08 | .00 | .00 | .70 | 1.5 | 4.9 | .32 | .12 | .14 | .12 |
| 8 | .13 | .25 | .08 | .00 | .00 | .60 | 1.1 | 2.9 | .29 | .12 | .14 | .11 |
| 9 | .15 | .24 | .08 | .00 | .25 | .50 | .89 | 2.1 | .35 | .10 | .13 | .10 |
| 10 | .16 | .23 | .07 | .00 | 1.0 | .45 | .77 | 1.8 | .29 | .10 | .12 | .09 |
| 11 | .16 | .22 | .06 | .00 | 5.0 | .40 | 1.0 | 1.7 | .38 | .09 | .11 | .08 |
| 12 | .20 | .24 | .05 | .00 | 10 | .35 | 4.9 | 1.2 | .34 | .09 | .11 | .08 |
| 13 | .24 | .24 | .05 | .00 | 20 | .35 | 4.5 | .90 | .31 | .08 | .13 | .08 |
| 14 | .24 | .24 | .04 | .00 | 26 | .30 | 2.7 | .56 | .48 | .08 | .16 | .08 |
| 15 | .23 | .24 | .04 | .00 | 30 | .25 | 2.0 | .45 | .50 | .07 | .18 | .11 |
| 16 | .22 | .24 | .03 | .00 | 28 | .25 | 1.4 | .34 | .30 | .07 | .17 | .15 |
| 17 | .28 | .24 | .03 | .00 | 20 | .25 | 1.0 | .28 | .24 | .06 | .15 | .22 |
| 18 | .27 | .24 | .02 | .00 | 18 | .50 | .82 | .22 | .26 | .06 | .13 | .27 |
| 19 | .27 | .27 | .02 | .00 | 15 | 1.2 | .60 | .21 | .22 | .08 | .11 | .35 |
| 20 | .29 | .27 | .01 | .00 | 12 | 4.0 | .68 | .20 | .24 | .10 | .10 | .50 |
| 21 | .30 | .25 | .01 | .00 | 10 | 10 | .60 | .21 | .75 | .12 | .09 | .94 |
| 22 | .34 | .22 | .00 | .00 | 8.0 | 27 | .53 | .20 | 1.5 | .11 | .08 | 1.1 |
| 23 | .35 | .20 | .00 | .00 | 6.0 | 36 | .47 | .20 | 1.3 | .10 | .08 | .75 |
| 24 | .38 | .20 | .00 | .00 | 4.5 | 45 | .46 | .18 | .90 | .10 | .08 | .46 |
| 25 | .38 | .18 | .00 | .00 | 2.5 | 33 | .40 | .19 | .60 | .10 | .09 | .32 |
| 26 | .35 | .18 | .00 | .00 | 1.8 | 25 | .39 | .21 | .45 | .09 | .08 | .24 |
| 27 | .32 | .16 | .00 | .00 | 1.5 | 14 | .38 | .22 | .30 | .08 | .07 | .18 |
| 28 | .33 | .16 | .00 | .00 | 1.2 | 6.0 | 1.8 | .22 | .20 | .08 | .07 | .15 |
| 29 | .32 | .15 | .00 | .00 | 1.2 | 3.0 | 1.4 | .23 | .17 | .08 | .06 | .14 |
| 30 | .32 | .15 | .00 | .00 | --- | 2.4 | 1.7 | .19 | .15 | .08 | .06 | .14 |
| 31 | .29 | --- | .00 | .00 | --- | 1.8 | --- | .19 | --- | .08 | .08 | --- |
| TOTAL | 8.05 | 7.02 | 1.34 | .00 | 221.95 | 218.90 | 40.99 | 118.60 | 12.48 | 2.84 | 3.33 | 7.34 |
| MEAN | .26 | .23 | .04 | .00 | 7.65 | 7.06 | 1.37 | 3.83 | .42 | .09 | .11 | .24 |
| MAX | .38 | .30 | .14 | .00 | 30 | 45 | 4.9 | 38 | 1.5 | .12 | .18 | 1.1 |
| MIN | .12 | .15 | .00 | .00 | .00 | .25 | .38 | .18 | .15 | .06 | .06 | .08 |
| AC-FT | 16 | 14 | 2.7 | .00 | 440 | 434 | 81 | 235 | 25 | 5.6 | 6.6 | 15 |
| CAL YR 1983 | TOTAL | 2742.67 | | MEAN | 7.51 | MAX | 384 | MIN | .00 | AC-FT | 5440 | |
| WTR YR 1984 | TOTAL | 642.84 | | MEAN | 1.76 | MAX | 45 | MIN | .00 | AC-FT | 1280 | |

BEAR DEN CREEK BASIN

06332515 BEAR DEN CREEK NEAR MANDAREE, ND--CONTINUED
(Hydrologic bench-mark station)

PERIOD OF RECORD.--Water years 1968 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|-----------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 11... | 1250 | .19 | 2800 | 8.8 | 3.0 | 7.0 | 39 | 10.8 | 96 | 100 | 70 |
| NOV 14... | 1155 | .24 | 3200 | 8.6 | .0 | 1.0 | -- | 12.0 | -- | -- | -- |
| FEB 28... | 1135 | 1.2 | 1900 | 7.2 | .4 | .0 | 22 | 12.0 | 88 | -- | -- |
| MAR 22... | 1055 | 23 | 445 | 7.9 | 2.0 | .5 | 100 | 12.6 | 95 | -- | -- |
| APR 04... | 1045 | 1.5 | 1370 | 8.3 | 6.5 | 7.0 | -- | 11.0 | -- | -- | -- |
| JUN 15... | 1025 | .55 | 2680 | 8.7 | 18.5 | 19.0 | 41 | 8.6 | 101 | 90 | 70 |
| AUG 14... | 0950 | .15 | 1950 | 8.5 | 21.0 | 23.0 | 80 | 8.1 | 102 | 80 | 60 |

| DATE | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
|-----------|---|--|--|--|--|------------------------------|--|---|--|---|---|
| OCT 11... | 190 | 0 | 34 | 26 | 620 | 87 | 20 | 6.3 | 824 | 2.5 | 760 |
| FEB 28... | 160 | 0 | 33 | 18 | 340 | 82 | 12 | 8.4 | 496 | 61 | 480 |
| MAR 22... | 62 | 0 | 15 | 6.0 | 56 | 62 | 3 | 9.9 | 99 | 2.4 | 87 |
| JUN 15... | 150 | 0 | 23 | 22 | 610 | 90 | 22 | 5.6 | 766 | 2.9 | 660 |
| AUG 14... | 140 | 0 | 26 | 17 | 420 | 86 | 16 | 8.8 | 532 | 3.2 | 510 |

| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) |
|-----------|---|--|--|---|---|--|--|---|---|--|---|
| OCT 11... | 4.6 | .40 | 11 | 1930 | 2000 | 2.6 | .99 | <.10 | .06 | 1.2 | .030 |
| FEB 28... | 7.0 | .20 | 12 | 1220 | 1200 | 1.7 | 4.0 | .31 | .13 | 1.1 | .150 |
| MAR 22... | 6.0 | .10 | 7.7 | 296 | 250 | .40 | 18 | .61 | .21 | 2.5 | .440 |
| JUN 15... | 3.3 | .40 | 2.8 | 1840 | 1800 | 2.5 | 2.7 | .20 | .14 | .90 | .150 |
| AUG 14... | 5.1 | .40 | 9.5 | 1330 | 1300 | 1.8 | .54 | <.10 | .06 | 1.6 | .110 |

| DATE | PHOS- PHORUS TOTAL (MG/L AS P04) (71886) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) |
|-----------|--|--|--|---|---|--|--|--|---|--|
| OCT 11... | .09 | .010 | <.010 | -- | -- | -- | -- | -- | -- | -- |
| FEB 28... | .46 | .100 | .110 | .34 | -- | -- | -- | -- | -- | -- |
| MAR 22... | 1.4 | .210 | .150 | .46 | 180 | 1 | 28 | <1 | <1 | <3 |
| JUN 15... | -- | .010 | .010 | .03 | -- | -- | -- | -- | -- | -- |
| AUG 14... | -- | .010 | <.010 | -- | 40 | 3 | 52 | <1 | <1 | <3 |

06332515 BEAR DEN CREEK NEAR MANDAREE, ND--CONTINUED
(Hydrologic bench-mark station)

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) |
|-----------|---|---|---|---|---|---|--|---|--|---|
| MAR 22... | 4 | 360 | <1 | 8 | 72 | .8 | <10 | 1 | <1 | <1 |
| AUG 14... | 7 | 54 | <1 | 51 | 11 | <.4 | <10 | 7 | <1 | <1 |

| DATE | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030) | GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040) | GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515) | GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516) | GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050) | GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060) | RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511) |
|------|---|---|---|---|---|--|--|---|---|--|
|------|---|---|---|---|---|--|--|---|---|--|

| | | | | | | | | | | |
|-----------|-----|----|----|-----|------|-----|------|-----|------|-----|
| OCT 11... | -- | -- | -- | <49 | <3.9 | <27 | <3.2 | <23 | <3.1 | .06 |
| MAR 22... | 100 | <6 | 15 | -- | -- | -- | -- | -- | -- | -- |
| AUG 14... | 320 | <6 | 12 | -- | -- | -- | -- | -- | -- | -- |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) |
|------|------|--|--|--|--|
|------|------|--|--|--|--|

| | | | | | |
|-----------|------|-----|-----|-----|----|
| OCT 11... | 1250 | .19 | 292 | .15 | -- |
| FEB 28... | 1135 | 1.2 | 68 | .22 | 99 |
| MAR 22... | 1055 | 23 | 140 | 8.7 | 97 |
| JUN 15... | 1025 | .55 | 113 | .17 | 99 |
| AUG 14... | 0950 | .15 | 230 | .09 | -- |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-----------|------|--|---|--|--|---|--|
| OCT 11... | 1252 | .90 | .45 | 7.0 | 2800 | 8.8 | 10.8 |
| OCT 11... | 1254 | 1.30 | .31 | 7.0 | 2800 | 8.8 | 10.8 |
| FEB 28... | 1204 | .50 | .40 | .0 | 1900 | 7.2 | 12.0 |
| FEB 28... | 1206 | .90 | .38 | .0 | 1900 | 7.2 | 12.0 |
| FEB 28... | 1208 | 1.30 | .37 | .0 | 1900 | 7.2 | 12.0 |
| FEB 28... | 1210 | 1.70 | .35 | .0 | 1900 | 7.2 | 12.0 |
| FEB 28... | 1212 | 2.10 | .30 | .0 | 1900 | 7.2 | 12.0 |
| FEB 28... | 1214 | 2.50 | .30 | .0 | 1890 | 7.2 | 12.0 |
| FEB 28... | 1216 | 2.90 | .27 | .0 | 1880 | 7.2 | 12.0 |
| JUN 15... | 1032 | .50 | .40 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1034 | 1.00 | .40 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1036 | 1.50 | .32 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1038 | 2.00 | .38 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1040 | 2.50 | .38 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1042 | 3.00 | .38 | 19.0 | 2680 | 8.7 | 8.6 |
| JUN 15... | 1044 | 3.50 | .30 | 19.0 | 2660 | 8.7 | 8.6 |
| JUN 15... | 1046 | 4.00 | .30 | 19.0 | 2660 | 8.7 | 8.6 |
| AUG 14... | 0952 | .50 | .37 | 23.0 | 1950 | 8.5 | 8.1 |
| AUG 14... | 0954 | .80 | .38 | 23.0 | 1950 | 8.5 | 8.1 |
| AUG 14... | 0956 | 1.10 | .30 | 23.0 | 1950 | 8.5 | 8.1 |

LITTLE MISSOURI RIVER BASIN

06335500 LITTLE MISSOURI RIVER AT MARMARTH, ND

LOCATION.--Lat 46°17'44", long 103°55'06", in SW¼ sec.30, T.133 N., R.105 W., Slope County, Hydrologic Unit 10110203, on left bank 90 ft downstream from bridge on U.S. Highway 12 in Marmarth, and 1.5 mi downstream from Little Beaver Creek.

DRAINAGE AREA.--4,640 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1938 to current year.

REVISED RECORDS (WATER YEARS).--WSP 896: 1938-39. WSP 1086: 1943-44. WSP 1279: 1943(M), 1945-46, 1948. WSP 1439: 1950 (calendar year figures).

GAGE.--Water-stage recorder. Datum of gage is 2,686.32 ft National Geodetic Vertical Datum of 1929. Prior to June 23, 1950, various nonrecording gages on former highway bridge at present site and datum. June 23, 1950, to Sept. 2, 1957, nonrecording gage at site 90 ft upstream at present datum.

REMARKS.--Records good except those for winter periods, which are poor. Small diversions for irrigation above station.

AVERAGE DISCHARGE.--46 years, 333 ft³/s, 241,300 acre-ft/yr; median of yearly mean discharges, 275 ft³/s, 199,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,000 ft³/s Mar. 23, 1947, gage height, 21.7 ft; maximum gage height, 23.4 ft Mar. 31, 1952, backwater from ice; no flow for part of most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--According to local residents, the greatest known flood prior to 1953 occurred in June 1907 (stage unknown). Other major floods occurred in March 1913, May 1929, and March 1920 and reached stages of about 21.5 ft, 20.2 ft, and 19.7 ft, respectively. These stages are not comparable to stages during period of record, owing to construction of levees.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 3,000 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|-------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| May 8 | 1045 | 3850 | 3.87 | June 21 | 1430 | *6080 | 8.60 |

Minimum daily discharge, 0.50 ft³/s Dec. 24-29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-----------|-------|--------|------|------|------|-------|-------|-------|--------|------|
| 1 | 7.8 | 12 | 3.3 | 1.0 | 170 | 47 | 123 | 1140 | 156 | 348 | 32 | 19 |
| 2 | 45 | 14 | 3.4 | 3.6 | 158 | 46 | 109 | 1850 | 144 | 307 | 196 | 19 |
| 3 | 35 | 14 | 4.4 | 2.7 | 112 | 47 | 103 | 2860 | 129 | 276 | 658 | 17 |
| 4 | 29 | 14 | 4.1 | 1.2 | 91 | 48 | 95 | 3520 | 117 | 248 | 522 | 15 |
| 5 | 24 | 15 | 4.8 | .83 | 112 | 53 | 85 | 3200 | 109 | 223 | 224 | 15 |
| 6 | 21 | 16 | 4.3 | 1.3 | 125 | 45 | 78 | 3000 | 183 | 210 | 164 | 14 |
| 7 | 18 | 16 | 4.6 | 9.9 | 100 | 51 | 71 | 3360 | 163 | 208 | 113 | 12 |
| 8 | 16 | 14 | 3.4 | 48 | 102 | 51 | 66 | 3760 | 149 | 211 | 86 | 14 |
| 9 | 16 | 15 | 3.2 | 33 | 99 | 38 | 57 | 3390 | 276 | 201 | 71 | 15 |
| 10 | 16 | 13 | 3.0 | 27 | 108 | 37 | 53 | 3140 | 1010 | 160 | 61 | 15 |
| 11 | 14 | 10 | 2.5 | 14 | 98 | 35 | 53 | 2840 | 567 | 147 | 51 | 16 |
| 12 | 12 | 15 | 2.5 | 13 | 96 | 34 | 115 | 2470 | 407 | 224 | 44 | 16 |
| 13 | 11 | 27 | 2.5 | 12 | 92 | 47 | 208 | 2110 | 596 | 378 | 41 | 16 |
| 14 | 12 | 18 | 2.3 | 10 | 93 | 65 | 100 | 1770 | 1300 | 292 | 34 | 16 |
| 15 | 14 | 26 | 2.2 | 8.0 | 87 | 96 | 67 | 1420 | 1710 | 209 | 32 | 16 |
| 16 | 20 | 17 | 2.6 | 7.0 | 90 | 118 | 55 | 1110 | 1810 | 151 | 27 | 16 |
| 17 | 22 | 12 | 2.6 | 6.0 | 107 | 155 | 46 | 844 | 2030 | 125 | 27 | 15 |
| 18 | 30 | 9.2 | 2.0 | 3.8 | 104 | 154 | 38 | 684 | 2290 | 108 | 25 | 15 |
| 19 | 25 | 6.3 | 1.6 | 5.0 | 99 | 279 | 30 | 575 | 2740 | 93 | 81 | 14 |
| 20 | 21 | 5.7 | 1.0 | 6.0 | 89 | 321 | 22 | 472 | 3220 | 91 | 70 | 13 |
| 21 | 19 | 2.2 | 1.0 | 7.0 | 96 | 360 | 19 | 386 | 4480 | 108 | 50 | 12 |
| 22 | 18 | 4.0 | 1.0 | 7.0 | 88 | 370 | 20 | 338 | 3350 | 84 | 49 | 12 |
| 23 | 18 | 10 | .75 | 8.0 | 63 | 370 | 19 | 296 | 2990 | 78 | 50 | 14 |
| 24 | 18 | 9.0 | .50 | 9.0 | 72 | 305 | 17 | 263 | 3170 | 75 | 57 | 22 |
| 25 | 15 | 8.0 | .50 | 10 | 64 | 310 | 14 | 239 | 2510 | 66 | 50 | 34 |
| 26 | 14 | 7.0 | .50 | 10 | 65 | 236 | 37 | 229 | 1610 | 62 | 43 | 57 |
| 27 | 14 | 7.7 | .50 | 10 | 56 | 213 | 78 | 222 | 967 | 56 | 34 | 111 |
| 28 | 12 | 5.8 | .50 | 35 | 58 | 180 | 74 | 213 | 680 | 49 | 29 | 133 |
| 29 | 12 | 7.8 | .50 | 200 | 56 | 160 | 141 | 203 | 503 | 44 | 24 | 78 |
| 30 | 12 | 5.0 | .75 | 150 | --- | 147 | 290 | 197 | 396 | 39 | 21 | 54 |
| 31 | 12 | --- | 1.0 | 137 | --- | 132 | --- | 173 | --- | 35 | 19 | --- |
| TOTAL | 572.8 | 355.7 | 67.80 | 796.33 | 2750 | 4550 | 2283 | 46274 | 39762 | 4906 | 2985 | 835 |
| MEAN | 18.5 | 11.9 | 2.19 | 25.7 | 94.8 | 147 | 76.1 | 1493 | 1325 | 158 | 96.3 | 27.8 |
| MAX | 45 | 27 | 4.8 | 200 | 170 | 370 | 290 | 3760 | 4480 | 378 | 658 | 133 |
| MIN | 7.8 | 2.2 | .50 | .83 | 56 | 34 | 14 | 173 | 109 | 35 | 19 | 12 |
| AC-FT | 1140 | 706 | 134 | 1580 | 5450 | 9020 | 4530 | 91780 | 78870 | 9730 | 5920 | 1660 |
| CAL YR 1983 | TOTAL | 80446.90 | | MEAN | 220 | MAX | 2800 | MIN | .50 | AC-FT | 159600 | |
| WTR YR 1984 | TOTAL | 106137.63 | | MEAN | 290 | MAX | 4480 | MIN | .50 | AC-FT | 210500 | |

LITTLE MISSOURI RIVER BASIN

209

06335500 LITTLE MISSOURI RIVER AT MARMARTH, ND--CONTINUED

PERIOD OF RECORD.--Water years 1950-51, 1970 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|--|
| OCT 14... | 1110 | 14 | 2140 | -- | 12.0 | 6.0 | -- | -- | -- | -- | -- | |
| DEC 07... | 1240 | 4.7 | 3510 | -- | -2.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 18... | 1245 | 3.8 | 3000 | -- | -17.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 03... | 1110 | 100 | 880 | 8.3 | -- | .0 | 360 | 236 | 28 | 70 | 130 | |
| MAR 08... | 1050 | 59 | 1650 | -- | -4.0 | .0 | -- | -- | -- | -- | -- | |
| APR 11... | 1125 | 52 | 1540 | -- | 9.0 | 9.0 | -- | -- | -- | -- | -- | |
| JUN 07... | 1120 | 182 | 1300 | -- | 16.0 | 17.0 | -- | -- | -- | -- | -- | |
| AUG 03... | 1100 | 552 | 1200 | -- | 25.0 | 20.0 | -- | -- | -- | -- | -- | |
| SEP 06... | 1135 | 14 | 2140 | 8.4 | -- | 20.5 | 310 | 7 | 61 | 39 | 380 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| FEB 03... | 43 | 3 | 11 | 150 | .000 | 120 | 1.2 | 300 | 9.0 | .20 | 8.2 | 598 |
| SEP 06... | 71 | 10 | 16 | 370 | .000 | 310 | 2.4 | 790 | 16 | .50 | 7.1 | 1480 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| FEB 03... | 630 | .81 | 161 | 1 | 120 | 140 | 0 | 70 | 70 | .2 | 0 | 220 |
| SEP 06... | 1500 | 2.0 | 55 | 1 | 350 | 30 | 0 | 120 | 10 | .2 | 1 | 760 |

LITTLE MISSOURI RIVER BASIN

06336447 DUCK CREEK NEAR WIBAUX, MT

LOCATION.--Lat 46°52'30", long 104°09'18", in SW1/4SW1/4SW1/4 sec.17, T.13 N., R.60 E., Wibaux County, Hydrologic Unit 10110204, on right bank, and 9.5 mi southeast of Wibaux.

DRAINAGE AREA.--46.5 mi².

PERIOD OF RECORD.--March 1978 to September 1981, May 1982 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 2,750 ft, from topographic map.

REMARKS.--Records poor. Some regulation due to stock dams above station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 580 ft³/s Mar. 21, 1978, gage height undetermined; maximum gage height recorded, 4.14 ft Apr. 18, 1979 (backwater from Beaver Creek); no flow during several months each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 169 ft³/s Aug. 2, gage height, 3.16 ft, only peak above base of 20 ft³/s; no flow most days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|------|------|--------|------|------|-------|------|------|-------|------|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .20 | .00 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .04 | .00 | .00 | 21 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | 5.5 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .01 | .00 | .00 | .46 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .17 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .09 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .04 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .24 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .14 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | .00 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .27 | .40 | .00 | 27.26 | .00 |
| MEAN | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .009 | .013 | .000 | .88 | .000 |
| MAX | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .20 | .24 | .00 | .21 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .5 | .8 | .00 | 54 | .00 |
| CAL YR 1983 | TOTAL | 216.51 | MEAN | .59 | MAX 10 | MIN | .00 | AC-FT | 429 | | | |
| WTR YR 1984 | TOTAL | 27.93 | MEAN | .076 | MAX 21 | MIN | .00 | AC-FT | 55 | | | |

LITTLE MISSOURI RIVER BASIN

211

06336600 BEAVER CREEK NEAR TROTTERS, ND

LOCATION.--Lat 47°09'47", long 103°59'32", in SW1/4SW1/4NE1/4 sec.33, T.143 N., R.105 W., Golden Valley County, Hydrologic Unit 10110204, on left bank 100 ft upstream from bridge on county road, 2.4 mi east of Montana-North Dakota State line, 13 mi southwest of Trotters, 17 mi north of Beach, 20 mi upstream from Elk Creek, and 27 mi above mouth.

DRAINAGE AREA.--616 mi², revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year (seasonal records only since 1984).

REVISED RECORDS.--1977: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 2,370 ft, from topographic map.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--6 years (water years 1978-83), 33.3 ft³/s, 24,130 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,720 ft³/s Mar. 29, 1978, gage height, 18.61 ft; maximum gage height, 19.27 ft Mar. 22, 1978, ice jam; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 183 ft³/s June 19, gage height, 6.02 ft, no flow many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|-----|-------|-------|-------|-------|-------|-------|-----|
| 1 | | | | | | 8.0 | 7.6 | 22 | 4.9 | 11 | .07 | .00 |
| 2 | | | | | | 10 | 6.0 | 30 | 5.1 | 9.3 | .11 | .00 |
| 3 | | | | | | 15 | 5.3 | 25 | 4.8 | 8.2 | .19 | .00 |
| 4 | | | | | | 14 | 4.3 | 26 | 3.9 | 6.9 | .11 | .00 |
| 5 | | | | | | 13 | 3.3 | 24 | 4.8 | 5.9 | 9.0 | .00 |
| 6 | | | | | | 12 | 2.8 | 26 | 5.9 | 5.1 | 22 | .00 |
| 7 | | | | | | 10 | 2.2 | 58 | 6.1 | 4.4 | 13 | .00 |
| 8 | | | | | | 8.0 | 1.7 | 60 | 7.1 | 3.6 | 7.5 | .00 |
| 9 | | | | | | 7.0 | 1.4 | 47 | 6.2 | 2.9 | 4.8 | .00 |
| 10 | | | | | | 7.0 | 1.2 | 36 | 6.0 | 2.3 | 3.3 | .00 |
| 11 | | | | | | 6.0 | 1.1 | 30 | 5.7 | 2.0 | 2.1 | .00 |
| 12 | | | | | | 6.0 | 2.4 | 26 | 6.3 | 1.6 | 1.5 | .00 |
| 13 | | | | | | 5.5 | 5.3 | 22 | 6.4 | 1.4 | 1.1 | .00 |
| 14 | | | | | | 5.5 | 5.1 | 18 | 6.1 | 1.1 | .83 | .00 |
| 15 | | | | | | 5.0 | 5.2 | 14 | 28 | .97 | .65 | .00 |
| 16 | | | | | | 5.0 | 6.9 | 12 | 32 | .74 | .45 | .00 |
| 17 | | | | | | 5.0 | 8.5 | 11 | 8.1 | .55 | .32 | .00 |
| 18 | | | | | | 7.0 | 9.1 | 9.6 | 20 | .42 | .24 | .00 |
| 19 | | | | | | 15 | 8.6 | 10 | 90 | .36 | .14 | .00 |
| 20 | | | | | | 35 | 8.4 | 10 | 14 | .34 | .11 | .00 |
| 21 | | | | | | 30 | 7.8 | 8.7 | 35 | .30 | .07 | .00 |
| 22 | | | | | | 24 | 7.2 | 9.9 | 22 | .36 | .06 | .00 |
| 23 | | | | | | 30 | 6.4 | 10 | 15 | .32 | .04 | .00 |
| 24 | | | | | | 38 | 6.4 | 9.6 | 11 | .25 | .03 | .01 |
| 25 | | | | | | 26 | 5.9 | 8.8 | 8.9 | .24 | .03 | .01 |
| 26 | | | | | | 27 | 7.0 | 8.6 | 7.0 | .19 | .02 | .01 |
| 27 | | | | | | 17 | 11 | 8.0 | 25 | .35 | .01 | .01 |
| 28 | | | | | | 12 | 10 | 7.6 | 23 | .10 | .01 | .01 |
| 29 | | | | | | 9.0 | 13 | 7.1 | 18 | .07 | .01 | .01 |
| 30 | | | | | | 9.8 | 21 | 6.1 | 14 | .07 | .01 | .01 |
| 31 | | | | | | 10 | --- | 5.7 | --- | .06 | .01 | --- |
| TOTAL | | | | | | 431.8 | 192.1 | 606.7 | 450.3 | 71.39 | 67.82 | .07 |
| MEAN | | | | | | 13.9 | 6.40 | 19.6 | 15.0 | 2.30 | 2.19 | .00 |
| MAX | | | | | | 38 | 21 | 60 | 90 | 11 | 22 | .01 |
| MIN | | | | | | 5.0 | 1.1 | 5.7 | 3.9 | .06 | .01 | .00 |
| AC-FT | | | | | | 856 | 381 | 1200 | 893 | 142 | 135 | .1 |

LITTLE MISSOURI RIVER BASIN

06336600 BEAVER CREEK NEAR TROTTERS, ND--CONTINUED

PERIOD OF RECORD.--Water years 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 03... | 1200 | .04 | 2400 | -- | 10.0 | 10.0 | -- | -- | -- | -- | -- | |
| FEB 29... | 1055 | 5.6 | 2690 | 7.8 | 2.5 | .0 | -- | -- | -- | -- | -- | |
| MAR 23... | 1215 | 35 | 2140 | -- | 10.5 | 1.5 | -- | -- | -- | -- | -- | |
| APR 16... | 1100 | 5.2 | 2110 | -- | 14.0 | 12.0 | -- | -- | -- | -- | -- | |
| MAY 11... | 1350 | 30 | 2150 | -- | 15.5 | 14.0 | -- | -- | -- | -- | -- | |
| JUN 26... | 1050 | 7.0 | 2350 | -- | 22.0 | 21.0 | -- | -- | -- | -- | -- | |
| JUL 16... | 1040 | .77 | 2620 | 8.3 | 24.0 | 22.0 | 590 | 245 | 81 | 93 | 390 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| JUL 16... | 59 | 7 | 12 | 420 | .000 | 340 | 3.3 | 1000 | 7.9 | .20 | 1.2 | 1910 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| FEB 29... | 1820 | 2.5 | -- | 1 | 360 | 40 | 1 | 60 | 20 | .2 | 0 | 130 |
| JUL 16... | 1800 | 2.6 | 4.0 | 7 | 640 | 40 | 0 | 80 | 30 | .3 | 1 | 820 |

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND

LOCATION.--Lat 47°35'25", long 103°15'05", in NW1/4SE1/4 sec.35, T.148 N., R.99 W., McKenzie County, Hydrologic Unit 10110205, at bridge on U.S. Highway 85, 17 mi upstream from Cherry Creek, and 17.5 mi south of Watford City.

DRAINAGE AREA.--8,310 mi² approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1934 to current year.

REVISED RECORDS (WATER YEARS).--WSP 926: 1935. WSP 1270: 1943.

GAGE.--Water-stage recorder and supplemental nonrecording gage. Datum of gage is 1,929.03 ft National Geodetic Vertical Datum of 1929. Oct. 2, 1959, to June 17, 1963, water-stage recorder at present site and datum. June 18, 1963, to Nov. 28, 1964, at site 700 ft upstream at present datum. See WSP 1729 or 1917 for history of changes prior to Oct. 2, 1959.

REMARKS.--Records fair except those for the winter period, which are poor.

AVERAGE DISCHARGE.--50 years, 590 ft³/s, 427,500 acre-ft/yr; median of yearly mean discharges, 470 ft³/s, 340,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 110,000 ft³/s Mar. 25, 1947, gage height, 24.0 ft from flood-mark, site then in use; no flow at times in most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,200 ft³/s June 24, gage height, 5.77 ft, no peak above base of 8,000 ft³/s maximum gage height, 8.00 ft Mar. 21, backwater from ice; no flow Dec. 24 - Jan. 27.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-----------------|------|--------|--------|-------|-------|-------|--------|-------|-------|--------|------|
| 1 | 27 | 26 | 16 | .00 | 400 | 280 | 450 | 1140 | 236 | 1260 | 86 | 34 |
| 2 | 34 | 27 | 14 | .00 | 325 | 325 | 395 | 1240 | 216 | 980 | 72 | 33 |
| 3 | 34 | 34 | 12 | .00 | 250 | 300 | 361 | 1160 | 205 | 780 | 78 | 32 |
| 4 | 33 | 33 | 12 | .00 | 325 | 280 | 325 | 1360 | 194 | 607 | 80 | 32 |
| 5 | 42 | 31 | 11 | .00 | 500 | 280 | 302 | 2000 | 194 | 500 | 385 | 31 |
| 6 | 50 | 28 | 10 | .00 | 350 | 270 | 272 | 2680 | 208 | 430 | 352 | 28 |
| 7 | 56 | 26 | 10 | .00 | 300 | 270 | 244 | 3250 | 226 | 375 | 330 | 30 |
| 8 | 56 | 25 | 9.0 | .00 | 350 | 260 | 233 | 2870 | 208 | 312 | 530 | 37 |
| 9 | 76 | 26 | 8.0 | .00 | 380 | 260 | 216 | 3070 | 316 | 233 | 455 | 37 |
| 10 | 65 | 26 | 8.0 | .00 | 300 | 250 | 205 | 3150 | 268 | 240 | 338 | 33 |
| 11 | 50 | 36 | 7.0 | .00 | 350 | 250 | 191 | 3430 | 222 | 226 | 236 | 31 |
| 12 | 44 | 72 | 7.0 | .00 | 400 | 250 | 191 | 3090 | 280 | 198 | 194 | 30 |
| 13 | 41 | 41 | 6.0 | .00 | 420 | 240 | 167 | 2990 | 518 | 170 | 158 | 28 |
| 14 | 38 | 33 | 6.0 | .00 | 400 | 240 | 155 | 2830 | 1180 | 155 | 130 | 27 |
| 15 | 34 | 23 | 5.0 | .00 | 400 | 230 | 149 | 2380 | 916 | 132 | 105 | 27 |
| 16 | 36 | 27 | 5.0 | .00 | 350 | 240 | 140 | 2160 | 705 | 122 | 86 | 25 |
| 17 | 36 | 34 | 4.0 | .00 | 400 | 240 | 132 | 1980 | 1540 | 122 | 78 | 24 |
| 18 | 33 | 41 | 3.0 | .00 | 425 | 260 | 128 | 1650 | 1250 | 230 | 68 | 23 |
| 19 | 32 | 46 | 2.0 | .00 | 370 | 325 | 184 | 1400 | 2410 | 191 | 62 | 23 |
| 20 | 32 | 52 | 2.0 | .00 | 360 | 600 | 161 | 1160 | 2830 | 184 | 100 | 24 |
| 21 | 31 | 65 | 1.0 | .00 | 450 | 1600 | 146 | 916 | 3430 | 152 | 143 | 22 |
| 22 | 30 | 70 | 1.0 | .00 | 370 | 1500 | 122 | 828 | 3450 | 128 | 115 | 24 |
| 23 | 31 | 44 | 1.0 | .00 | 370 | 1010 | 110 | 748 | 4130 | 120 | 95 | 22 |
| 24 | 31 | 34 | .00 | .00 | 350 | 1190 | 100 | 642 | 5260 | 112 | 70 | 25 |
| 25 | 30 | 32 | .00 | .00 | 420 | 1420 | 92 | 600 | 3580 | 102 | 50 | 32 |
| 26 | 26 | 28 | .00 | .00 | 370 | 1130 | 95 | 512 | 2870 | 98 | 38 | 30 |
| 27 | 25 | 24 | .00 | .00 | 280 | 940 | 233 | 450 | 3370 | 88 | 33 | 25 |
| 28 | 22 | 22 | .00 | 5.0 | 300 | 924 | 240 | 390 | 2950 | 84 | 30 | 24 |
| 29 | 21 | 20 | .00 | 30 | 360 | 740 | 544 | 330 | 2240 | 82 | 28 | 23 |
| 30 | 24 | 18 | .00 | 200 | --- | 635 | 916 | 284 | 1690 | 82 | 28 | 34 |
| 31 | 26 | --- | .00 | 450 | --- | 518 | --- | 256 | --- | 92 | 26 | --- |
| TOTAL | 1146 | 1044 | 160.00 | 685.00 | 10625 | 17257 | 7199 | 50946 | 47092 | 8587 | 4579 | 850 |
| MEAN | 37.0 | 34.8 | 5.16 | 22.1 | 366 | 557 | 240 | 1643 | 1570 | 277 | 148 | 28.3 |
| MAX | 76 | 72 | 16 | 450 | 500 | 1600 | 916 | 3430 | 5260 | 1260 | 530 | 37 |
| MIN | 21 | 18 | .00 | .00 | 250 | 230 | 92 | 256 | 194 | 82 | 26 | 22 |
| AC-FT | 2270 | 2070 | 317 | 1360 | 21070 | 34230 | 14280 | 101100 | 93410 | 17030 | 9080 | 1690 |
| CAL YR 1983 | TOTAL 144772.00 | | | MEAN | 397 | MAX | 4000 | MIN | .00 | AC-FT | 287200 | |
| WTR YR 1984 | TOTAL 150170.00 | | | MEAN | 410 | MAX | 5260 | MIN | .00 | AC-FT | 297900 | |

LITTLE MISSOURI RIVER BASIN

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND--CONTINUED
(National stream-quality accounting network station)

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI KF AGAR (COLS. PER 100 ML) (31673) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 12... | 0950 | 47 | 2270 | 8.4 | 7.0 | 5.5 | 1800 | 11.0 | 94 | 50 | 40 |
| NOV 18... | 1050 | 42 | 2440 | 8.3 | 4.5 | 2.5 | -- | 12.0 | -- | -- | -- |
| MAR 26... | 1355 | 1060 | 1030 | 8.3 | 7.5 | 1.5 | 2900 | 12.2 | 95 | -- | -- |
| JUN 19... | 1205 | 3280 | 1080 | 7.8 | 26.0 | 22.0 | -- | 8.0 | 99 | -- | -- |
| JUN 21... | 1155 | 3280 | 1070 | 7.8 | 26.0 | 22.0 | 280 | 8.0 | 99 | 70 | 75 |
| AUG 15... | 1035 | 109 | 1600 | 8.3 | 19.0 | 20.5 | 700 | 8.5 | 102 | 50 | 40 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|--------------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| OCT 12... | 320 | 0 | 71 | 34 | 440 | 74 | 11 | 9.6 | 347 | 2.6 | 880 | 17 |
| MAR 26... | 130 | 0 | 29 | 14 | 170 | 73 | 7 | 6.6 | 171 | 1.6 | 320 | 7.2 |
| JUN 21... | 210 | 93 | 50 | 20 | 160 | 62 | 5 | 8.2 | 115 | 3.5 | 390 | 6.0 |
| AUG 15... | 200 | 0 | 48 | 19 | 280 | 74 | 9 | 9.9 | 229 | 2.2 | 540 | 9.3 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS P04) (71886) |
|--------------|---|--|---|--|--|--|--|--|---|--|---|
| OCT 12... | .40 | 5.5 | 1600 | 1700 | 2.2 | 203 | <.10 | .06 | 1.3 | 1.00 | 3.1 |
| MAR 26... | .30 | 6.0 | 705 | 660 | .96 | 2020 | .52 | .27 | 7.0 | 37.0 | 110 |
| JUN 21... | .40 | 8.3 | 664 | 710 | .90 | 5880 | .77 | .10 | 13 | 6.40 | -- |
| AUG 15... | .50 | 11 | 1070 | 1100 | 1.5 | 315 | .69 | .05 | 5.9 | 1.60 | -- |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS P04) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|--------------|---|---|--|--|---|---|---|--|---|---|---|
| OCT 12... | .010 | <.010 | -- | 50 | 1 | <100 | <1 | <1 | <1 | 6 | 50 |
| MAR 26... | .030 | .020 | .06 | 120 | <1 | 29 | <1 | <1 | <3 | 11 | 110 |
| JUN 21... | .020 | .020 | .06 | 150 | 1 | 45 | <1 | <1 | <3 | 6 | 55 |
| AUG 15... | .030 | .040 | .12 | 20 | 2 | 52 | <1 | <1 | <3 | 9 | 34 |

LITTLE MISSOURI RIVER BASIN

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06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|---|---|--|---|--|---|---|---|---|
| OCT 12... | 5 | 80 | 20 | .2 | 6 | 7 | 1 | 1 | 640 | 4 | <10 |
| MAR 26... | <1 | 32 | 6 | .3 | <10 | 2 | <1 | <1 | 270 | <6 | 7 |
| JUN 21... | 8 | 57 | 5 | .2 | 10 | 7 | 1 | <1 | 450 | <6 | 19 |
| AUG 15... | <1 | 64 | 3 | <.1 | 10 | 7 | 3 | <1 | 440 | <6 | 9 |

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) |
|--------------|------|--|--|--|--|
| OCT 12... | 0950 | 47 | 2940 | 373 | -- |
| MAR 26... | 1355 | 1060 | 10300 | 29500 | 88 |
| JUN 21... | 1155 | 3280 | 13500 | 120000 | -- |
| AUG 15... | 1035 | 109 | 3790 | 1120 | -- |

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|--------------|------|--|---|--|--|---|--|
| OCT 12... | 1002 | 8.00 | .18 | 5.2 | 2250 | 8.5 | 11.2 |
| 12... | 1004 | 16.0 | .45 | 5.2 | 2250 | 8.5 | 11.2 |
| 12... | 1006 | 24.0 | .58 | 5.4 | 2260 | 8.5 | 11.1 |
| 12... | 1008 | 32.0 | .70 | 5.5 | 2260 | 8.4 | 11.0 |
| 12... | 1010 | 40.0 | .85 | 5.5 | 2270 | 8.4 | 11.0 |
| 12... | 1012 | 48.0 | .85 | 5.5 | 2270 | 8.4 | 11.0 |
| 12... | 1014 | 56.0 | .95 | 5.5 | 2270 | 8.4 | 11.0 |
| 12... | 1016 | 64.0 | .85 | 5.5 | 2280 | 8.4 | 11.0 |
| 12... | 1018 | 72.0 | .60 | 5.5 | 2280 | 8.5 | 11.1 |
| MAR 26... | 1250 | 20.0 | .00 | 1.5 | 1010 | 8.2 | 12.1 |
| 26... | 1300 | 40.0 | .00 | 1.5 | 1010 | 8.2 | 12.1 |
| 26... | 1310 | 60.0 | .00 | 1.5 | 1020 | 8.3 | 12.1 |
| 26... | 1320 | 80.0 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| 26... | 1330 | 100 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| 26... | 1335 | 120 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| 26... | 1340 | 140 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| 26... | 1345 | 160 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| 26... | 1350 | 180 | .00 | 1.5 | 1030 | 8.3 | 12.2 |
| JUN 19... | 1205 | 50.0 | 2.8 | 22.0 | 1080 | 7.8 | 8.0 |
| 19... | 1210 | 100 | 3.2 | 22.0 | 1070 | 7.8 | 8.0 |
| 19... | 1215 | 150 | 3.0 | 22.0 | 1070 | 7.8 | 8.0 |
| 19... | 1220 | 200 | 3.8 | 22.0 | 1070 | 7.8 | 8.0 |
| 19... | 1225 | 250 | 2.0 | 22.0 | 1070 | 7.8 | 8.1 |
| 19... | 1230 | 300 | 1.2 | 22.0 | 1080 | 7.8 | 8.2 |
| 19... | 1235 | 350 | 3.0 | 22.0 | 1070 | 7.8 | 8.0 |

LITTLE MISSOURI RIVER BASIN

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| AUG | | | | | | | |
| 15... | 1042 | 5.00 | 1.0 | 20.5 | 1590 | 8.5 | 8.4 |
| 15... | 1044 | 10.0 | 1.5 | 20.5 | 1580 | 8.5 | 8.5 |
| 15... | 1046 | 15.0 | 1.8 | 20.5 | 1580 | 8.5 | 8.5 |
| 15... | 1048 | 20.0 | 1.8 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1050 | 25.0 | 1.5 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1052 | 30.0 | 1.3 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1054 | 35.0 | 1.2 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1058 | 40.0 | 1.3 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1100 | 45.0 | 1.3 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1102 | 50.0 | 1.3 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1104 | 55.0 | 1.5 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1106 | 60.0 | 1.6 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1108 | 65.0 | 1.6 | 20.5 | 1600 | 8.5 | 8.5 |
| 15... | 1110 | 70.0 | 2.0 | 20.5 | 1590 | 8.5 | 8.5 |
| 15... | 1112 | 75.0 | 1.8 | 20.5 | 1570 | 8.5 | 8.5 |

MISSOURI RIVER MAIN STEM

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06338000 LAKE SAKAKAWEA NEAR RIVERDALE, ND

LOCATION.--Lat 47°30'10", long 101°25'50", in S1/2 sec.31, T.147 N., R.84 W., Mercer County, Hydrologic Unit 10110101, in control structure of Garrison Dam, 2.5 mi west of Riverdale, 14 mi upstream from Knife River, and at mile 1,389.9.

DRAINAGE AREA.--181,400 mi², approximately.

PERIOD OF RECORD.--October 1953 to current year. Prior to October 1966, published as Garrison Reservoir near Riverdale.

REVISED RECORDS.--WSP 1559: 1957(M).

GAGE.--Water-stage recorder. Datum of gage is at National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by earth-fill dam; storage began in November 1953. Maximum capacity, 24,200,000 acre-ft below elevation 1,854.0 ft, top of 29-ft gates. Normal maximum, 22,700,000 acre-ft below elevation 1,850.0 ft, of which about 4,300,000 acre-ft is designated for flood control. Elevation of crest of spillway, 1,825.0 ft, surmounted by radial gates. Inactive storage, 5,000,000 acre-ft below elevation 1,775.0 ft. Dead storage, zero at elevation 1,672.0 ft. Snake Creek arm of the reservoir has connecting gate to main reservoir, with sill at elevation, 1,810 ft. Figures herein represent total contents.

COOPERATION.--Elevations and contents are furnished by the Corps of Engineers. Elevations are observed elevations at midnight on the last day of each month. Contents are computed based on reservoir inflow, reservoir outflow, evaporation, and rainfall; and are adjusted for wind effect.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 24,368,000 acre-ft July 25, 1975, elevation, 1,854.6 ft; minimum since first reaching normal maximum level in July of 1969, 14,742,000 acre-ft Mar. 13, 1978, elevation, 1,825.2 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 22,248,000 acre-ft July 14, elevation, 1849.5 ft; minimum, 18,643,000 acre-ft Mar. 6, elevation, 1,838.9 ft.

MONTHEND ELEVATION AND CONTENTS, AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 1843.1 | 20,009,000 | -- |
| Oct. 31----- | 1843.4 | 20,110,000 | +101,000 |
| Nov. 30----- | 1843.2 | 20,043,000 | -67,000 |
| Dec. 31----- | 1841.4 | 19,445,000 | -598,000 |
| CAL YR 1983----- | -- | -- | -197,000 |
| Jan. 31----- | 1840.0 | 18,991,000 | -454,000 |
| Feb. 29----- | 1839.1 | 18,705,000 | -286,000 |
| Mar. 31----- | 1839.5 | 18,832,000 | +127,000 |
| Apr. 30----- | 1839.5 | 18,832,000 | 0 |
| May 31----- | 1842.4 | 19,775,000 | +943,000 |
| June 30----- | 1847.7 | 21,600,000 | +1,825,000 |
| July 31----- | 1849.2 | 22,139,000 | +539,000 |
| Aug. 31----- | 1847.2 | 21,423,000 | -716,000 |
| Sept. 30----- | 1845.2 | 20,724,000 | -699,000 |
| WTR YR 1984----- | -- | -- | +715,000 |

MISSOURI RIVER MAIN STEM

06338490 MISSOURI RIVER AT GARRISON DAM, ND

LOCATION.--Lat 47°30'08", long 101°25'50", in S sec.31, T.147 N., R.84 W., Mercer County, Hydrologic Unit 10130101, downstream from dam at National Fish Hatchery's supply line from penstocks 4 and 5, in control structure of Garrison Dam, 2.5 mi west of Riverdale, 14 mi upstream from Knife River, and at mile 1,389.9.

DRAINAGE AREA.--181,400 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Flow meter and gate readings.

REMARKS.--Records good. Many diversions above station. Flow regulated by Lake Sakakawea (station 06338000). Prior to October 1969 records were obtained at a site 9.1 mi downstream. Discharges at the downstream site were generally about 7 percent greater than those furnished by the Corps of Engineers for the present site.

COOPERATION.--Records furnished by the Corps of Engineers.

AVERAGE DISCHARGE.--15 years, 25,030 ft³/s, 18,130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 65,200 ft³/s July 25, 1975; minimum daily, 6,000 ft³/s Sept. 29, 1974.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 29,400 ft³/s Jan. 19; minimum daily, 11,000 ft³/s June 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|---------|---------|---------|---------|--------|--------|--------|---------------|---------|---------|
| 1 | 18800 | 12500 | 19500 | 24300 | 29000 | 23200 | 14000 | 14500 | 16200 | 11800 | 26200 | 28600 |
| 2 | 18900 | 12600 | 20200 | 22700 | 27200 | 23300 | 13600 | 14900 | 16300 | 12700 | 26600 | 27500 |
| 3 | 18300 | 14700 | 20900 | 23400 | 27200 | 23100 | 13800 | 13700 | 16400 | 12900 | 26100 | 28400 |
| 4 | 18300 | 15800 | 22500 | 23600 | 27100 | 23000 | 14100 | 13600 | 16100 | 15100 | 27300 | 28000 |
| 5 | 18000 | 14900 | 23400 | 24300 | 27400 | 23200 | 18000 | 14000 | 16700 | 15200 | 28000 | 27700 |
| 6 | 15800 | 15500 | 23500 | 24600 | 27700 | 21100 | 17900 | 14200 | 16600 | 15100 | 26900 | 27100 |
| 7 | 14000 | 17000 | 23100 | 24500 | 27600 | 19800 | 18200 | 13600 | 16400 | 15100 | 27700 | 27800 |
| 8 | 11700 | 17400 | 23300 | 24300 | 27200 | 20300 | 18100 | 14400 | 16300 | 17800 | 26700 | 27800 |
| 9 | 11600 | 16900 | 19900 | 24800 | 26700 | 20100 | 17600 | 13800 | 15600 | 18700 | 27200 | 27700 |
| 10 | 12100 | 17400 | 20200 | 25300 | 27200 | 19900 | 17600 | 14600 | 15700 | 19900 | 27500 | 27400 |
| 11 | 12700 | 17400 | 20300 | 26300 | 26900 | 20200 | 18000 | 13900 | 15700 | 20300 | 28000 | 28400 |
| 12 | 11900 | 17000 | 20100 | 26800 | 26400 | 19700 | 18200 | 13500 | 16800 | 23200 | 27800 | 29100 |
| 13 | 12000 | 17000 | 19900 | 28000 | 27500 | 19700 | 18200 | 12200 | 16600 | 23300 | 27300 | 27600 |
| 14 | 12300 | 17000 | 19800 | 28400 | 26800 | 19700 | 17000 | 13500 | 15400 | 23200 | 27500 | 27800 |
| 15 | 12500 | 16800 | 19900 | 27800 | 26700 | 20200 | 12600 | 13500 | 12600 | 23200 | 27000 | 26200 |
| 16 | 12300 | 17100 | 19800 | 27200 | 27300 | 20000 | 18300 | 13200 | 12600 | 23200 | 26700 | 23800 |
| 17 | 11800 | 16800 | 20000 | 29100 | 27300 | 17600 | 18200 | 13400 | 13900 | 24000 | 27300 | 23400 |
| 18 | 12600 | 16900 | 19800 | 29000 | 26700 | 15900 | 18400 | 13700 | 13000 | 25200 | 27700 | 23500 |
| 19 | 12600 | 17000 | 20700 | 29400 | 27200 | 15700 | 18200 | 13800 | 12900 | 25300 | 27000 | 23700 |
| 20 | 12100 | 17100 | 22800 | 28400 | 27000 | 16400 | 16400 | 13800 | 11600 | 26200 | 27100 | 23800 |
| 21 | 12100 | 18000 | 21600 | 28100 | 27100 | 16300 | 15000 | 13500 | 11100 | 26600 | 27100 | 23200 |
| 22 | 12700 | 17200 | 21900 | 29000 | 27500 | 16300 | 14100 | 13500 | 11800 | 26600 | 27300 | 23700 |
| 23 | 12700 | 17300 | 23300 | 28200 | 27400 | 16200 | 13900 | 13000 | 11500 | 26500 | 26500 | 23200 |
| 24 | 12600 | 16600 | 23500 | 28200 | 27200 | 15700 | 14100 | 12900 | 11800 | 26000 | 26900 | 23600 |
| 25 | 12300 | 16800 | 23900 | 28200 | 24900 | 16100 | 14400 | 12600 | 11000 | 25700 | 26900 | 23200 |
| 26 | 16300 | 17000 | 23400 | 28200 | 23900 | 16000 | 14600 | 13400 | 11900 | 25700 | 27500 | 23100 |
| 27 | 12300 | 16800 | 24000 | 28200 | 23400 | 16100 | 14500 | 13500 | 11500 | 25900 | 27600 | 22800 |
| 28 | 12100 | 17100 | 23900 | 28100 | 23000 | 15700 | 14800 | 13000 | 11500 | 26100 | 26900 | 23000 |
| 29 | 12300 | 17500 | 23300 | 28100 | 23300 | 15900 | 14600 | 12800 | 11900 | 26800 | 27300 | 23600 |
| 30 | 11700 | 17800 | 23500 | 28300 | --- | 15400 | 15000 | 13100 | 11500 | 26300 | 26900 | 23100 |
| 31 | 14600 | --- | 23700 | 28300 | --- | 15400 | --- | 16100 | --- | 27100 | 28500 | --- |
| TOTAL | 422000 | 496900 | 675600 | 833100 | 771800 | 577200 | 481400 | 423200 | 418900 | 680700 | 843000 | 767800 |
| MEAN | 13610 | 16560 | 21790 | 26870 | 26610 | 18620 | 16050 | 13650 | 13960 | 21960 | 27190 | 25590 |
| MAX | 18900 | 18000 | 24000 | 29400 | 29000 | 23300 | 18400 | 16100 | 16800 | 27100 | 28500 | 29100 |
| MIN | 11600 | 12500 | 19500 | 22700 | 23000 | 15400 | 12600 | 12200 | 11000 | 11800 | 26100 | 22800 |
| AC-FT | 837000 | 985600 | 1340000 | 1652000 | 1531000 | 1145000 | 954900 | 839400 | 830900 | 1350000 | 1672000 | 1523000 |
| CAL YR 1983 | TOTAL | 7670700 | | MEAN | 21020 | MAX | 31100 | MIN | 11600 | AC-FT15215000 | | |
| WTR YR 1984 | TOTAL | 7391600 | | MEAN | 20200 | MAX | 29400 | MIN | 11000 | AC-FT14661000 | | |

MISSOURI RIVER MAIN STEM

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06338490 MISSOURI RIVER AT GARRISON DAM, ND--CONTINUED
(National stream-quality accounting network station)

LOCATION.--Samples collected at National Fish Hatchery's supply line from penstocks 4 and 5, in control structure of Garrison Dam.

PERIOD OF RECORD.--Water years 1972 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1971 to current year.

WATER TEMPERATURES: October 1971 to current year.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 870 micromhos May 4, 18, 19, July 4, 1980; minimum daily, 553 micromhos Dec. 24, 1975.

WATER TEMPERATURES: Maximum daily, 18.0°C Sept. 11, 12, 1980 and Sept. 11, 1981; minimum daily, 0.0°C on many days during winter months.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily, 740 micromhos Dec. 12, Jan. 20; minimum daily, 560 micromhos May 18.

WATER TEMPERATURES: Maximum daily, 17.0°C Sept. 6, 21, 22; minimum observed 1.5°C Dec. 29, Jan. 2.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SPECIFIC CONDUCTANCE (UMHOS) (00095) | PH (STANDARD UNITS) (00400) | TEMPERATURE AIR (DEG C) (00020) | TEMPERATURE (DEG C) (00010) | TURBIDITY (NTU) (00076) | OXYGEN, DIS-SOLVED (MG/L) (00300) | OXYGEN, DIS-SOLVED SATURATION (00301) | COLIFORM, 0.7 UM-MF (COLS./100 ML) (31625) | STREPTOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673) | |
|-----------|---|---|---|---|--|---|--|--|---|---|--|
| OCT 05... | 1000 | 645 | 8.2 | 9.0 | 12.0 | -- | 7.9 | 73 | <1 | K2 | |
| NOV 08... | 1230 | 665 | 8.3 | 4.5 | 10.5 | -- | 9.6 | 86 | <1 | <1 | |
| JAN 24... | 0910 | 715 | 8.4 | 3.0 | 2.5 | .80 | 11.7 | 87 | <1 | <1 | |
| MAR 14... | 0900 | 710 | 7.8 | - .9 | 3.0 | .50 | 12.3 | 93 | <1 | <1 | |
| APR 25... | 0900 | 690 | 7.6 | 17.0 | 4.5 | .40 | 10.0 | 78 | <1 | K6 | |
| JUN 06... | 0950 | 645 | 7.6 | 18.0 | 9.0 | -- | 10.1 | 89 | <1 | 28 | |
| JUL 11... | 0900 | 650 | 7.9 | -- | 11.0 | -- | 9.0 | 81 | -- | -- | |
| AUG 29... | 0910 | 660 | 7.6 | 21.0 | 11.5 | 1.4 | 7.3 | 67 | <1 | K6 | |
| DATE | HARDNESS (MG/L AS CaCO3) (00900) | HARDNESS NONCARBONATE (MG/L AS CaCO3) (95902) | CALCIUM DIS-SOLVED (MG/L AS Ca) (00915) | MAGNESIUM, DIS-SOLVED (MG/L AS Mg) (00925) | SODIUM, DIS-SOLVED (MG/L AS Na) (00930) | PERCENT SODIUM (00932) | SODIUM ADSORPTION RATIO (00931) | POTASSIUM, DIS-SOLVED (MG/L AS K) (00935) | ALKALINITY LAB (MG/L AS CaCO3) (90410) | CARBON DIOXIDE DIS-SOLVED (MG/L AS CO2) (00405) | SULFATE DIS-SOLVED (MG/L AS SO4) (00945) |
| JAN 24... | 210 | 58 | 51 | 21 | 61 | 38 | 2 | 3.9 | 156 | 1.2 | 190 |
| MAR 14... | 220 | 58 | 53 | 22 | 65 | 38 | 2 | 3.9 | 166 | 5.1 | 190 |
| APR 25... | 210 | 49 | 50 | 21 | 61 | 38 | 2 | 4.0 | 163 | 7.9 | 200 |
| AUG 29... | 210 | 55 | 50 | 21 | 58 | 37 | 2 | 3.7 | 157 | 7.6 | 180 |
| DATE | CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940) | FLUORIDE, DIS-SOLVED (MG/L AS F) (00950) | SILICA, DIS-SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303) | NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631) | NITROGEN, AMMONIA DIS-SOLVED (MG/L AS NH4) (71846) | NITROGEN, AMMONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOSPHORUS, TOTAL (MG/L AS P) (00665) | PHOSPHORUS, TOTAL (MG/L AS PO4) (71886) |
| JAN 24... | 10 | .50 | 6.3 | 440 | 440 | .60 | <.10 | .14 | <.20 | .010 | .03 |
| MAR 14... | 11 | .50 | 6.9 | 452 | 450 | .61 | <.10 | .09 | <.20 | .030 | .09 |
| APR 25... | 11 | .40 | 6.7 | 568 | 450 | .77 | .13 | .12 | .80 | .010 | .03 |
| AUG 29... | 10 | .50 | 6.6 | 417 | 420 | .57 | <.10 | .05 | .50 | .010 | -- |

MISSOURI RIVER MAIN STEM

06338490 MISSOURI RIVER AT GARRISON DAM, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|--------------|---|---|--|--|--|---|--|--|---|---|---|
| JAN 24... | <.010 | .050 | .15 | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR 14... | .010 | .030 | .09 | <10 | <1 | 50 | <1 | <1 | <3 | 1 | 17 |
| APR 25... | .010 | .030 | .09 | <10 | 2 | 57 | <1 | <1 | <3 | 12 | 13 |
| AUG 29... | .010 | <.010 | -- | <10 | 2 | 52 | <1 | <1 | <3 | 9 | 4 |
| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
| MAR 14... | <1 | 46 | 4 | <.1 | <10 | 2 | <1 | <1 | 530 | <6 | 24 |
| APR 25... | <1 | 47 | 5 | .3 | <10 | 2 | 1 | <1 | 500 | <6 | 23 |
| AUG 29... | <1 | 46 | 4 | .1 | <10 | <1 | <1 | <1 | 510 | <6 | 6 |

06338490 MISSOURI RIVER AT GARRISON DAM, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|------|-----|-----|-----|-----|-----|-----|------|------|------|------|
| 1 | 16.0 | 13.0 | 7.5 | --- | 4.0 | 4.0 | 5.5 | 5.5 | 9.5 | 18.5 | 15.5 | 17.5 |
| 2 | 16.0 | 13.0 | 7.0 | --- | 4.0 | 4.0 | 5.0 | 5.5 | 9.0 | 19.0 | 15.0 | 19.0 |
| 3 | 15.5 | 12.5 | 6.5 | --- | 4.0 | 4.0 | 5.5 | 6.0 | 9.5 | 18.5 | 15.5 | 17.5 |
| 4 | 14.5 | 12.5 | 7.0 | --- | 4.0 | 4.0 | 5.0 | 6.0 | 11.0 | 20.5 | 15.0 | 17.5 |
| 5 | 14.0 | 13.0 | 6.0 | --- | 4.0 | 4.0 | 5.0 | 6.0 | 10.5 | 16.5 | 15.5 | 17.5 |
| 6 | 15.0 | 12.5 | 5.5 | --- | 4.0 | 3.5 | 5.0 | 7.5 | 10.0 | 13.5 | 16.5 | 17.5 |
| 7 | 15.0 | 12.0 | 5.5 | --- | 3.5 | 3.0 | 5.0 | 6.5 | 10.0 | 16.0 | 17.0 | 18.0 |
| 8 | 14.5 | 12.0 | 5.0 | --- | 4.5 | 5.0 | 4.5 | 6.5 | 10.0 | 17.0 | 16.5 | 18.5 |
| 9 | 14.5 | 11.5 | 5.0 | --- | 4.5 | 4.0 | 5.0 | 6.5 | 10.0 | 16.5 | 17.0 | 18.5 |
| 10 | 14.5 | 11.5 | 5.0 | --- | 4.0 | 3.5 | 5.0 | 6.5 | 10.0 | 14.5 | 17.0 | 19.0 |
| 11 | 14.5 | 11.5 | 5.0 | 3.0 | 4.5 | 3.5 | 5.0 | 6.5 | 10.0 | 15.0 | 14.0 | 18.5 |
| 12 | 15.0 | 11.5 | 4.5 | 3.0 | 4.0 | 3.5 | 5.0 | 7.0 | 10.0 | 15.0 | 16.5 | 18.5 |
| 13 | 14.0 | 11.0 | 5.0 | 3.5 | 4.0 | 4.0 | 5.0 | 7.0 | 10.0 | 15.0 | 14.5 | 18.5 |
| 14 | 14.5 | 11.0 | 5.0 | 3.0 | 4.0 | 5.0 | 5.5 | 7.0 | 10.0 | 16.0 | 15.0 | 19.0 |
| 15 | 14.5 | 11.0 | 4.0 | 3.0 | 4.0 | 4.5 | 5.0 | 7.0 | 10.0 | 15.0 | 15.5 | 18.5 |
| 16 | 14.5 | 11.5 | 4.0 | 3.0 | 4.0 | 5.5 | 5.0 | 8.0 | 10.5 | 14.5 | 15.0 | 16.5 |
| 17 | 14.0 | 10.0 | 4.5 | 3.0 | 4.0 | 5.5 | 5.0 | 7.0 | 10.0 | 15.0 | 15.0 | 17.5 |
| 18 | 13.5 | 10.5 | 3.5 | 4.5 | 4.0 | 5.0 | 4.5 | 8.0 | 10.0 | 14.5 | 15.5 | 17.5 |
| 19 | 13.0 | 10.0 | 3.0 | 4.5 | 4.0 | 5.5 | 4.5 | 8.5 | 10.0 | 15.5 | 16.5 | 17.5 |
| 20 | 13.0 | 10.5 | 3.0 | 3.5 | 4.0 | 5.0 | 4.5 | 9.0 | 10.5 | 16.5 | 17.0 | 18.0 |
| 21 | 13.0 | 9.5 | 3.0 | 5.0 | 4.0 | 5.0 | 5.0 | 8.5 | 13.5 | 16.5 | 16.0 | 17.5 |
| 22 | 13.0 | 9.5 | 3.0 | 4.5 | 4.0 | 4.0 | 5.0 | 8.5 | 15.0 | 15.5 | 16.5 | 21.5 |
| 23 | 13.5 | 9.5 | 3.0 | 4.0 | 4.0 | 5.0 | 5.0 | 9.0 | 15.5 | 16.5 | 16.5 | 22.0 |
| 24 | 12.5 | 9.0 | 3.0 | 2.5 | 4.0 | 5.0 | 5.0 | 8.5 | 16.5 | 17.0 | 14.0 | 22.5 |
| 25 | 13.0 | 9.0 | 3.0 | 2.5 | 4.5 | 4.5 | 5.0 | 9.5 | 15.5 | 17.0 | 16.0 | 18.0 |
| 26 | 13.0 | 8.5 | 4.5 | 3.0 | 4.0 | 5.0 | 6.5 | 9.5 | 16.0 | 15.5 | 16.5 | 17.5 |
| 27 | 13.0 | 8.0 | 4.0 | 3.0 | 4.0 | 4.5 | 6.0 | 9.5 | 18.0 | 16.0 | 17.0 | 17.5 |
| 28 | 13.0 | 8.0 | 3.5 | 2.5 | 4.0 | 5.0 | 5.5 | 9.5 | 19.0 | 15.5 | 16.5 | 16.0 |
| 29 | 13.0 | 8.0 | 4.5 | 2.5 | 4.0 | 6.0 | 5.5 | 9.0 | 18.0 | 16.0 | 17.0 | 17.5 |
| 30 | 13.0 | 8.0 | 3.5 | 3.0 | --- | 5.5 | 5.5 | 9.0 | 18.0 | 16.5 | 18.5 | 16.5 |
| 31 | 13.0 | --- | 3.5 | 4.0 | --- | 5.5 | --- | 9.0 | --- | 14.5 | 19.5 | --- |
| MEAN | 14.0 | 10.5 | 4.5 | --- | 4.0 | 4.5 | 5.0 | 7.5 | 12.0 | 16.0 | 16.0 | 18.0 |
| MAX | 16.0 | 13.0 | 7.5 | --- | 4.5 | 6.0 | 6.5 | 9.5 | 19.0 | 20.5 | 19.5 | 22.5 |
| MIN | 12.5 | 8.0 | 3.0 | --- | 3.5 | 3.0 | 4.5 | 5.5 | 9.0 | 13.5 | 14.0 | 16.0 |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE DAILY

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | 670 | 700 | 690 | 670 | 650 | 675 | 740 | 660 | 645 | 650 | 630 | 640 |
| 2 | 680 | 700 | 660 | 670 | 645 | 670 | 720 | 650 | 650 | 647 | 640 | 650 |
| 3 | 675 | 690 | 630 | 650 | 650 | 650 | 740 | 540 | 640 | 640 | 630 | 650 |
| 4 | 670 | 690 | 690 | 660 | 630 | 670 | 740 | 580 | 640 | 640 | 565 | 640 |
| 5 | 675 | 630 | 750 | 660 | 635 | 660 | 660 | 560 | 640 | 640 | 640 | 650 |
| 6 | 680 | 650 | 655 | 650 | 640 | 700 | 700 | 580 | 640 | 645 | 510 | 640 |
| 7 | 680 | 625 | 650 | 660 | 640 | 720 | 700 | 540 | 640 | 640 | 615 | 660 |
| 8 | 685 | 685 | 690 | 650 | 640 | 750 | 690 | 645 | 640 | 640 | 615 | 650 |
| 9 | 685 | 680 | 685 | 650 | 640 | 570 | 660 | 650 | 620 | 640 | 615 | 650 |
| 10 | 690 | 670 | 690 | 680 | 640 | 670 | 680 | 650 | 640 | 670 | 615 | 710 |
| 11 | 670 | 670 | 695 | 710 | 640 | 660 | 670 | 650 | 640 | 670 | 615 | 660 |
| 12 | 690 | 680 | 700 | 690 | 640 | 680 | 680 | 650 | 500 | 660 | 615 | 660 |
| 13 | 670 | 610 | 680 | 700 | 640 | 690 | 670 | 660 | 500 | 660 | 630 | 670 |
| 14 | 680 | 610 | 680 | 690 | 690 | 680 | 690 | 650 | 640 | 670 | 615 | 680 |
| 15 | 680 | 640 | 680 | 690 | 690 | 640 | 680 | 650 | 500 | 660 | 615 | 660 |
| 16 | 680 | 620 | 680 | 680 | 690 | 660 | 650 | 650 | 650 | 670 | 615 | 670 |
| 17 | 670 | 595 | 680 | 670 | 690 | 640 | 640 | 650 | 500 | 660 | 615 | 660 |
| 18 | 660 | 690 | 680 | 710 | 685 | 610 | 640 | 650 | 505 | 670 | 620 | 560 |
| 19 | 675 | 680 | 685 | 690 | 690 | 655 | 650 | 650 | 615 | 660 | 625 | 670 |
| 20 | 680 | 690 | 690 | 570 | 660 | 700 | 640 | 650 | 590 | 650 | 625 | 610 |
| 21 | 690 | 680 | 690 | 690 | 680 | 730 | 660 | 650 | 630 | 650 | 620 | 680 |
| 22 | 690 | 690 | 690 | 655 | 650 | 650 | 650 | 660 | 615 | 660 | 625 | 605 |
| 23 | 690 | 700 | 685 | 650 | 660 | 730 | 650 | 680 | 595 | 640 | 620 | 660 |
| 24 | 650 | 700 | 690 | 690 | 670 | 720 | 650 | 660 | 620 | 660 | 620 | 670 |
| 25 | 650 | 700 | 700 | 560 | 680 | 700 | 650 | 670 | 580 | 660 | 630 | 675 |
| 26 | 650 | 700 | 740 | 540 | 670 | 710 | 640 | 670 | 620 | 640 | 620 | 550 |
| 27 | 650 | 700 | 690 | 650 | 650 | 740 | 590 | 660 | 620 | 650 | 620 | 620 |
| 28 | 635 | 700 | 690 | 640 | 655 | 750 | 620 | 650 | 615 | 650 | 640 | 570 |
| 29 | 630 | 700 | 690 | 690 | 660 | 680 | 620 | 660 | 615 | 660 | 640 | 655 |
| 30 | 630 | 700 | 710 | 620 | --- | 710 | 640 | 670 | 615 | 650 | 650 | 555 |
| 31 | 630 | --- | 700 | 650 | --- | 710 | --- | 660 | --- | 660 | 650 | --- |
| MEAN | 669 | 673 | 688 | 659 | 659 | 683 | 667 | 640 | 605 | 654 | 619 | 643 |
| MAX | 690 | 700 | 750 | 710 | 690 | 750 | 740 | 680 | 650 | 670 | 650 | 710 |
| MIN | 630 | 595 | 630 | 540 | 630 | 570 | 590 | 540 | 500 | 640 | 510 | 550 |

WTR YR 1984 MEAN 655 MAX 750 MIN 500

MISSOURI RIVER BASIN

06339010 MISSOURI RIVER ABOVE STANTON, ND

LOCATION.--Lat 47°21'45", long 101°21'25", SE1/4NE1/4SE1/4 sec.22, T.145 N., R.84 W., McLean County, Hydrologic Unit 10130101, on left bank 9 mi south of Riverdale, and at mile 1,379.

DRAINAGE AREA.--181,400 mi², approximately.

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1600.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated by Lake Sakakawea (station 06338000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 72.24 ft Jan. 29, 1977; minimum daily recorded, 64.57 ft Apr. 15, 1982.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | | | --- | --- | 67.83 | 67.30 | 65.61 | 65.75 | 65.96 | 65.39 | 67.75 | 68.27 |
| 2 | | | 66.98 | --- | 67.66 | 67.35 | 65.65 | 65.87 | 66.04 | 65.48 | 67.89 | 67.96 |
| 3 | | | 66.98 | --- | 67.70 | 67.33 | 65.77 | 65.77 | 66.26 | 65.72 | 67.83 | 68.17 |
| 4 | | | 66.78 | --- | 67.51 | 67.33 | 65.68 | 65.68 | 66.34 | 65.59 | 67.82 | 68.08 |
| 5 | | | 66.98 | --- | 67.61 | 67.34 | 66.30 | 65.72 | 66.30 | 66.18 | 67.99 | 68.15 |
| 6 | | | 66.89 | 67.62 | 67.78 | 67.21 | 66.43 | 65.60 | 66.22 | 66.00 | 68.02 | 67.96 |
| 7 | | | 66.91 | 67.41 | 67.67 | 66.80 | 66.67 | 65.95 | 66.31 | 66.03 | 67.99 | 68.09 |
| 8 | | | 66.93 | 67.32 | 67.70 | 66.81 | 66.53 | 65.69 | 65.98 | 66.31 | 67.86 | 67.99 |
| 9 | | | 66.82 | 67.33 | 67.81 | 66.88 | 66.60 | 65.81 | 66.08 | 66.88 | 67.92 | 67.95 |
| 10 | | | 66.88 | 67.54 | 67.91 | 66.83 | 66.27 | 65.80 | 66.12 | 66.81 | 68.02 | 67.96 |
| 11 | | | 66.80 | 67.60 | 67.91 | 66.85 | 66.54 | 65.77 | 66.18 | 66.96 | 68.17 | 68.25 |
| 12 | | | 66.84 | 67.57 | 67.56 | 66.87 | 66.53 | 65.50 | 66.22 | 67.46 | 67.89 | 68.30 |
| 13 | | | 66.78 | 67.60 | 67.97 | 66.73 | 66.59 | 65.42 | 66.26 | 67.56 | 67.92 | 67.81 |
| 14 | | | 66.74 | 67.45 | 67.84 | 66.96 | 66.16 | 65.66 | 66.24 | 67.56 | 68.03 | 68.21 |
| 15 | | | 66.67 | 67.53 | 67.82 | 66.80 | 65.48 | 65.79 | 65.53 | 67.50 | 67.99 | 67.83 |
| 16 | | | 66.53 | 67.51 | 67.63 | 66.85 | 66.59 | 65.53 | 65.51 | 67.42 | 67.83 | 67.55 |
| 17 | | | 67.10 | 67.40 | 67.87 | 66.44 | 66.63 | 65.54 | 65.85 | 67.48 | 68.07 | 67.34 |
| 18 | | | 67.19 | 67.64 | 67.81 | 66.28 | 66.46 | 65.63 | 65.61 | 67.73 | 68.21 | 67.45 |
| 19 | | | 67.44 | 67.51 | 67.83 | 66.12 | 66.63 | 65.65 | 65.69 | 67.66 | 67.69 | 67.38 |
| 20 | | | 67.68 | 67.40 | 67.80 | 66.17 | 66.28 | 65.50 | 65.22 | 67.85 | 68.07 | 67.38 |
| 21 | | | 67.67 | 67.74 | 68.03 | 66.16 | 65.98 | 65.80 | 65.18 | 68.16 | 67.92 | 67.30 |
| 22 | | | 67.74 | 67.75 | 67.89 | 66.28 | 65.70 | 65.60 | 65.21 | 67.85 | 67.97 | 67.41 |
| 23 | | | --- | 67.97 | 67.90 | 66.24 | 65.81 | 65.57 | 65.26 | 67.88 | 67.82 | 67.28 |
| 24 | | | --- | 67.77 | 67.67 | 66.13 | 65.58 | 65.37 | 65.30 | 67.95 | 67.98 | 67.36 |
| 25 | | | --- | 67.42 | 67.45 | 66.15 | 65.92 | 65.45 | 65.29 | 67.72 | 68.02 | 67.28 |
| 26 | | | --- | 67.42 | 67.41 | 66.25 | 65.82 | 65.53 | 65.43 | 67.74 | 67.97 | 67.30 |
| 27 | | | --- | 67.74 | 67.31 | 66.11 | 65.61 | 65.64 | 65.27 | 67.70 | 68.16 | 67.28 |
| 28 | | | --- | 67.86 | 67.36 | 66.04 | 65.93 | 65.58 | 65.15 | 67.76 | 67.83 | 67.25 |
| 29 | | | --- | 67.50 | 67.42 | 66.09 | 65.96 | 65.47 | 65.33 | 67.93 | 67.94 | 67.41 |
| 30 | | | --- | 67.68 | --- | 65.96 | 65.88 | 65.53 | 65.33 | 67.86 | 67.95 | 67.28 |
| 31 | | | --- | 67.81 | --- | 66.05 | --- | 66.04 | --- | 67.93 | 67.88 | --- |
| MEAN | | | --- | --- | 67.71 | 66.60 | 66.12 | 65.65 | 65.76 | 67.16 | 67.95 | 67.71 |
| MAX | | | --- | --- | 68.03 | 67.35 | 66.67 | 66.04 | 66.34 | 68.16 | 68.21 | 68.30 |
| MIN | | | --- | --- | 67.31 | 65.96 | 65.48 | 65.37 | 65.15 | 65.39 | 67.69 | 67.25 |

06339100 KNIFE RIVER AT MANNING, ND

LOCATION.--Lat 47°14'10", long 102°46'10", in SE1/4NW1/4 sec.6, T.143 N., R.95 W., Dunn County, Hydrologic Unit 10130201, on left bank 50 ft downstream from bridge on State Highway 22, and 0.4 mi north of Manning.

DRAINAGE AREA.--205 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,156.55 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--17 years, 23.3 ft³/s, 16,900 acre-ft/yr; median of yearly mean discharges, 24 ft³/s, 17,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge 2,940 ft³/s June 15, 1970, gage height, 16.20 ft; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 300 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Jan. 30 | 1530 | 380 | 8.17 | May 4 | 0100 | 359 | 8.65 |
| Mar. 20 | 2245 | *553 | *a10.21 | June 19 | 0345 | 311 | 8.20 |

Minimum daily, 0.01 ft³/s Sept. 23-30.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|-------|--------|--------|-------|--------|-------|-------|-------|------|
| 1 | 4.7 | 2.5 | 1.2 | 1.3 | 164 | 8.2 | 8.9 | 13 | 1.7 | 2.1 | .35 | .12 |
| 2 | 6.0 | 2.6 | 1.3 | 1.3 | 167 | 7.1 | 7.5 | 25 | 2.1 | 2.5 | .40 | .11 |
| 3 | 6.3 | 3.4 | 1.4 | 1.3 | 152 | 6.7 | 6.8 | 186 | 1.9 | 1.8 | .67 | .10 |
| 4 | 5.8 | 2.8 | 1.5 | 1.3 | 114 | 6.9 | 6.2 | 300 | 1.8 | 1.4 | .64 | .11 |
| 5 | 5.2 | 1.6 | 1.5 | 1.4 | 70 | 6.6 | 5.0 | 204 | 1.7 | 1.5 | .63 | .14 |
| 6 | 4.7 | 1.4 | 1.5 | 1.4 | 78 | 6.0 | 4.3 | 115 | 1.6 | 1.6 | .55 | .12 |
| 7 | 3.9 | 1.8 | 1.5 | 1.5 | 55 | 5.8 | 4.0 | 72 | 1.6 | 2.0 | .44 | .08 |
| 8 | 5.6 | 2.0 | 1.5 | 1.5 | 32 | 4.7 | 6.2 | 59 | 1.7 | 2.4 | .36 | .08 |
| 9 | 5.2 | 2.0 | 1.5 | 1.6 | 23 | 4.7 | 4.7 | 39 | 1.5 | 2.1 | .33 | .08 |
| 10 | 5.2 | 1.8 | 1.5 | 1.6 | 32 | 4.5 | 4.0 | 29 | 1.3 | 1.8 | .35 | .08 |
| 11 | 5.2 | 1.6 | 1.5 | 1.7 | 87 | 4.1 | 8.1 | 21 | 1.6 | 2.0 | .37 | .11 |
| 12 | 5.2 | 1.7 | 1.5 | 1.8 | 131 | 3.6 | 11 | 14 | 3.2 | 2.1 | .38 | .09 |
| 13 | 3.2 | 1.4 | 1.5 | 1.8 | 108 | 3.1 | 11 | 10 | 2.4 | 1.6 | .41 | .07 |
| 14 | 2.2 | 1.3 | 1.5 | 1.9 | 89 | 2.7 | 9.8 | 7.8 | 3.3 | 2.0 | .35 | .06 |
| 15 | 2.6 | 1.3 | 1.5 | 2.1 | 120 | 2.6 | 11 | 5.8 | 2.8 | 1.8 | .35 | .05 |
| 16 | 4.1 | 1.3 | 1.3 | 2.2 | 123 | 2.6 | 8.6 | 4.4 | 7.8 | 2.0 | .33 | .04 |
| 17 | 3.8 | 1.3 | 1.3 | 2.2 | 100 | 3.0 | 6.5 | 3.0 | 10 | 1.6 | .38 | .03 |
| 18 | 3.8 | 1.3 | 1.3 | 2.2 | 72 | 2.7 | 5.8 | 2.4 | 17 | 1.7 | .40 | .04 |
| 19 | 3.2 | 1.3 | 1.3 | 2.4 | 49 | 51 | 3.9 | 2.1 | 175 | .62 | .46 | .04 |
| 20 | 3.6 | 1.3 | 1.4 | 3.7 | 42 | 354 | 3.2 | 4.8 | 171 | .46 | 1.2 | .04 |
| 21 | 3.4 | 1.3 | 1.2 | 3.8 | 33 | 346 | 2.7 | 3.9 | 77 | .41 | 1.3 | .03 |
| 22 | 4.1 | 1.4 | 1.2 | 5.2 | 40 | 134 | 2.4 | 2.9 | 72 | .40 | 1.4 | .02 |
| 23 | 3.4 | 1.4 | 1.2 | 5.7 | 48 | 87 | 2.0 | 3.1 | 45 | .40 | .96 | .01 |
| 24 | 3.8 | 1.4 | 1.2 | 7.7 | 41 | 70 | 1.8 | 3.0 | 38 | .42 | 1.0 | .01 |
| 25 | 3.1 | 1.4 | 1.2 | 8.8 | 30 | 67 | 2.0 | 2.3 | 21 | .37 | .74 | .01 |
| 26 | 2.8 | 1.3 | 1.2 | 9.6 | 21 | 67 | 1.8 | 3.1 | 12 | .38 | .45 | .01 |
| 27 | 3.2 | 1.2 | 1.2 | 9.0 | 18 | 50 | 17 | 2.1 | 8.5 | .41 | .39 | .01 |
| 28 | 2.1 | 1.2 | 1.2 | 9.6 | 12 | 34 | 8.7 | 3.2 | 5.9 | .40 | .29 | .01 |
| 29 | 1.7 | 1.2 | 1.2 | 122 | 9.0 | 29 | 9.9 | 3.4 | 4.2 | .36 | .19 | .01 |
| 30 | 2.4 | 1.2 | 1.3 | 259 | --- | 13 | 10 | 3.6 | 2.5 | .35 | .14 | .01 |
| 31 | 2.2 | --- | 1.3 | 174 | --- | 13 | --- | 2.6 | --- | .32 | .11 | --- |
| TOTAL | 121.7 | 48.7 | 41.9 | 650.6 | 2060.0 | 1400.6 | 194.8 | 1150.5 | 697.1 | 39.30 | 16.32 | 1.72 |
| MEAN | 3.93 | 1.62 | 1.35 | 21.0 | 71.0 | 45.2 | 6.49 | 37.1 | 23.2 | 1.27 | .53 | .06 |
| MAX | 6.3 | 3.4 | 1.5 | 259 | 167 | 354 | 17 | 300 | 175 | 2.5 | 1.4 | .14 |
| MIN | 1.7 | 1.2 | 1.2 | 1.3 | 9.0 | 2.6 | 1.8 | 2.1 | 1.3 | .32 | .11 | .01 |
| AC-FT | 241 | 97 | 83 | 1290 | 4090 | 2780 | 386 | 2280 | 1380 | 78 | 32 | 3.4 |
| CAL YR 1983 | TOTAL | 7017.30 | | MEAN | 19.2 | MAX | 1100 | MIN | .07 | AC-FT | 13918 | |
| WTR YR 1984 | TOTAL | 6423.24 | | MEAN | 17.5 | MAX | 354 | MIN | .01 | AC-FT | 12740 | |

KNIFE RIVER BASIN

06339100 KNIFE RIVER AT MANNING, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 28... | 1420 | 2.1 | 1900 | -- | 25.0 | 7.0 | -- | -- | -- | -- | -- |
| DEC 12... | 1305 | 1.6 | 2100 | -- | -10.0 | .0 | -- | -- | -- | -- | -- |
| FEB 01... | 1430 | 159 | 400 | 7.4 | 4.5 | .5 | 60 | 0 | 14 | 6.0 | 47 |
| MAR 15... | 1110 | 2.4 | 1400 | -- | -6.5 | .0 | -- | -- | -- | -- | -- |
| APR 04... | 1255 | 6.3 | 785 | -- | 12.0 | 4.5 | -- | -- | -- | -- | -- |
| JUN 05... | 1450 | 1.6 | 1690 | -- | 17.0 | 16.0 | -- | -- | -- | -- | -- |
| JUL 26... | 1255 | .36 | 1830 | 8.2 | 28.0 | 22.0 | 270 | 0 | 55 | 31 | 310 |
| SEP 06... | 0830 | .14 | 2260 | -- | 15.5 | 14.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| FEB 01... | 56 | 3 | 16 | 100 | .000 | 83 | 6.3 | 85 | 5.8 | .10 | 4.9 | 262 |
| JUL 26... | 71 | 9 | 9.3 | 550 | .000 | 450 | 5.5 | 490 | 7.7 | .40 | 7.4 | 1230 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|---|--|--|---|---|---|---|---|---|---|--|---|
| FEB 01... | 230 | .36 | 112 | 1 | 80 | 320 | 5 | 2 | 80 | .2 | 0 | 120 |
| JUL 26... | 1200 | 1.7 | 1.2 | 3 | 340 | 60 | 0 | 40 | 70 | .3 | 1 | 620 |

06339500 KNIFE RIVER NEAR GOLDEN VALLEY, ND

LOCATION.--Lat 47°09'40", long 102°03'39", in SE1/4 sec.34, T.143 N., R.90 W., Mercer County, Hydrologic Unit 10130201, on left bank 6 ft downstream from highway bridge, 4.5 mi downstream from Elm Creek, and 9 mi south of Golden Valley.

DRAINAGE AREA.--1,230 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to November 1906, April 1907 to November 1915, April 1916 to October 1919, and October 1921 to September 1924 (published as "at Broncho" or "near Broncho"), and April 1943 to current year. Monthly discharge only for some periods published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1006: Drainage area. WSP 1279: 1904, 1914-19(M), 1922-24(M), 1944.

GAGE.--Water-stage recorder. Datum of gage is 1,847.13 ft National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to May 1, 1946.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--58 years, 97.8 ft³/s, 70,900 acre-ft/yr; median of yearly mean discharges, 86 ft³/s, 62,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft³/s May 9, 1970, gage height, 25.84 ft; maximum gage height, 26.7 ft Mar. 26, 27, 1943, from floodmark; no flow at times in some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 26, 27, 1943 reached a stage of 26.7 ft, from floodmark, 11,500 ft³/s. The 1943 flood was the highest since 1903 according to information from local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,500 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|---------|-----------------------------------|---------------------|
| Mar. 22 | 1730 | *2050 | a*14.27 | May 4 | Unknown | 1700 | Unknown |

Minimum daily, 5.0 ft³/s Sept. 6.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|-------|------|-------|-------|-------|-------|-------|
| 1 | 14 | 15 | 14 | 6.0 | 850 | 48 | 101 | 90 | 22 | 45 | 9.2 | 5.4 |
| 2 | 17 | 18 | 13 | 6.2 | 800 | 38 | 87 | 250 | 20 | 35 | 8.4 | 5.6 |
| 3 | 21 | 20 | 13 | 6.5 | 600 | 32 | 75 | 600 | 20 | 28 | 12 | 5.4 |
| 4 | 23 | 20 | 12 | 6.8 | 450 | 29 | 68 | 1500 | 19 | 24 | 10 | 5.5 |
| 5 | 25 | 20 | 12 | 7.0 | 318 | 24 | 64 | 1000 | 20 | 22 | 11 | 5.6 |
| 6 | 27 | 22 | 12 | 7.5 | 201 | 22 | 59 | 650 | 25 | 21 | 10 | 5.0 |
| 7 | 28 | 22 | 12 | 7.5 | 168 | 19 | 56 | 400 | 28 | 25 | 9.6 | 5.7 |
| 8 | 20 | 22 | 11 | 7.5 | 139 | 20 | 53 | 280 | 34 | 27 | 9.3 | 5.7 |
| 9 | 16 | 21 | 11 | 7.4 | 126 | 21 | 51 | 190 | 41 | 30 | 8.6 | 5.6 |
| 10 | 16 | 20 | 11 | 7.2 | 119 | 22 | 50 | 120 | 49 | 28 | 8.4 | 5.7 |
| 11 | 14 | 20 | 11 | 7.0 | 179 | 21 | 54 | 100 | 43 | 26 | 8.1 | 5.3 |
| 12 | 13 | 20 | 10 | 7.0 | 255 | 20 | 87 | 65 | 144 | 25 | 7.9 | 5.6 |
| 13 | 12 | 21 | 10 | 6.8 | 203 | 20 | 172 | 50 | 91 | 24 | 7.8 | 5.5 |
| 14 | 12 | 22 | 9.8 | 6.6 | 244 | 19 | 220 | 40 | 119 | 23 | 7.1 | 5.7 |
| 15 | 14 | 22 | 9.8 | 6.6 | 384 | 18 | 212 | 30 | 223 | 25 | 6.6 | 5.9 |
| 16 | 16 | 22 | 9.6 | 6.4 | 420 | 17 | 153 | 23 | 459 | 23 | 6.3 | 6.2 |
| 17 | 18 | 22 | 9.5 | 6.2 | 362 | 18 | 105 | 18 | 246 | 22 | 6.1 | 6.4 |
| 18 | 18 | 21 | 9.4 | 6.0 | 300 | 19 | 80 | 16 | 279 | 21 | 6.3 | 6.5 |
| 19 | 18 | 20 | 9.2 | 5.8 | 229 | 35 | 63 | 15 | 261 | 20 | 5.9 | 6.2 |
| 20 | 17 | 18 | 9.0 | 5.6 | 183 | 227 | 49 | 17 | 281 | 18 | 5.8 | 6.1 |
| 21 | 17 | 17 | 8.6 | 5.4 | 154 | 1090 | 43 | 22 | 447 | 16 | 5.9 | 6.4 |
| 22 | 17 | 17 | 8.2 | 5.4 | 137 | 1790 | 37 | 21 | 591 | 15 | 5.6 | 6.2 |
| 23 | 16 | 16 | 7.8 | 5.4 | 125 | 1380 | 33 | 20 | 807 | 15 | 40 | 5.8 |
| 24 | 16 | 16 | 7.4 | 5.6 | 105 | 687 | 32 | 19 | 539 | 14 | 28 | 7.8 |
| 25 | 16 | 16 | 7.0 | 5.6 | 98 | 421 | 30 | 20 | 321 | 14 | 18 | 8.5 |
| 26 | 15 | 15 | 6.6 | 5.7 | 79 | 301 | 25 | 20 | 206 | 13 | 15 | 9.0 |
| 27 | 15 | 15 | 6.4 | 5.8 | 80 | 251 | 24 | 22 | 143 | 12 | 12 | 7.9 |
| 28 | 15 | 15 | 6.2 | 6.1 | 63 | 201 | 28 | 25 | 97 | 12 | 9.0 | 8.0 |
| 29 | 14 | 14 | 6.2 | 17 | 51 | 154 | 40 | 25 | 71 | 11 | 7.5 | 8.5 |
| 30 | 14 | 14 | 6.0 | 46 | --- | 140 | 60 | 27 | 55 | 11 | 6.4 | 10 |
| 31 | 14 | --- | 6.0 | 624 | --- | 101 | --- | 25 | --- | 10 | 5.7 | --- |
| TOTAL | 528 | 563 | 294.7 | 865.6 | 7422 | 7205 | 2211 | 5700 | 5701 | 655 | 317.5 | 192.7 |
| MEAN | 17.0 | 18.8 | 9.51 | 27.9 | 256 | 232 | 73.7 | 184 | 190 | 21.1 | 10.2 | 6.42 |
| MAX | 28 | 22 | 14 | 624 | 850 | 1790 | 220 | 1500 | 807 | 45 | 40 | 10 |
| MIN | 12 | 14 | 6.0 | 5.4 | 51 | 17 | 24 | 15 | 19 | 10 | 5.6 | 5.0 |
| AC-FT | 1050 | 1120 | 585 | 1720 | 14720 | 14290 | 4390 | 11310 | 11310 | 1300 | 630 | 382 |
| CAL YR 1983 | TOTAL | 34490.1 | | MEAN | 94.5 | MAX | 3130 | MIN | 6.0 | AC-FT | 68411 | |
| WTR YR 1984 | TOTAL | 31655.5 | | MEAN | 86.5 | MAX | 1790 | MIN | 5.0 | AC-FT | 62790 | |

KNIFE RIVER BASIN

06339500 KNIFE RIVER NEAR GOLDEN VALLEY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1950, 1964-65, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 14... | 1025 | 12 | 2040 | -- | 5.0 | 6.0 | -- | -- | -- | -- | -- |
| NOV 21... | 1145 | 17 | 2440 | -- | -1.0 | 1.0 | -- | -- | -- | -- | -- |
| DEC 14... | 1015 | 9.9 | 2600 | -- | -13.5 | .0 | -- | -- | -- | -- | -- |
| FEB 09... | 1045 | 120 | 660 | 6.9 | -- | .0 | 120 | 0 | 25 | 13 | 79 |
| MAR 19... | 1050 | 18 | 1800 | -- | 5.5 | .5 | -- | -- | -- | -- | -- |
| APR 04... | 0945 | 65 | 1050 | -- | 6.5 | 3.5 | -- | -- | -- | -- | -- |
| JUN 07... | 1050 | 29 | 1950 | -- | 16.5 | 18.0 | -- | -- | -- | -- | -- |
| 20... | 1130 | 239 | 1180 | -- | 16.5 | 19.0 | -- | -- | -- | -- | -- |
| AUG 01... | 1105 | 9.6 | 1890 | 8.2 | -- | 23.5 | 340 | 0 | 61 | 45 | 330 |
| SEP 07... | 1020 | 5.6 | 2270 | -- | 15.5 | 16.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| FEB 09... | 55 | 3 | 18 | 160 | .000 | 130 | 32 | 170 | 5.7 | .20 | 7.0 | 437 |
| AUG 01... | 67 | 8 | 11 | 580 | .000 | 470 | 5.8 | 570 | 5.3 | .50 | 12 | 1360 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|---|--|--|---|---|---|---|---|---|---|--|---|
| FEB 09... | 400 | .59 | 142 | 0 | 90 | 340 | 1 | 6 | 50 | .2 | 0 | 210 |
| AUG 01... | 1300 | 1.8 | 35 | 3 | 260 | 40 | 0 | 50 | 30 | .4 | 1 | 880 |

KNIFE RIVER BASIN

227

06339560 BRUSH CREEK NEAR BEULAH, ND

LOCATION.--Lat 47°10'43", long 101°47'05", in NW1/4SW1/4NW1/4 sec.25, T.143 N., R.88 W., Mercer County, Hydrologic Unit 10130201, on right bank 60 ft upstream from bridge on State Highway 49, and 6 mi south of Beulah.

DRAINAGE AREA.--23.92 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,948 ft from State Highway Department levels.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--10 years, 1.79 ft³/s, 1,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 940 ft³/s Mar. 29, 1982, gage height, 8.40 ft, backwater from ice; maximum gage height, 9.26 ft Mar. 21, 1978; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|---------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Feb. 14 | Unknown | a25 | Unknown | June 15 | 2000 | 140 | 6.25 |
| Mar. 19 | 2130 | 74 | b7.66 | June 22 | 0600 | *307 | 7.12 |

Minimum discharge, no flow many days.

a - Ice jam

b - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-----|------|--------|--------|------|--------|--------|-------|------|------|
| 1 | .35 | .31 | .00 | .00 | .00 | .55 | 2.3 | 5.5 | .49 | .63 | .19 | .11 |
| 2 | .46 | .31 | .00 | .00 | .00 | .60 | 2.2 | 10 | .49 | .54 | .19 | .11 |
| 3 | .40 | .37 | .00 | .00 | 2.6 | .55 | 2.1 | 14 | .46 | .53 | .24 | .11 |
| 4 | .32 | .35 | .00 | .00 | .00 | .10 | 1.9 | 16 | .50 | .50 | .25 | .12 |
| 5 | .28 | .36 | .00 | .00 | .00 | .05 | 2.0 | 19 | .81 | .46 | .20 | .10 |
| 6 | .26 | .37 | .00 | .00 | .00 | .02 | 2.0 | 12 | 1.1 | .43 | .19 | .10 |
| 7 | .25 | .35 | .00 | .00 | .00 | .02 | 2.0 | 9.5 | 1.2 | .43 | .15 | .14 |
| 8 | .28 | .32 | .00 | .00 | .00 | .02 | 1.7 | 6.2 | .83 | .43 | .15 | .15 |
| 9 | .29 | .31 | .00 | .00 | .10 | .10 | 1.7 | 5.4 | .85 | .40 | .14 | .16 |
| 10 | .28 | .30 | .00 | .00 | 2.0 | .10 | 1.8 | 5.4 | 1.5 | .37 | .14 | .16 |
| 11 | .27 | .33 | .00 | .00 | 2.5 | .10 | 5.9 | 4.5 | 1.3 | .34 | .15 | .17 |
| 12 | .28 | .35 | .00 | .00 | 10 | .15 | 7.2 | 3.7 | 1.7 | .35 | .14 | .17 |
| 13 | .27 | .35 | .00 | .00 | 15 | .17 | 8.3 | 3.1 | 1.2 | .34 | .14 | .17 |
| 14 | .28 | .35 | .00 | .00 | 20 | .17 | 5.1 | 2.9 | 1.3 | .33 | .12 | .18 |
| 15 | .30 | .35 | .00 | .00 | 15 | .05 | 2.9 | 2.5 | 21 | .32 | .11 | .19 |
| 16 | .33 | .35 | .00 | .00 | 11 | .05 | 2.4 | 2.0 | 21 | .30 | .10 | .19 |
| 18 | .33 | .35 | .00 | .00 | 7.4 | .65 | 1.8 | 1.3 | 1.8 | .26 | .10 | .19 |
| 19 | .30 | .33 | .00 | .00 | 6.0 | 16 | 1.5 | 1.2 | 2.0 | .26 | .11 | .19 |
| 20 | .32 | .33 | .00 | .00 | 7.0 | 40 | 1.4 | 1.2 | 1.6 | .25 | .12 | .18 |
| 21 | .33 | .30 | .00 | .00 | 10 | 23 | 1.2 | 1.2 | 7.2 | .24 | .12 | .19 |
| 22 | .32 | .28 | .00 | .00 | 13 | 9.5 | 1.1 | 1.2 | 55 | .27 | .10 | .18 |
| 23 | .33 | .18 | .00 | .00 | 10 | 4.1 | 1.2 | 1.0 | 5.4 | .28 | .11 | .18 |
| 24 | .32 | .12 | .00 | .00 | 5.0 | 2.0 | 1.6 | .89 | 2.4 | .26 | .12 | .22 |
| 25 | .30 | .08 | .00 | .00 | 2.5 | 1.9 | 1.5 | .73 | 1.5 | .27 | .10 | .25 |
| 26 | .32 | .05 | .00 | .00 | 1.2 | 1.8 | 1.4 | .77 | 1.2 | .26 | .09 | .25 |
| 27 | .30 | .02 | .00 | .00 | .75 | 2.0 | 1.0 | .81 | .98 | .24 | .08 | .23 |
| 28 | .32 | .01 | .00 | .00 | .60 | 2.3 | 1.1 | .73 | .84 | .23 | .08 | .24 |
| 29 | .33 | .01 | .00 | .00 | .60 | 2.4 | 1.2 | .72 | .75 | .20 | .10 | .22 |
| 30 | .34 | .01 | .00 | .00 | --- | 2.4 | 1.5 | .64 | .67 | .18 | .11 | .23 |
| 31 | .34 | --- | .00 | .00 | --- | 2.3 | --- | .59 | --- | .18 | .09 | --- |
| TOTAL | 9.73 | 7.85 | .00 | .00 | 151.25 | 113.40 | 71.1 | 136.18 | 141.07 | 10.34 | 4.14 | 5.27 |
| MEAN | .31 | .26 | .00 | .00 | 5.22 | 3.66 | 2.37 | 4.39 | 4.70 | .33 | .13 | .18 |
| MAX | .46 | .37 | .00 | .00 | 20 | 40 | 8.3 | 19 | 55 | .63 | .25 | .25 |
| MIN | .25 | .01 | .00 | .00 | .00 | .02 | 1.0 | .59 | .46 | .18 | .08 | .10 |
| AC-FT | 19 | 16 | .00 | .00 | 300 | 225 | 141 | 270 | 280 | 21 | 8.2 | 10 |
| CAL YR 1983 | TOTAL | 486.50 | | MEAN | 1.33 | MAX | 50 | MIN | .00 | AC-FT | 965 | |
| WTR YR 1984 | TOTAL | 650.33 | | MEAN | 1.78 | MAX | 55 | MIN | .00 | AC-FT | 1290 | |

KNIFE RIVER BASIN

06339560 BRUSH CREEK NEAR BEULAH, ND--CONTINUED

PERIOD OF RECORD.--Water years 1975 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-----------|------|--|--|---|--|--|--|---|
| OCT 03... | 1320 | .39 | 1790 | 8.7 | 14.0 | 9.0 | 11.0 | 97 |
| NOV 10... | 1245 | .32 | 1760 | 8.5 | 5.5 | 8.0 | 12.6 | 108 |
| FEB 03... | 0835 | 2.5 | -- | -- | .4 | .0 | -- | -- |
| MAR 14... | 1448 | .17 | 1640 | 7.2 | .9 | .0 | 8.2 | 57 |
| 22... | 1130 | 9.9 | 325 | -- | 6.5 | 1.0 | -- | -- |
| APR 03... | 1512 | 1.9 | 1010 | -- | 14.0 | 7.5 | -- | -- |
| 26... | 0846 | 1.4 | 1790 | -- | .0 | 5.0 | -- | -- |
| JUN 08... | 0932 | .80 | 1780 | 7.6 | 18.5 | 15.5 | 7.8 | 80 |
| JUL 11... | 1420 | .34 | 1600 | 7.4 | 33.0 | 23.0 | 6.6 | 78 |
| AUG 29... | 1225 | .10 | 1790 | 7.8 | 19.5 | 16.0 | 9.8 | 100 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|--|
| OCT 03... | 540 | 28 | 86 | 80 | 280 | 52 | 5 | 11 | 517 | 1.9 | 650 |
| NOV 10... | 550 | 24 | 95 | 76 | 250 | 49 | 5 | 8.9 | 527 | 3.2 | 590 |
| MAR 14... | 430 | 0 | 82 | 55 | 220 | 52 | 5 | 8.7 | 492 | 60 | 450 |
| JUN 08... | 490 | 106 | 80 | 70 | 240 | 51 | 5 | 7.1 | 382 | 19 | 560 |
| AUG 29... | 420 | 0 | 75 | 57 | 280 | 58 | 6 | 8.3 | 574 | 18 | 460 |

| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610) | NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) |
|-----------|--|---|--|---|--|--|--|--|---|---|---|
| OCT 03... | 12 | .20 | 9.9 | 1420 | 1400 | 1.9 | 1.5 | .10 | .020 | 1.6 | 1.6 |
| NOV 10... | 8.7 | .30 | 11 | 1370 | 1400 | 1.9 | 1.2 | .11 | .080 | 1.3 | 1.4 |
| MAR 14... | 7.0 | .20 | 13 | 1160 | 1100 | 1.6 | .53 | .15 | .170 | .63 | .80 |
| JUN 08... | 6.0 | .20 | 7.1 | 1290 | 1200 | 1.8 | 2.8 | .11 | .080 | 1.8 | 1.9 |
| AUG 29... | 8.7 | .30 | 13 | 1250 | 1200 | 1.7 | .34 | .36 | .060 | .64 | .70 |

| DATE | NITRO- GEN,NH4 + ORG. SUSP. TOTAL (MG/L AS N) (00624) | NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623) | NITRO- GEN DIS- SOLVED (MG/L AS N) (00602) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) |
|-----------|--|--|--|--|---|---|---|---|---|--|
| OCT 03... | .70 | .90 | -- | .040 | .12 | .010 | 1 | 380 | 11 | 101 |
| NOV 10... | .60 | .80 | -- | .020 | .06 | .020 | 1 | 340 | 11 | 101 |
| MAR 14... | .00 | 1.5 | 1.7 | .070 | .21 | .060 | -- | 260 | -- | -- |
| JUN 08... | -- | 1.1 | -- | .080 | -- | .050 | -- | 340 | -- | -- |
| AUG 29... | -- | 4.4 | -- | .070 | -- | .280 | 1 | 380 | <1 | <10 |

06339560 BRUSH CREEK NEAR BEULAH, ND--CONTINUED

WATER QUALITY DATA, WATER OCTOBER 1983 TO SEPTEMBER 1984

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | NICKEL, SUS- PENDE RECov- ERABLE (UG/L AS NI) (01066) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | ZINC, TOTAL RECov- ERABLE (UG/L AS ZN) (01092) | ZINC, SUS- PENDE RECov- ERABLE (UG/L AS ZN) (01091) |
|-----------|---|---|---|--|--|---|--|---|---|--|
| | | | | | | | | | | |
| OCT 03... | 11 | 25 | 3 | 80 | .1 | 1 | 9 | 11 | 20 | 20 |
| NOV 10... | 11 | 22 | 11 | 97 | .1 | 3 | 24 | 11 | 20 | 10 |
| MAR 14... | -- | 69 | -- | 220 | -- | -- | -- | -- | -- | -- |
| JUN 08... | -- | 42 | -- | 52 | -- | -- | -- | -- | -- | -- |
| AUG 29... | 4 | 20 | <1 | 67 | <.1 | <1 | -- | <1 | <10 | -- |
| DATE | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030) | GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80040) | GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515) | GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03516) | GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050) | GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80060) | CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681) | CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689) | CYANIDE TOTAL (MG/L AS CN) (00720) |
| | | | | | | | | | | |
| OCT 03... | 5 | -- | -- | -- | -- | -- | -- | 12 | .7 | .01 |
| NOV 10... | 8 | -- | -- | -- | -- | -- | -- | 8.7 | .5 | .01 |
| MAR 14... | -- | -- | -- | -- | -- | -- | -- | 8.7 | .5 | -- |
| JUN 08... | -- | -- | -- | -- | -- | -- | -- | 12 | .1 | -- |
| AUG 29... | <3 | 31 | <.4 | <19 | <.4 | <16 | <.4 | 8.0 | .2 | <.01 |
| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | | | | | | |
| | | | | | | | | | | |
| OCT 03... | 1320 | .39 | 388 | .41 | | | | | | |
| NOV 10... | 1245 | .32 | 110 | .10 | | | | | | |
| MAR 14... | 1448 | .17 | 6 | .00 | | | | | | |
| JUN 08... | 0932 | .80 | 10 | .02 | | | | | | |
| AUG 29... | 1225 | .10 | 36 | .00 | | | | | | |

KNIFE RIVER BASIN

06340000 SPRING CREEK AT ZAP, ND

LOCATION.--Lat 47°17'10", long 101°55'31", in SW¹/₄ sec.14, T.144 N., R.89 W., Mercer County, Hydrologic Unit 10130201, on right bank 250 ft downstream from Burlington Northern Railway bridge in Zap, and 9 mi upstream from mouth.

DRAINAGE AREA.--549 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to September 1924, October 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,819.39 ft National Geodetic Vertical Datum of 1929. Mar. 4 to Sept. 30, 1924, nonrecording gage at site 250 ft upstream at different datum. Oct. 1, 1945, to Sept. 30, 1947, nonrecording gage 250 ft upstream at datum 1.12 ft higher.

REMARKS.--Records fair except those for winter months, which are poor. Flow slightly regulated by Lake Ilo 56 mi upstream, capacity, 7,130 acre-ft.

AVERAGE DISCHARGE.--39 years, 43.5 ft³/s, 31,520 acre-ft/yr; median of yearly mean discharges, 41 ft³/s, 29,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,130 ft³/s Apr. 7, 1952, gage height, 20.03 ft; maximum gage height, 20.70 ft Mar. 15, 1972; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known occurred in about 1902, from ice jam. Floods of February 1913 and March 1943 reached a stage of about 20 ft and 19.5 ft, respectively, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharges, about 800 ft³/s, Mar. 21, gage height, 13.10 ft, from floodmark, ice jam. No peaks above base of 1000 ft³/s; minimum daily 6.1 ft³/s, Sept. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|------|------|------|------|------|-------|-------|-------|
| 1 | 13 | 13 | 12 | 9.0 | 140 | 35 | 53 | 40 | 18 | 24 | 9.5 | 6.2 |
| 2 | 16 | 13 | 12 | 10 | 170 | 25 | 48 | 60 | 17 | 18 | 9.2 | 6.3 |
| 3 | 17 | 13 | 12 | 10 | 180 | 25 | 43 | 120 | 17 | 18 | 12 | 6.3 |
| 4 | 18 | 13 | 12 | 10 | 160 | 20 | 40 | 250 | 17 | 18 | 13 | 7.1 |
| 5 | 19 | 13 | 12 | 10 | 100 | 15 | 40 | 489 | 16 | 17 | 14 | 6.9 |
| 6 | 19 | 14 | 12 | 10 | 95 | 15 | 39 | 513 | 19 | 15 | 12 | 7.2 |
| 7 | 19 | 14 | 12 | 10 | 90 | 15 | 39 | 342 | 24 | 14 | 11 | 8.9 |
| 8 | 19 | 13 | 12 | 9.0 | 80 | 15 | 38 | 232 | 25 | 14 | 11 | 9.3 |
| 9 | 19 | 13 | 12 | 9.0 | 90 | 15 | 36 | 166 | 28 | 15 | 10 | 9.4 |
| 10 | 17 | 13 | 12 | 9.0 | 100 | 15 | 35 | 151 | 33 | 14 | 9.9 | 9.0 |
| 11 | 16 | 13 | 12 | 8.0 | 150 | 15 | 38 | 135 | 29 | 13 | 9.7 | 8.4 |
| 12 | 15 | 13 | 12 | 8.0 | 250 | 16 | 49 | 115 | 26 | 11 | 9.6 | 8.5 |
| 13 | 14 | 13 | 12 | 8.0 | 210 | 15 | 77 | 94 | 26 | 11 | 9.3 | 8.1 |
| 14 | 13 | 13 | 11 | 8.0 | 210 | 15 | 72 | 74 | 29 | 10 | 8.9 | 8.0 |
| 15 | 14 | 13 | 10 | 7.0 | 200 | 15 | 60 | 66 | 31 | 10 | 7.5 | 8.0 |
| 16 | 15 | 14 | 9.0 | 7.0 | 230 | 14 | 50 | 54 | 117 | 9.7 | 7.9 | 8.0 |
| 17 | 15 | 15 | 9.0 | 7.0 | 220 | 20 | 45 | 47 | 68 | 10 | 7.8 | 7.8 |
| 18 | 15 | 15 | 9.0 | 7.0 | 175 | 30 | 40 | 41 | 43 | 10 | 7.8 | 7.4 |
| 19 | 15 | 15 | 9.0 | 7.0 | 120 | 80 | 37 | 37 | 39 | 9.8 | 8.0 | 7.0 |
| 20 | 15 | 15 | 9.5 | 7.0 | 110 | 300 | 35 | 36 | 37 | 10 | 8.7 | 6.4 |
| 21 | 15 | 14 | 9.0 | 7.0 | 110 | 480 | 32 | 37 | 46 | 10 | 8.9 | 6.3 |
| 22 | 15 | 13 | 9.0 | 7.0 | 130 | 430 | 30 | 33 | 67 | 10 | 9.6 | 6.2 |
| 23 | 15 | 12 | 9.0 | 8.0 | 120 | 300 | 28 | 29 | 103 | 10 | 10 | 6.1 |
| 24 | 15 | 12 | 9.0 | 8.0 | 100 | 377 | 27 | 27 | 101 | 10 | 8.8 | 7.2 |
| 25 | 14 | 12 | 9.0 | 8.5 | 80 | 241 | 26 | 26 | 76 | 10 | 11 | 8.3 |
| 26 | 13 | 12 | 9.0 | 9.0 | 60 | 166 | 25 | 26 | 55 | 11 | 9.3 | 8.4 |
| 27 | 13 | 12 | 9.0 | 9.0 | 50 | 130 | 15 | 24 | 42 | 9.2 | 8.7 | 8.0 |
| 28 | 13 | 12 | 9.0 | 9.0 | 40 | 101 | 15 | 23 | 35 | 8.9 | 7.9 | 8.1 |
| 29 | 13 | 12 | 9.0 | 10 | 35 | 80 | 30 | 22 | 30 | 9.6 | 6.6 | 8.2 |
| 30 | 13 | 12 | 9.0 | 20 | --- | 71 | 35 | 20 | 27 | 10 | 6.2 | 8.1 |
| 31 | 13 | --- | 9.0 | 60 | --- | 58 | --- | 18 | --- | 9.9 | 6.2 | --- |
| TOTAL | 475 | 394 | 321.5 | 325.5 | 3805 | 3149 | 1177 | 3347 | 1241 | 380.1 | 290.0 | 229.1 |
| MEAN | 15.3 | 13.1 | 10.4 | 10.5 | 131 | 102 | 39.2 | 108 | 41.4 | 12.3 | 9.35 | 7.64 |
| MAX | 19 | 15 | 12 | 60 | 250 | 480 | 77 | 513 | 117 | 24 | 14 | 9.4 |
| MIN | 13 | 12 | 9.0 | 7.0 | 35 | 14 | 15 | 18 | 16 | 8.9 | 6.2 | 6.1 |
| AC-FT | 942 | 781 | 638 | 646 | 7550 | 6250 | 2330 | 6640 | 2460 | 754 | 575 | 454 |
| CAL YR 1983 | TOTAL | 15392.1 | | MEAN | 42.2 | MAX | 1500 | MIN | 6.0 | AC-FT | 30530 | |
| WTR YR 1984 | TOTAL | 15134.2 | | MEAN | 41.4 | MAX | 513 | MIN | 6.1 | AC-FT | 30020 | |

KNIFE RIVER BASIN

231

06340000 SPRING CREEK AT ZAP, ND--CONTINUED

PERIOD OF RECORD.--Water years 1969-70, 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 04... | 0850 | 18 | 1750 | 8.3 | 8.5 | 7.0 | -- | -- | -- | -- | -- | |
| NOV 09... | 1420 | 13 | 2030 | 8.2 | 5.0 | 4.0 | -- | -- | -- | -- | -- | |
| DEC 20... | 1650 | 9.3 | 2590 | 6.6 | -17.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 25... | 1130 | 8.3 | 2270 | 7.8 | -6.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 03... | 1143 | 175 | -- | -- | .0 | .0 | -- | -- | -- | -- | -- | |
| MAR 16... | 0926 | 14 | 1430 | -- | -6.0 | .0 | -- | -- | -- | -- | -- | |
| 22... | 1342 | 428 | 365 | 7.1 | 9.5 | .0 | 100 | 24 | 21 | 12 | 31 | |
| 28... | 1507 | 98 | 750 | -- | 9.0 | .5 | -- | -- | -- | -- | -- | |
| APR 04... | 0853 | 43 | 1000 | -- | 12.5 | 3.0 | -- | -- | -- | -- | -- | |
| 26... | 1146 | 24 | 1750 | -- | 1.0 | 6.0 | -- | -- | -- | -- | -- | |
| JUN 13... | 1031 | 27 | 1730 | -- | 24.0 | 16.0 | -- | -- | -- | -- | -- | |
| JUL 12... | 0945 | 13 | 1520 | -- | 31.0 | 22.5 | -- | -- | -- | -- | -- | |
| AUG 28... | 1456 | 7.3 | 1780 | 7.8 | 28.0 | 19.5 | 420 | 25 | 73 | 58 | 270 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 22... | 37 | 1 | 10 | 95 | .000 | 78 | 12 | 91 | 4.5 | .10 | 6.0 | 244 |
| AUG 28... | 57 | 6 | 11 | 490 | .000 | 400 | 12 | 590 | 9.2 | .50 | 9.5 | 1320 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 22... | 220 | .33 | 282 | 1 | 80 | 330 | 0 | 10 | 140 | .5 | 0 | 270 |
| AUG 28... | 1300 | 1.8 | 26 | 1 | 380 | 10 | 0 | 71 | 30 | .0 | 0 | 1600 |

KNIFE RIVER BASIN

06340200 WEST BRANCH OTTER CREEK NEAR BEULAH, ND

LOCATION.--Lat 47°08'05", long 101°39'35", in NW1/4NW1/4SW1/4 sec.12, T.142 N., R.87 W., Oliver County, Hydrologci Unit 10130201, and on right bank 10 mi southeast of Beulah.

DRAINAGE ARE.--26.5 mi2.

REMARKS.-- Annual maximum discharge and miscellaneous measurement notes are published in the crest-stage partial record section of this report.

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|-------|------|--|--|---|--|--|---|--|---|---|---|
| MAR | | | | | | | | | | | |
| 14... | 1233 | .15 | 1320 | -- | -1.0 | .0 | -- | -- | -- | -- | -- |
| 22... | 0851 | 12 | 370 | .5 | 5.0 | .5 | 85 | 23 | 16 | 11 | 36 |
| 28... | 1042 | 2.9 | 535 | -- | 5.0 | .5 | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 03... | 1259 | 1.9 | 880 | -- | 13.0 | 8.0 | -- | -- | -- | -- | -- |
| 23... | 1557 | .46 | -- | -- | 15.0 | 20.5 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|-------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| MAR | | | | | | | | | | | | |
| 22... | 45 | 2 | 9.1 | 70 | | 63 | -- | 110 | 2.9 | .10 | 3.0 | 234 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|-------|---|--|--|---|---|---|---|---|---|---|--|---|
| MAR | | | | | | | | | | | | |
| 22... | 230 | .32 | 7.7 | 1 | 50 | 410 | 0 | 10 | 130 | .0 | 0 | 170 |

06340500 KNIFE RIVER AT HAZEN, ND

LOCATION.--Lat 47°17'07", long 101°37'18", in SW1/4SE1/4SE1/4 sec.18, T.144 N., R.86 W., Mercer County, Hydrologic Unit 10130201, on left bank at downstream side of highway bridge, 0.5 mi south of Hazen, and 3 mi upstream from Antelope Creek.

DRAINAGE AREA.--2,240 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October to November 1928, March 1929 to September 1933, August 1937 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1146: 1943. WSP 1279: 1930-31, 1932-33(M). WSP 1917: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,712.35 ft National Geodetic Vertical Datum of 1929. Prior to Sept. 25, 1947, nonrecording gages at same site and datum.

REMARKS.--Records are fair. Small diversions above station. Slight regulation by Lake Ilo 81 mi upstream, capacity, 7,130 acre-ft.

AVERAGE DISCHARGE.--51 years (1929-33, 1937-84), 181 ft³/s, 131,100 acre-ft/yr; median of yearly mean discharges, 157 ft³/s, 113,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,300 ft³/s June 24, 1966, gage height, 27.01 ft; no flow at times in 1933, 1959, 1962.

EXTREMES OUTSIDE PERIOD OF RECORD.--According to local residents, the floods of 1943 and 1950 were not exceeded during the period 1884 to 1942.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,500 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|--------|------|--------------------------------|------------------|
| Mar. 21 | 1800 | *2500 | a14.50 | May. 6 | 0745 | 2160 | b12.33 |
| June 16 | 1800 | 1700 | b10.71 | | | | |

Minimum daily, 15 ft³/s Sept. 22-23.

a - Backwater from ice
b - Observed

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-------|------|------|-------|-------|------|-------|-------|-------|--------|------|
| 1 | 37 | 39 | 25 | 25 | 250 | 140 | 201 | 100 | 56 | 143 | 33 | 21 |
| 2 | 39 | 39 | 25 | 25 | 800 | 117 | 191 | 200 | 55 | 130 | 33 | 21 |
| 3 | 44 | 41 | 25 | 25 | 850 | 110 | 181 | 580 | 54 | 100 | 34 | 20 |
| 4 | 47 | 42 | 25 | 27 | 600 | 97 | 163 | 1370 | 51 | 90 | 42 | 20 |
| 5 | 50 | 44 | 25 | 28 | 400 | 84 | 154 | 1900 | 58 | 80 | 44 | 20 |
| 6 | 49 | 44 | 25 | 28 | 250 | 84 | 144 | 2100 | 57 | 70 | 41 | 19 |
| 7 | 50 | 44 | 26 | 28 | 200 | 80 | 137 | 1740 | 60 | 60 | 36 | 19 |
| 8 | 50 | 43 | 25 | 28 | 180 | 74 | 131 | 1160 | 51 | 60 | 35 | 19 |
| 9 | 51 | 42 | 24 | 28 | 156 | 74 | 125 | 784 | 59 | 55 | 32 | 19 |
| 10 | 46 | 42 | 24 | 28 | 192 | 68 | 124 | 611 | 70 | 52 | 32 | 21 |
| 11 | 40 | 41 | 24 | 28 | 300 | 60 | 140 | 526 | 83 | 52 | 32 | 21 |
| 12 | 37 | 42 | 24 | 26 | 500 | 52 | 190 | 435 | 85 | 48 | 32 | 21 |
| 13 | 36 | 44 | 24 | 25 | 650 | 52 | 287 | 356 | 126 | 48 | 32 | 21 |
| 14 | 35 | 44 | 22 | 25 | 600 | 53 | 398 | 288 | 164 | 45 | 31 | 21 |
| 15 | 39 | 44 | 20 | 25 | 700 | 48 | 385 | 237 | 195 | 44 | 31 | 20 |
| 16 | 42 | 45 | 20 | 25 | 600 | 44 | 306 | 204 | 1130 | 41 | 29 | 20 |
| 17 | 42 | 46 | 20 | 25 | 550 | 50 | 232 | 175 | 709 | 39 | 31 | 20 |
| 18 | 42 | 46 | 20 | 25 | 500 | 61 | 183 | 150 | 442 | 38 | 30 | 20 |
| 19 | 41 | 46 | 20 | 25 | 422 | 88 | 150 | 130 | 407 | 38 | 26 | 19 |
| 20 | 41 | 45 | 21 | 25 | 388 | 350 | 129 | 122 | 380 | 36 | 25 | 17 |
| 21 | 41 | 40 | 22 | 25 | 349 | 1700 | 114 | 120 | 421 | 36 | 25 | 16 |
| 22 | 40 | 35 | 23 | 26 | 350 | 1750 | 102 | 111 | 1020 | 37 | 24 | 15 |
| 23 | 40 | 30 | 23 | 27 | 375 | 1850 | 94 | 105 | 1220 | 37 | 22 | 15 |
| 24 | 39 | 28 | 23 | 28 | 280 | 1560 | 89 | 94 | 1080 | 37 | 22 | 19 |
| 25 | 38 | 27 | 23 | 30 | 240 | 1080 | 93 | 82 | 747 | 40 | 52 | 22 |
| 26 | 38 | 26 | 23 | 30 | 199 | 713 | 88 | 86 | 553 | 38 | 43 | 25 |
| 27 | 38 | 25 | 23 | 30 | 180 | 549 | 60 | 84 | 438 | 37 | 35 | 25 |
| 28 | 38 | 25 | 23 | 30 | 147 | 430 | 50 | 76 | 344 | 35 | 30 | 26 |
| 29 | 38 | 25 | 23 | 35 | 148 | 345 | 50 | 70 | 270 | 33 | 27 | 26 |
| 30 | 39 | 25 | 25 | 40 | --- | 284 | 80 | 71 | 202 | 34 | 24 | 26 |
| 31 | 39 | --- | 25 | 100 | --- | 241 | --- | 59 | --- | 35 | 22 | --- |
| TOTAL | 1286 | 1149 | 720 | 925 | 11356 | 12288 | 4771 | 14126 | 10587 | 1668 | 987 | 614 |
| MEAN | 41.5 | 38.3 | 23.2 | 29.8 | 392 | 396 | 159 | 456 | 353 | 53.8 | 31.8 | 20.5 |
| MAX | 51 | 46 | 26 | 100 | 850 | 1850 | 398 | 2100 | 1220 | 143 | 52 | 26 |
| MIN | 35 | 25 | 20 | 25 | 147 | 44 | 50 | 59 | 51 | 33 | 22 | 15 |
| AC-FT | 2550 | 2280 | 1430 | 1830 | 22520 | 24370 | 9460 | 28020 | 21000 | 3310 | 1960 | 1220 |
| CAL YR 1983 | TOTAL | 69882 | | MEAN | 191 | MAX | 4500 | MIN | 20 | AC-FT | 138600 | |
| WTR YR 1984 | TOTAL | 60477 | | MEAN | 165 | MAX | 2100 | MIN | 15 | AC-FT | 120000 | |

KNIFE RIVER BASIN

06340500 KNIFE RIVER AT HAZEN, ND--CONTINUED
(National stream-quality accounting network station)

PERIOD OF RECORD.--Water years 1950-51, 1969 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED SATUR- ATION (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOC- CI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|-----------|------|--|--|---|--|--|---|--|---|---|--|
| OCT 06... | 1024 | 49 | 1500 | 8.4 | 12.0 | 8.0 | -- | 11.0 | 93 | 30 | <140 |
| NOV 08... | 1605 | 41 | 1820 | 8.5 | 4.0 | 5.5 | -- | 9.2 | 73 | 200 | K300 |
| DEC 22... | 1250 | 24 | 1360 | 7.3 | -1.9 | .0 | -- | 8.9 | 61 | -- | -- |
| JAN 24... | 1450 | 28 | 1550 | 7.8 | 2.0 | .0 | -- | 10.1 | 70 | -- | -- |
| FEB 03... | 1434 | 842 | -- | -- | .5 | .0 | -- | -- | -- | -- | -- |
| MAR 13... | 0926 | 51 | 1160 | 7.3 | -.9 | .0 | 12 | 10.4 | 71 | K15 | 420 |
| 23... | 0848 | 1770 | 590 | 7.2 | 7.0 | 1.0 | -- | 19.6 | 139 | -- | -- |
| 27... | 1058 | 519 | 575 | 7.1 | 1.5 | 1.0 | -- | 11.4 | 80 | -- | -- |
| 29... | 0850 | 357 | 625 | -- | 6.0 | 1.0 | -- | -- | -- | -- | -- |
| APR 04... | 1120 | 162 | 900 | 7.3 | 16.0 | 5.0 | -- | 10.4 | 81 | -- | -- |
| 24... | 0847 | 90 | 1760 | 8.0 | 16.5 | 13.0 | -- | 8.1 | 78 | K12 | 390 |
| JUN 07... | 0948 | 64 | 1610 | 8.2 | 23.0 | 16.0 | -- | 9.5 | 98 | -- | -- |
| JUL 11... | 1228 | 54 | 1590 | 8.0 | 32.0 | 24.5 | -- | 8.8 | 106 | -- | -- |
| AUG 28... | 0836 | 30 | 1670 | 7.9 | 20.5 | 19.5 | 23 | 7.4 | 82 | 200 | 550 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| MAR 13... | 270 | 0 | 53 | 32 | 190 | 60 | 5 | 10 | 338 | 33 | 360 | 6.3 |
| AUG 28... | 330 | 0 | 60 | 44 | 290 | 65 | 7 | 9.5 | 462 | 11 | 510 | 6.4 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, AM- MONIA DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AM- MONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|-----------|---|--|---|--|--|--|---|---|---|--|---|
| OCT 06... | -- | -- | -- | -- | -- | -- | <.10 | .10 | 1.5 | .050 | .15 |
| MAR 13... | .40 | 11 | 868 | 870 | 1.2 | 120 | .30 | .28 | 1.4 | .110 | .34 |
| APR 24... | -- | -- | -- | -- | -- | -- | <.10 | .14 | 1.4 | .060 | .18 |
| AUG 28... | .30 | 13 | -- | 1200 | 1.6 | 98 | <.10 | .05 | 1.3 | .090 | -- |

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|-----------|---|---|--|--|---|---|---|--|---|---|---|
| OCT 06... | .010 | .010 | .03 | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR 13... | .050 | .060 | .18 | 70 | 1 | 68 | <1 | <1 | <3 | 4 | 230 |
| APR 24... | .030 | .020 | .06 | -- | -- | -- | -- | -- | -- | -- | -- |
| AUG 28... | .020 | .020 | .06 | <10 | 9 | 100 | <1 | 1 | <3 | 6 | 5 |

06340500 KNIFE RIVER AT HAZEN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|--|---|--|--|---|--|---|---|---|---|
| MAR 13... | <1 | 35 | 70 | <.1 | <10 | 2 | <1 | <1 | 760 | <6 | 25 |
| AUG 28... | <1 | 59 | 20 | .2 | <10 | 3 | <1 | <1 | 1000 | <6 | <3 |
| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) | | | | | | |
| NOV 08... | 1605 | 41 | 52 | 5.8 | 96 | | | | | | |
| MAR 13... | 0926 | 51 | 12 | 1.7 | 97 | | | | | | |
| APR 24... | 0847 | 90 | 47 | 11 | 99 | | | | | | |
| AUG 28... | 0836 | 30 | 107 | 8.7 | 99 | | | | | | |
| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | | | | |
| MAR | | | | | | | | | | | |
| 13... | 1040 | .00 | .00 | .0 | 1080 | 7.1 | 9.4 | | | | |
| 13... | 1043 | .00 | 1.7 | .0 | 1110 | 7.2 | 9.2 | | | | |
| 13... | 1045 | .00 | .00 | .0 | 1050 | 7.4 | 9.1 | | | | |
| 13... | 1047 | 10.0 | 1.7 | .0 | 1090 | 7.3 | 9.3 | | | | |
| 13... | 1050 | 12.0 | .00 | .0 | 1060 | 7.3 | 9.1 | | | | |
| 13... | 1051 | 12.0 | 1.7 | .0 | 1090 | 7.3 | 9.3 | | | | |
| 13... | 1052 | 14.0 | .00 | .0 | 1120 | 7.5 | 9.0 | | | | |
| 13... | 1053 | 16.0 | .00 | .0 | 1060 | 7.5 | 9.5 | | | | |
| 13... | 1055 | 18.0 | .00 | .0 | 1030 | 7.5 | 9.0 | | | | |
| 13... | 1057 | 20.0 | .00 | .0 | 1120 | 7.5 | 8.9 | | | | |
| 13... | 1100 | 22.0 | .00 | .0 | 1110 | 7.3 | 9.4 | | | | |
| 13... | 1102 | 24.0 | .00 | .0 | 1120 | 7.1 | 9.5 | | | | |
| 13... | 1105 | 26.0 | .00 | .0 | 1120 | 7.1 | 9.0 | | | | |
| 13... | 1107 | 28.0 | .00 | .0 | 1110 | 7.1 | 8.7 | | | | |
| 13... | 1110 | 30.0 | .00 | .0 | 1100 | 7.1 | 9.0 | | | | |
| 13... | 1113 | 30.0 | 1.7 | .0 | 1120 | 7.1 | 8.9 | | | | |
| 13... | 1115 | 32.0 | .00 | .0 | 1100 | 7.1 | 8.9 | | | | |
| 13... | 1117 | 32.0 | 1.7 | .0 | 1100 | 7.1 | 8.9 | | | | |
| 13... | 1120 | 34.0 | .00 | .0 | 1110 | 7.1 | 9.0 | | | | |
| 13... | 1123 | 34.0 | 1.7 | .0 | 1110 | 7.2 | 8.9 | | | | |
| 13... | 1125 | 36.0 | .00 | .0 | 1100 | 7.2 | 8.8 | | | | |
| 13... | 1130 | 36.0 | 1.7 | .0 | 1110 | 7.2 | 8.7 | | | | |
| 13... | 1132 | 40.0 | .00 | .0 | 1110 | 7.2 | 9.1 | | | | |
| 13... | 1135 | 44.0 | .00 | .0 | 1110 | 7.2 | 9.2 | | | | |
| 13... | 1137 | 48.0 | .00 | -- | -- | -- | -- | | | | |
| APR | | | | | | | | | | | |
| 24... | 1005 | 4.00 | .00 | 13.0 | 1775 | 8.1 | 8.4 | | | | |
| 24... | 1010 | 9.00 | .00 | 13.0 | 1760 | 8.0 | 8.4 | | | | |
| 24... | 1013 | 9.00 | 1.6 | -- | -- | -- | 8.4 | | | | |
| 24... | 1015 | 14.0 | .00 | 13.0 | 1760 | 8.0 | 8.4 | | | | |
| 24... | 1018 | 14.0 | 1.6 | -- | -- | -- | 8.4 | | | | |
| 24... | 1020 | 19.0 | .00 | 13.0 | 1760 | 8.0 | 8.5 | | | | |
| 24... | 1023 | 19.0 | 1.6 | -- | -- | -- | 8.3 | | | | |
| 24... | 1025 | 24.0 | .00 | 13.0 | 1770 | 8.0 | 8.4 | | | | |
| 24... | 1028 | 24.0 | 1.6 | -- | -- | -- | 8.3 | | | | |
| 24... | 1030 | 29.0 | .00 | 13.0 | 1760 | 8.0 | 8.4 | | | | |
| 24... | 1033 | 34.0 | .00 | 13.0 | 1760 | 8.0 | 8.4 | | | | |
| 24... | 1037 | 39.0 | .00 | 13.0 | 1750 | 8.0 | 8.4 | | | | |
| 24... | 1040 | 44.0 | .00 | 13.0 | 1750 | 8.0 | 8.5 | | | | |
| 24... | 1042 | 49.0 | .00 | 13.0 | 1780 | 8.0 | 8.4 | | | | |

06340500 KNIFE RIVER AT HAZEN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|--|---|--|--|---|--|
| AUG | | | | | | | |
| 28... | 0900 | 1.00 | .00 | 19.5 | 1680 | 7.9 | 8.1 |
| 28... | 0903 | 4.00 | .00 | 19.5 | 1660 | 7.9 | 8.1 |
| 28... | 0907 | 8.00 | .00 | 19.5 | 1650 | 8.0 | 8.1 |
| 28... | 0910 | 12.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |
| 28... | 0914 | 16.0 | .00 | 19.5 | 1650 | 8.0 | 8.1 |
| 28... | 0917 | 20.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |
| 28... | 0921 | 24.0 | .00 | 19.5 | 1660 | 7.9 | 8.1 |
| 28... | 0924 | 28.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |
| 28... | 0928 | 32.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |
| 28... | 0931 | 36.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |
| 28... | 0933 | 40.0 | .00 | 19.5 | 1650 | 7.9 | 8.1 |

KNIFE RIVER BASIN

237

06340520 ANTELOPE CREEK ABOVE HAZEN, ND

LOCATION.--Lat 47°20'07", long 101°41'41", in SE1/4SE1/4NE1/4 sec.36, T.145 N., R.87 W., Mercer County, Hydrologic Unit 10130201, on left bank about 100 ft upstream from bridge on county road, 4.2 mi northwest of Hazen, and 2.0 mi upstream from Schramm Dam.

DRAINAGE AREA.--47.2 mi², revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,800 ft, from topographic map.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--7 years, 4.23 ft³/s, 3,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,420 ft³/s Mar. 29, 1982, from rating curve extended above 350 ft³/s, gage height, 8.55 ft; maximum gage height, 8.95 ft Mar. 21, 1978, ice jam; no flow for many days each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|------|-----------------------------------|---------------------|
| Mar. 20 | 2045 | *275 | 8.532 | May 2 | 2115 | 106 | 3.84 |
| Apr. 13 | 1245 | 64 | 3.48 | | | | |

No flow for many days.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|--------|--------|--------|--------|-------|-------|------|-----|
| 1 | .00 | .00 | .01 | .00 | .27 | .73 | 3.0 | 3.5 | .10 | .17 | .00 | .00 |
| 2 | .00 | .00 | .01 | .00 | .21 | .46 | 1.9 | 27 | .08 | .11 | .01 | .00 |
| 3 | .00 | .00 | .02 | .00 | .00 | .25 | 1.9 | 65 | .07 | .08 | .01 | .00 |
| 4 | .00 | .00 | .02 | .00 | .00 | .29 | 1.7 | 65 | .53 | .08 | .01 | .00 |
| 5 | .00 | .00 | .02 | .00 | .00 | .32 | 1.2 | 56 | 7.2 | .07 | .01 | .00 |
| 6 | .00 | .00 | .02 | .00 | .00 | .25 | 1.0 | 36 | 11 | .06 | .01 | .00 |
| 7 | .00 | .00 | .03 | .00 | .00 | .18 | .80 | 23 | 5.4 | .06 | .02 | .00 |
| 8 | .00 | .00 | .03 | .00 | .00 | .12 | .52 | 15 | 2.0 | .04 | .02 | .00 |
| 9 | .00 | .00 | .03 | .00 | .00 | .20 | .52 | 12 | 1.3 | .03 | .00 | .00 |
| 10 | .00 | .00 | .03 | .00 | .05 | .20 | .80 | 9.9 | 1.2 | .03 | .00 | .00 |
| 11 | .00 | .00 | .03 | .00 | 2.5 | .20 | 1.6 | 8.5 | .73 | .02 | .00 | .00 |
| 12 | .00 | .00 | .03 | .00 | 8.0 | .20 | 8.7 | 7.5 | .73 | .02 | .00 | .00 |
| 13 | .00 | .00 | .03 | .00 | 10 | .16 | 48 | 5.8 | .41 | .01 | .00 | .00 |
| 14 | .00 | .00 | .03 | .00 | 20 | .15 | 31 | 4.8 | .38 | .00 | .00 | .00 |
| 15 | .00 | .00 | .03 | .00 | 25 | .13 | 13 | 3.8 | .48 | .00 | .00 | .00 |
| 16 | .00 | .00 | .04 | .00 | 30 | .13 | 6.7 | 3.2 | 1.0 | .00 | .00 | .00 |
| 17 | .00 | .00 | .04 | .00 | 10 | .12 | 4.2 | 2.4 | .99 | .00 | .00 | .00 |
| 18 | .00 | .00 | .04 | .00 | 6.0 | .10 | 2.1 | 1.3 | .50 | .00 | .00 | .00 |
| 19 | .00 | .00 | .04 | .00 | 4.0 | 10 | 1.7 | 1.1 | 1.4 | .00 | .00 | .00 |
| 20 | .00 | .00 | .04 | .00 | 2.5 | 81 | 1.1 | .92 | 1.3 | .00 | .00 | .00 |
| 21 | .00 | .00 | .04 | .00 | 3.5 | 106 | .90 | .84 | 1.6 | .00 | .00 | .00 |
| 22 | .00 | .00 | .04 | .00 | 10 | 42 | .81 | .79 | 12 | .00 | .00 | .00 |
| 23 | .00 | .00 | .02 | .00 | 15 | 38 | .63 | .52 | 6.6 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | 8.0 | 29 | .67 | .36 | 8.2 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | 5.5 | 18 | .72 | .32 | 5.4 | .01 | .00 | .00 |
| 26 | .00 | .01 | .00 | .00 | 4.0 | 9.2 | .78 | .25 | 3.6 | .02 | .00 | .00 |
| 27 | .00 | .01 | .00 | .00 | 1.8 | 5.6 | .53 | .22 | 1.7 | .02 | .00 | .00 |
| 28 | .00 | .01 | .00 | .00 | 1.5 | 4.6 | .13 | .21 | 1.1 | .02 | .00 | .00 |
| 29 | .00 | .01 | .00 | .03 | 1.1 | 3.2 | 4.6 | .17 | .47 | .00 | .00 | .00 |
| 30 | .00 | .01 | .00 | .01 | --- | 4.7 | 4.8 | .15 | .23 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .05 | --- | 4.4 | --- | .11 | --- | .00 | .00 | --- |
| TOTAL | .00 | .05 | .67 | .09 | 168.93 | 359.89 | 146.01 | 355.66 | 77.70 | .85 | .09 | .00 |
| MEAN | .00 | .00 | .02 | .00 | 5.83 | 11.6 | 4.87 | 11.5 | 2.59 | .03 | .00 | .00 |
| MAX | .00 | .01 | .04 | .05 | 30 | 106 | 48 | 65 | 12 | .17 | .02 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .10 | .13 | .11 | .07 | .00 | .00 | .00 |
| AC-FT | .00 | .1 | 1.3 | .2 | 335 | 714 | 290 | 705 | 154 | 1.7 | .2 | .00 |
| CAL YR 1983 | TOTAL | 1652.87 | | MEAN | 4.53 | MAX | 275 | MIN | .00 | AC-FT | 3280 | |
| WTR YR 1984 | TOTAL | 1109.94 | | MEAN | 3.03 | MAX | 106 | MIN | .00 | AC-FT | 2200 | |

KNIFE RIVER BASIN

06340520 ANTELOPE CREEK ABOVE HAZEN, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|-------|------|---|---|--------------------------------|-------------------------------------|-----------------------------|--|---|--|--|--|
| MAR | | | | | | | | | | | |
| 15... | 1138 | .13 | 1300 | 7.3 | -3.0 | .0 | 320 | 0 | 67 | 36 | 180 |
| 21... | 1216 | 97 | 230 | 6.8 | 3.0 | 1.0 | 79 | 10 | 17 | 8.8 | 26 |
| 27... | 1355 | 5.0 | 530 | -- | 3.0 | 2.0 | -- | -- | -- | -- | -- |
| 29... | 1049 | 3.1 | 660 | -- | 6.5 | 2.0 | -- | -- | -- | -- | -- |
| APR | | | | | | | | | | | |
| 04... | 1428 | 1.6 | 1020 | -- | 18.0 | 10.0 | -- | -- | -- | -- | -- |
| 25... | 1405 | .72 | 1380 | 8.1 | 10.0 | 12.0 | 390 | 35 | 81 | 45 | 180 |
| JUN | | | | | | | | | | | |
| 13... | 1244 | .43 | 1040 | 7.9 | 28.5 | 18.5 | 400 | 160 | 77 | 51 | 84 |
| JUL | | | | | | | | | | | |
| 10... | 0918 | .03 | 1800 | 7.7 | 27.0 | 17.5 | 440 | 0 | 73 | 63 | 270 |

| DATE | SODIUM AD- SORP- TION RATIO | ALKA- LINITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) | SOLIDS, DIS- SOLVED (TONS PER DAY) |
|-------|---|---|---|---|--|---|---|
| MAR | | | | | | | |
| 15... | 5 | 381 | 39 | 330 | 896 | 1.2 | .31 |
| 21... | 1 | 68 | 21 | 46 | 165 | .22 | .43 |
| APR | | | | | | | |
| 25... | 4 | 353 | 5.4 | 430 | 1010 | 1.4 | 2.0 |
| JUN | | | | | | | |
| 13... | 2 | 209 | 5.9 | 350 | 727 | .99 | .84 |
| JUL | | | | | | | |
| 10... | 6 | 437 | 19 | 580 | 1290 | 1.8 | .10 |

KNIFE RIVER BASIN

239

06340528 WEST BRANCH ANTELOPE CREEK NO. 4 NEAR ZAP, ND

LOCATION.--Lat 47°21'21", long 101°51'16", in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ sec.26, T.145 N., R.88 W., Mercer County, Hydrologic Unit 10130201, on left bank upstream from culvert, and 6.0 mi northeast of Zap.

DRAINAGE AREA.--8.46 mi², revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1976 to current year. Prior to Oct. 1978, published as Antelope Creek Tributary No. 4 near Zap.

GAGE.--Water-stage recorder.

REMARKS.--Records poor. Some regulation by stock dams above station.

AVERAGE DISCHARGE.--8 years, 0.67 ft³/s, 485 acre-ft.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 650 ft³/s Apr. 17, 1979, gage height, 9.66 ft; no flow for several months each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 10 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|--------|-----------------------------------|---------------------|
| Feb. 12 | 1530 | 44 | b5.17 | May 3 | Unkown | a20 | Unkown |
| Mar. 20 | 2100 | 80 | *b5.74 | | | | |

No flow for several months.

a - About

b - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-----|------|--------|-------|-------|-------|------|-------|-----|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | .32 | .50 | .00 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | .31 | 2.0 | .00 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | .31 | 10 | .00 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .02 | .00 | .24 | 8.0 | .00 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | .22 | 6.0 | .00 | .01 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | .20 | 5.0 | .06 | .01 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | .17 | 4.0 | .14 | .01 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .04 | .14 | 3.0 | .13 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .10 | .04 | .13 | 2.5 | .10 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | 10 | .13 | .30 | 2.0 | .08 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | 20 | .11 | .63 | 1.5 | .06 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | 13 | .34 | 1.6 | 1.2 | .05 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | 15 | .03 | 3.6 | .95 | .07 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | 19 | .00 | 2.3 | .75 | .10 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | 10 | .00 | .97 | .60 | .16 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | 6.0 | .02 | .51 | .40 | .18 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | 4.0 | .38 | .33 | .38 | .10 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | 4.7 | 1.2 | .19 | .32 | .04 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | 2.9 | 4.4 | .13 | .29 | .11 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | 3.5 | 37 | .09 | .27 | .10 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | 4.0 | 18 | .06 | .25 | .12 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | 1.2 | 10 | .05 | .22 | .25 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .53 | 9.1 | .04 | .18 | .20 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .04 | 4.4 | .08 | .14 | .10 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 1.2 | .09 | .11 | .05 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | .70 | .07 | .11 | .02 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | .50 | .03 | .08 | .00 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | .34 | .04 | .05 | .00 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | .46 | .05 | .03 | .00 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | .58 | .10 | .00 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | .42 | --- | .00 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | 113.99 | 89.39 | 13.30 | 50.83 | 2.22 | .03 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | 3.93 | 2.88 | .44 | 1.64 | .07 | .00 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | 20 | 37 | 3.6 | 10 | .25 | .01 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .03 | .00 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | 226 | 177 | 26 | 101 | 4.4 | .06 | .00 | .00 |
| CAL YR 1983 | TOTAL | 213.00 | | MEAN | .58 | MAX | 32 | MIN | .00 | AC-FT | 422 | |
| WTR YR 1984 | TOTAL | 269.76 | | MEAN | .74 | MAX | 37 | MIN | .00 | AC-FT | 535 | |

KNIFE RIVER BASIN

06340528 WEST BRANCH ANTELOPE CREEK NO.4 NEAR ZAP, ND--CONTINUED

PERIOD OF RECORD.--Water years 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | |
|-------|------|--|---|---|--|---|--|--|---|--|--|
| | | | | | | | | (00301) | | | |
| MAR | | | | | | | | | | | |
| 21... | 1502 | 20 | 140 | 6.4 | 3.0 | 2.0 | 21.2 | 155 | 56 | 13 | |
| 22... | 1637 | 3.2 | 205 | -- | 5.5 | .0 | -- | -- | -- | -- | |
| 23... | 1401 | 8.3 | -- | -- | 9.5 | 2.0 | -- | -- | -- | -- | |
| 28... | 0835 | .34 | 605 | -- | 2.0 | .5 | -- | -- | -- | -- | |
| APR | | | | | | | | | | | |
| 03... | 1110 | .29 | 875 | -- | 12.0 | 5.0 | -- | -- | -- | -- | |
| 25... | 1200 | .09 | 1250 | 7.4 | 12.0 | 8.5 | 12.8 | 111 | 560 | 233 | |
| JUN | | | | | | | | | | | |
| 06... | 1318 | .13 | 1200 | 7.4 | 21.0 | 13.0 | 8.7 | 85 | 470 | 166 | |
| JUL | | | | | | | | | | | |
| 10... | 1117 | .01 | 1340 | 8.0 | 29.0 | 16.0 | 12.2 | 125 | 540 | 214 | |
| DATE | | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | ALKA- LINEITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) |
| | | | | | | | | | (70300) | | |
| MAR | | | | | | | | | | | |
| 21... | 14 | 5.2 | 2.5 | .1 | 45 | 33 | 24 | 112 | .15 | 6.0 | |
| APR | | | | | | | | | | | |
| 25... | 130 | 58 | 9.1 | .2 | 331 | 25 | 400 | 922 | 1.3 | .22 | |
| JUN | | | | | | | | | | | |
| 06... | 100 | 53 | 97 | 2 | 279 | 23 | 400 | 861 | 1.2 | .30 | |
| JUL | | | | | | | | | | | |
| 10... | 120 | 58 | 120 | 2 | 280 | 6.3 | 520 | 999 | 1.4 | .03 | |

MISSOURI RIVER MAIN STEM

241

06340700 MISSOURI RIVER NEAR STANTON, ND

LOCATION.--Lat 47°17'14", long 101°20'25", in SW1/4 sec.16, T.144 N., R.84 W., McLean County, Hydrologic Unit 10130101, on right bank 3 mi southeast of Stanton, 0.1 mi below Ft. Clark irrigation pumping station, 0.4 mi above the United Power Association power plant, and at mile 1,372.

DRAINAGE AREA.--182,000 mi², approximately.

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,650.00 ft National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Sept. 30, 1964, at datum 50.00 ft lower.

REMARKS.--Stage regulated by Lake Sakakawea (station 06339000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 24.56 ft Feb. 22, 1965; minimum daily 10.45 ft June 28, 1984.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 12.51 | 11.18 | 12.70 | 15.92 | 14.67 | --- | 11.38 | 11.44 | 11.55 | 10.70 | 14.12 | 14.66 |
| 2 | 12.50 | 10.86 | 13.00 | 14.17 | 14.75 | --- | 11.41 | 11.57 | 11.64 | 10.87 | 14.24 | 14.31 |
| 3 | 12.48 | 11.27 | 13.10 | --- | 14.70 | --- | 11.49 | 11.56 | 12.04 | 11.08 | 14.24 | 14.53 |
| 4 | 12.42 | 11.84 | 13.10 | --- | 14.49 | --- | 11.42 | 11.53 | 12.32 | 10.99 | 14.18 | 14.46 |
| 5 | 12.34 | 11.42 | 13.56 | --- | 14.71 | --- | 12.02 | 11.69 | 12.06 | 11.84 | 14.39 | 14.50 |
| 6 | 11.88 | 11.53 | 13.46 | --- | 14.60 | --- | 12.31 | 11.64 | 12.04 | 11.60 | 14.48 | 14.27 |
| 7 | 11.71 | 12.02 | 13.76 | --- | 14.67 | --- | 12.60 | 12.05 | 12.11 | 11.66 | 14.35 | 14.41 |
| 8 | 10.90 | 12.12 | 13.69 | --- | 14.56 | --- | 12.37 | 11.55 | 11.66 | 11.95 | 14.24 | 14.27 |
| 9 | 10.84 | 11.88 | 12.98 | --- | 14.40 | --- | 12.50 | 11.66 | 11.84 | 12.73 | 14.23 | 14.26 |
| 10 | 10.78 | 12.37 | 12.79 | --- | 14.51 | --- | 12.04 | 11.54 | 11.79 | 12.65 | 14.40 | 14.30 |
| 11 | 10.90 | 12.16 | 12.82 | --- | 14.55 | --- | 12.49 | 11.54 | 11.84 | 12.86 | 14.54 | 14.62 |
| 12 | 10.97 | 12.10 | 13.03 | --- | 14.27 | --- | 12.46 | 11.14 | 11.89 | 13.48 | 14.23 | 14.67 |
| 13 | 10.89 | 12.12 | 12.90 | --- | 14.59 | 12.69 | 12.52 | 11.11 | 12.06 | 13.69 | 14.30 | 14.08 |
| 14 | 10.77 | 12.09 | 12.72 | --- | 14.50 | 13.01 | 12.04 | 11.30 | 11.93 | 13.69 | 14.39 | 14.57 |
| 15 | 10.91 | 11.98 | 12.78 | --- | 14.43 | 12.78 | 11.29 | 11.52 | 11.09 | 13.59 | 14.39 | 14.12 |
| 16 | 10.93 | 12.11 | 12.26 | --- | 14.58 | 12.91 | 12.43 | 11.09 | 11.05 | 13.52 | 14.15 | 13.74 |
| 17 | 10.91 | 12.11 | 12.98 | --- | 14.60 | 12.41 | 12.55 | 11.07 | 11.55 | 13.62 | 14.43 | 13.48 |
| 18 | 10.79 | 12.01 | 13.05 | --- | 14.40 | 12.07 | 12.33 | 11.22 | 11.18 | 13.92 | 14.61 | 13.58 |
| 19 | 10.98 | 12.07 | 14.00 | --- | 14.54 | 11.95 | 12.56 | 11.26 | 11.31 | 13.87 | 13.93 | 13.50 |
| 20 | 10.93 | 12.07 | 15.27 | --- | 14.36 | 12.01 | 12.18 | 11.04 | 10.72 | 14.12 | 14.45 | 13.50 |
| 21 | 10.69 | 12.17 | 15.78 | --- | 14.45 | 12.12 | 11.73 | 11.40 | 10.58 | 14.54 | 14.26 | 13.41 |
| 22 | 11.00 | 12.08 | 15.55 | --- | 14.43 | 12.47 | 11.39 | 11.15 | 10.62 | 14.14 | 14.33 | 13.47 |
| 23 | 10.89 | 12.22 | 15.96 | --- | 14.51 | 12.41 | 11.47 | 11.15 | 10.84 | 14.18 | 14.12 | 13.41 |
| 24 | 11.14 | 11.93 | 16.34 | 15.34 | 14.44 | 12.29 | 11.13 | 10.83 | 10.84 | 14.34 | 14.29 | 13.47 |
| 25 | 10.78 | 12.02 | 16.95 | 15.06 | --- | 12.22 | 11.55 | 11.01 | 10.84 | 14.05 | 14.35 | 13.38 |
| 26 | 11.54 | 12.24 | 16.66 | 14.97 | --- | 12.27 | 11.58 | 11.05 | 10.87 | 14.08 | 14.28 | 13.40 |
| 27 | 11.31 | 12.23 | 16.77 | 14.89 | --- | 12.04 | 11.31 | 11.23 | 10.68 | 14.05 | 14.52 | 13.38 |
| 28 | 10.69 | 11.90 | 16.24 | 14.78 | --- | 11.95 | 11.53 | 11.16 | 10.45 | 14.08 | 14.10 | 13.32 |
| 29 | 10.91 | 12.11 | 16.31 | 14.55 | --- | 11.97 | 11.74 | 10.95 | 10.69 | 14.23 | 14.22 | 13.51 |
| 30 | 10.62 | 12.27 | 16.29 | 15.14 | --- | 11.80 | 11.56 | 11.06 | 10.67 | 14.21 | 14.27 | 13.37 |
| 31 | 11.11 | --- | 15.99 | 14.61 | --- | 11.87 | --- | 11.62 | --- | 14.31 | 14.19 | --- |
| MEAN | 11.23 | 11.95 | 14.28 | --- | --- | --- | 11.91 | 11.33 | 11.36 | 13.18 | 14.30 | 13.93 |
| MAX | 12.51 | 12.37 | 16.95 | --- | --- | --- | 12.60 | 12.05 | 12.32 | 14.54 | 14.61 | 14.67 |
| MIN | 10.62 | 10.86 | 12.26 | --- | --- | --- | 11.13 | 10.83 | 10.45 | 10.70 | 13.93 | 13.32 |

MISSOURI RIVER MAIN STEM

06340900 MISSOURI RIVER NEAR HENSLER, ND

LOCATION.--Lat 47°16'45", long 101°11'03", in SW1/4 sec.22, T.144 N., R.83 W., McLean County, Hydrologic Unit 10130101, on left bank about 7.5 mi west of Washburn, and at mile 1,362.

DRAINAGE AREA.--183,000 mi², approximately.

PERIOD OF RECORD.--May 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,640.00 ft National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Sept. 30, 1964, at datum 40 ft lower.

REMARKS.--Stage regulated by Lake Sakakawea (station 06338000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 27.77 ft Mar. 20, 1965; minimum daily recorded, 14.58 ft June 28, 1984.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 16.61 | 15.59 | | --- | 18.54 | 17.47 | 15.41 | 15.47 | --- | 14.74 | 18.25 | 18.70 |
| 2 | 16.57 | 15.11 | | --- | 18.65 | 17.47 | 15.39 | 15.64 | --- | 15.20 | 18.25 | 18.49 |
| 3 | 16.49 | 15.41 | | --- | 18.65 | 17.44 | 15.37 | 16.45 | --- | 15.08 | 18.39 | 18.56 |
| 4 | 16.42 | 15.97 | | --- | --- | 17.42 | 15.44 | 16.69 | --- | 15.05 | 18.29 | 18.63 |
| 5 | 16.33 | 15.75 | | --- | --- | --- | 15.67 | 17.34 | --- | 16.00 | 18.41 | 18.68 |
| 6 | 16.02 | 15.70 | | 20.00 | --- | --- | 16.22 | 17.58 | 16.23 | 15.80 | 18.68 | 18.43 |
| 7 | 15.83 | 16.15 | | 19.10 | --- | --- | 16.56 | 18.48 | 16.30 | 15.84 | 18.42 | 18.54 |
| 8 | --- | 16.21 | | 18.70 | 18.50 | --- | 16.40 | 17.22 | 15.80 | 15.91 | 18.40 | 18.39 |
| 9 | --- | 16.18 | | --- | 18.31 | --- | 16.50 | 17.25 | 16.16 | 16.79 | 18.26 | 18.34 |
| 10 | --- | 16.39 | | --- | 18.37 | --- | 15.93 | 17.00 | 16.04 | 16.81 | 18.47 | 18.46 |
| 11 | --- | 16.32 | | --- | 18.44 | --- | 16.43 | --- | 15.99 | 16.96 | 18.59 | 18.74 |
| 12 | --- | 16.30 | | --- | 18.15 | --- | 16.51 | --- | 15.92 | 17.44 | 18.32 | 18.78 |
| 13 | --- | 16.25 | | --- | 18.47 | 16.63 | 16.64 | --- | 16.49 | 17.79 | 18.49 | 18.28 |
| 14 | --- | 16.23 | | --- | 18.39 | 17.00 | 16.17 | --- | 16.06 | 17.82 | 18.44 | 18.68 |
| 15 | --- | 16.21 | | --- | 18.29 | --- | 15.64 | --- | 15.53 | 17.65 | 18.49 | 18.40 |
| 16 | --- | 16.23 | | --- | 18.41 | --- | 15.97 | --- | 15.21 | 17.62 | --- | 18.01 |
| 17 | --- | 16.26 | | --- | 18.51 | 16.36 | 16.54 | --- | 15.53 | 17.73 | --- | 17.74 |
| 18 | --- | 16.18 | | --- | 18.33 | 16.05 | 16.33 | --- | 15.38 | 17.93 | --- | 17.74 |
| 19 | --- | 16.19 | | --- | 18.38 | 15.84 | 16.53 | --- | 15.52 | 17.98 | --- | 17.67 |
| 20 | --- | 16.18 | | --- | 18.30 | 15.89 | 16.34 | --- | 15.11 | 18.14 | --- | 17.65 |
| 21 | 14.93 | 16.33 | | --- | 18.31 | 16.01 | 15.85 | --- | 14.79 | 18.60 | --- | 17.61 |
| 22 | 15.12 | 16.30 | | --- | 18.31 | 16.34 | 15.60 | --- | 14.66 | 18.24 | --- | 17.56 |
| 23 | 15.17 | 16.33 | | --- | 18.38 | 16.34 | 15.45 | --- | 15.09 | 18.21 | --- | 17.62 |
| 24 | 15.33 | 16.09 | | --- | 18.37 | 16.24 | 15.24 | --- | 14.97 | 18.42 | --- | 17.58 |
| 25 | 15.10 | 16.08 | | --- | --- | 16.16 | 15.41 | --- | 15.14 | 18.12 | --- | 17.52 |
| 26 | 15.61 | 16.35 | | --- | --- | 16.20 | 15.68 | --- | 14.92 | 18.14 | --- | 17.55 |
| 27 | 15.82 | 16.43 | | --- | 17.51 | 15.99 | 15.34 | --- | 14.95 | 18.15 | --- | 17.54 |
| 28 | 14.89 | 15.99 | | --- | 17.48 | 15.91 | 15.84 | --- | 14.58 | 18.27 | --- | 17.47 |
| 29 | 15.14 | 16.16 | | --- | 17.45 | 15.90 | 15.89 | --- | 14.79 | 18.22 | --- | 17.65 |
| 30 | 14.91 | --- | | --- | --- | 15.80 | 15.85 | --- | 14.98 | 18.26 | --- | 17.54 |
| 31 | 15.13 | --- | | 18.78 | --- | 15.75 | --- | --- | --- | 18.34 | 18.28 | --- |
| MEAN | --- | --- | | --- | --- | --- | 15.94 | --- | --- | 17.27 | --- | 18.08 |
| MAX | --- | --- | | --- | --- | --- | 16.64 | --- | --- | 18.60 | --- | 18.78 |
| MIN | --- | --- | | --- | --- | --- | 15.24 | --- | --- | 14.74 | --- | 17.47 |

COAL LAKE COULEE BASIN

243

06340905 COAL LAKE COULEE NEAR HENSLER, ND

LOCATION.--Lat 47°18'09", long 101°07'52", in SW1/4SE1/4SE1/4 sec.12, T.144 N., R.83 W., McLean County, Hydrologic Unit 10130101, on right bank 100 ft upstream from bridge, on county road 4.5 mi west of Washburn, 3.6 mi northwest of Hensler, and 0.3 mi upstream from mouth.

DRAINAGE AREA.--70.5 mi², of which 53.3 mi² is probably noncontributing, revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,690 ft, from topographic map.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--7 years, 2.74 ft³/s, 1,980 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 926 ft³/s Aug. 20, 1980, gage height, 8.61 ft, from rating extended above 600 ft³/s on basis of a culvert computation of peak flow; no flow for many months each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 40 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|------|-----------------------------------|---------------------|
| Mar. 20 | 1515 | *120 | 2.98 | May 5 | 0215 | 52 | 1.47 |

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|-------|--------|--------|--------|------|-------|------|-----|
| 1 | .00 | .00 | .00 | .00 | .05 | .01 | 14 | .10 | .02 | .00 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .05 | .00 | 13 | .20 | .01 | .00 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 12 | .40 | .01 | .00 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 12 | 8.0 | .01 | .00 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 12 | 49 | .20 | .00 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 13 | 38 | .44 | .00 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .01 | .00 | 11 | 28 | .50 | .00 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .05 | .00 | 8.5 | 25 | .37 | .00 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .50 | .00 | 9.6 | 23 | .36 | .00 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | 1.0 | .00 | 7.4 | 17 | .53 | .00 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | 1.0 | .00 | 12 | 12 | .35 | .00 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .80 | .00 | 17 | 12 | .45 | .00 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .80 | .00 | 26 | 7.4 | .36 | .00 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .50 | .00 | 22 | 7.4 | .31 | .00 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .40 | .00 | 23 | 8.6 | .46 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .30 | .00 | 22 | 5.3 | .35 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .20 | .00 | 21 | 1.0 | .29 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .50 | .00 | 21 | .71 | .22 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | 1.5 | 20 | 18 | .41 | .23 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | 3.0 | 75 | 16 | .30 | .30 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | 1.0 | 12 | 12 | .30 | .29 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .15 | 5.2 | 9.7 | .20 | 1.9 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .10 | 3.1 | 7.1 | .10 | .45 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .07 | .20 | 6.3 | .09 | .27 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .05 | .00 | 5.1 | .08 | .17 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .04 | .20 | 2.5 | .07 | .21 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .03 | 7.6 | .00 | .06 | .10 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .10 | .03 | 14 | .00 | .05 | .04 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .30 | .02 | 16 | .00 | .04 | .01 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .30 | --- | 17 | .05 | .03 | .00 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .10 | --- | 15 | --- | .02 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .80 | 12.15 | 185.31 | 353.25 | 244.86 | 9.21 | .00 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .03 | .42 | 5.98 | 11.8 | 7.90 | .31 | .00 | .00 | .00 |
| MAX | .00 | .00 | .00 | .30 | 3.0 | 75 | 26 | 49 | 1.9 | .00 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | .00 | .02 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | 1.6 | 24 | 368 | 701 | 486 | 18 | .00 | .00 | .00 |
| CAL YR 1983 | TOTAL | 1963.66 | | MEAN | 5.38 | MAX | 100 | MIN | .00 | AC-FT | 3890 | |
| WTR YR 1984 | TOTAL | 805.58 | | MEAN | 2.20 | MAX | 75 | MIN | .00 | AC-FT | 1600 | |

COAL LAKE COULEE BASIN

06340905 COAL LAKE COULEE NEAR HENSLER, ND--CONTINUED

PERIOD OF RECORD.--Water years 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | | | | |
|-------|---|--|--|---|---|--|--|---|--|---|--|--|
| MAR | | | | | | | | | | | | |
| 21... | 1740 | 12 | 172 | 7.4 | 1.0 | .0 | 12.0 | 82 | | | | |
| 27... | 1305 | 7.5 | 1770 | -- | 2.0 | 3.0 | -- | -- | | | | |
| APR | | | | | | | | | | | | |
| 24... | 1415 | 7.8 | 1530 | 8.5 | 24.0 | 15.5 | 8.8 | 89 | | | | |
| JUN | | | | | | | | | | | | |
| 05... | 1400 | .20 | 1950 | 8.3 | -- | 16.0 | 9.5 | 98 | | | | |
| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) |
| MAR | | | | | | | | | | | | |
| 21... | 48 | 0 | 11 | 5.0 | 12 | .8 | 56 | 4.3 | 37 | 124 | .17 | 4.1 |
| APR | | | | | | | | | | | | |
| 24... | 470 | 185 | 66 | 75 | 160 | 3 | 306 | 1.7 | 530 | 1090 | 1.5 | 23 |
| JUN | | | | | | | | | | | | |
| 05... | 410 | 0 | 65 | 59 | 320 | 7 | 483 | 4.8 | 620 | 1390 | 1.9 | .75 |

MISSOURI RIVER MAIN STEM

245

06341000 MISSOURI RIVER AT WASHBURN, ND

LOCATION.--Lat 47°17'20", long 101°02'15", in SE¼SW¼ sec.14, T.144 N., R.82 W., McLean County, Hydrologic Unit 10130101, on left bank near municipal water plant in Washburn, and at mile 1,355.

DRAINAGE AREA.--184,000 mi², approximately.

PERIOD OF RECORD.--August 1960 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,640.00 ft National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1964, at datum 40 ft lower.

REMARKS.--Stage regulated by Lake Sakakawea (station 06338000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 22.76 ft Jan. 11, 1964; minimum daily recorded, 9.73 ft May 7, 1978.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-----|-----|-------|-------|-------|
| 1 | --- | 11.10 | 12.02 | 17.46 | 14.76 | 13.21 | 11.44 | | | --- | 13.48 | 13.89 |
| 2 | --- | 10.62 | 12.50 | 17.39 | 14.58 | 13.24 | 11.36 | | | --- | 13.53 | 13.79 |
| 3 | --- | 10.85 | 12.54 | 16.67 | 14.50 | 13.21 | 11.33 | | | --- | 13.42 | 13.78 |
| 4 | --- | 11.35 | 12.50 | --- | 14.14 | 13.13 | 11.41 | | | --- | 13.48 | 13.89 |
| 5 | --- | --- | 13.01 | --- | 14.66 | 13.29 | 11.49 | | | --- | 13.57 | 13.93 |
| 6 | --- | --- | 12.77 | 17.09 | 16.05 | 13.19 | 12.09 | | | --- | 13.82 | 13.71 |
| 7 | --- | --- | 13.25 | 16.23 | 15.52 | 12.65 | 12.37 | | | --- | 13.62 | 13.83 |
| 8 | --- | --- | 12.94 | 15.65 | 14.64 | 12.71 | 12.26 | | | --- | 13.60 | 13.72 |
| 9 | --- | --- | 12.63 | 15.50 | 14.11 | 12.71 | 12.30 | | | --- | 13.48 | 13.63 |
| 10 | --- | 11.75 | 12.30 | 15.85 | 14.07 | 12.53 | 11.83 | | | --- | 13.64 | 13.75 |
| 11 | --- | 11.50 | 12.37 | 17.98 | 14.12 | 12.55 | 12.17 | | | --- | 13.77 | 13.96 |
| 12 | --- | 11.80 | 12.41 | 19.47 | 13.86 | 12.72 | 12.30 | | | --- | 13.56 | 14.02 |
| 13 | --- | 11.75 | 12.36 | 19.80 | 14.12 | 12.47 | 12.41 | | | --- | 13.72 | 13.67 |
| 14 | --- | --- | 12.17 | 19.57 | 14.06 | 12.78 | 12.05 | | | --- | 13.65 | 13.91 |
| 15 | --- | --- | 12.30 | 19.43 | 13.97 | 12.43 | 11.68 | | | --- | 13.73 | 13.76 |
| 16 | --- | --- | 12.05 | 19.12 | 14.07 | 12.65 | 11.60 | | | --- | 13.62 | 13.42 |
| 17 | --- | --- | 12.49 | 18.36 | 14.17 | 12.30 | 12.29 | | | --- | 13.64 | 13.15 |
| 18 | --- | --- | 14.11 | 18.62 | 14.01 | 12.02 | --- | | | --- | 13.88 | 13.10 |
| 19 | --- | --- | 16.59 | 18.99 | 14.03 | 11.78 | --- | | | --- | 13.35 | 13.05 |
| 20 | --- | --- | 17.13 | 19.20 | 13.99 | 11.81 | --- | | | --- | 13.71 | 13.05 |
| 21 | --- | --- | 17.44 | 19.02 | 13.98 | 11.92 | --- | | | --- | 13.60 | 13.00 |
| 22 | --- | --- | 17.16 | 19.15 | 13.98 | 12.20 | --- | | | --- | 13.65 | 12.99 |
| 23 | --- | --- | 15.47 | 19.41 | 14.04 | 12.24 | --- | | | --- | 13.60 | 13.03 |
| 24 | --- | --- | 15.48 | 18.92 | 14.03 | 12.17 | --- | | | --- | 13.70 | 12.97 |
| 25 | --- | --- | 17.74 | 18.03 | 13.95 | 12.08 | --- | | | --- | 13.61 | 12.94 |
| 26 | --- | --- | 17.90 | 17.55 | 13.44 | 12.08 | --- | | | --- | 13.68 | 12.95 |
| 27 | 11.35 | --- | 17.85 | 17.19 | 13.27 | 11.92 | --- | | | 13.04 | 13.84 | 12.94 |
| 28 | 10.53 | --- | 17.70 | 16.78 | 13.24 | 11.85 | --- | | | 13.50 | 13.59 | 12.89 |
| 29 | 10.67 | --- | 17.47 | 15.96 | 13.25 | 11.81 | --- | | | 13.40 | 13.60 | 13.02 |
| 30 | 10.55 | 11.90 | 17.57 | 16.01 | --- | 11.74 | --- | | | 13.45 | 13.67 | 12.95 |
| 31 | 10.58 | --- | 17.41 | 15.42 | --- | 11.66 | --- | | | 13.52 | 13.52 | --- |
| MEAN | --- | --- | 14.50 | --- | 14.16 | 12.42 | --- | | | --- | 13.62 | 13.42 |
| MAX | --- | --- | 17.90 | --- | 16.05 | 13.29 | --- | | | --- | 13.88 | 14.02 |
| MIN | --- | --- | 12.02 | --- | 13.24 | 11.66 | --- | | | --- | 13.35 | 12.89 |

PAINTED WOODS CREEK BASIN

06341800 PAINTED WOODS CREEK NEAR WILTON, ND

LOCATION.--Lat 47°16'30", long 100°47'30", in SW1/4SW1/4 sec.23, T.144 N., R.80 W., McLean County, Hydrologic Unit 10130101, on right bank 600 ft upstream from county highway bridge, 7 mi upstream from Yanktonai Creek, and 8 mi north of Wilton.

DRAINAGE AREA.--427 mi², approximately, of which about 310 mi² is probably noncontributing.

PERIOD OF RECORD.--October 1957 to September 1981, August 1982 to September 1983.

GAGE.--Water-stage recorder. Altitude of gage is 1,760 ft, from topographic map.

REMARKS.--Records good. Since the fall of 1982 Missouri River Basin water has been diverted into the stream at a point several miles upstream.

AVERAGE DISCHARGE.--24 years (water years 1958-81), 8.07 ft³/s, 5,850 acre-ft/yr; median of yearly mean discharges, 6.7 ft³/s 4,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,050 ft³/s Apr. 19, 1979, gage height, 9.64 ft; no flow for many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 468 ft³/s Mar. 22, gage height, 6.50 ft, minimum daily discharge 1.9 ft³/s Jan. 23.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|------|------|------|-------|-------|------|
| 1 | 21 | 13 | 9.0 | 3.4 | 4.7 | 20 | 65 | 49 | 41 | 30 | 34 | 38 |
| 2 | 22 | 12 | 8.6 | 3.4 | 4.8 | 16 | 62 | 55 | 40 | 29 | 33 | 40 |
| 3 | 22 | 13 | 8.5 | 3.3 | 4.7 | 13 | 56 | 71 | 39 | 29 | 29 | 41 |
| 4 | 21 | 13 | 8.5 | 3.2 | 4.9 | 12 | 50 | 92 | 41 | 30 | 28 | 41 |
| 5 | 20 | 13 | 8.3 | 3.2 | 5.9 | 11 | 46 | 72 | 46 | 31 | 28 | 41 |
| 6 | 20 | 13 | 8.4 | 3.3 | 5.9 | 10 | 43 | 57 | 52 | 30 | 26 | 40 |
| 7 | 19 | 12 | 8.3 | 3.4 | 6.0 | 10 | 41 | 50 | 56 | 29 | 22 | 40 |
| 8 | 18 | 12 | 8.2 | 3.5 | 6.0 | 10 | 39 | 44 | 52 | 30 | 18 | 35 |
| 9 | 18 | 12 | 7.7 | 3.4 | 6.0 | 10 | 36 | 42 | 50 | 28 | 19 | 33 |
| 10 | 18 | 12 | 7.6 | 3.3 | 6.8 | 9.6 | 33 | 38 | 51 | 29 | 26 | 32 |
| 11 | 18 | 12 | 6.9 | 3.8 | 7.4 | 8.1 | 32 | 34 | 50 | 29 | 28 | 33 |
| 12 | 18 | 12 | 6.8 | 3.7 | 7.3 | 6.8 | 44 | 30 | 49 | 29 | 28 | 32 |
| 13 | 17 | 12 | 6.8 | 3.5 | 7.3 | 6.6 | 91 | 27 | 49 | 29 | 28 | 32 |
| 14 | 16 | 14 | 6.8 | 3.5 | 7.9 | 6.8 | 110 | 24 | 47 | 28 | 26 | 33 |
| 15 | 16 | 13 | 6.0 | 3.6 | 8.4 | 6.9 | 87 | 22 | 46 | 29 | 27 | 33 |
| 16 | 16 | 13 | 6.0 | 3.5 | 8.5 | 9.0 | 66 | 19 | 47 | 28 | 27 | 33 |
| 17 | 16 | 13 | 6.0 | 3.6 | 8.7 | 10 | 55 | 17 | 45 | 28 | 26 | 33 |
| 18 | 16 | 13 | 6.0 | 3.7 | 8.2 | 8.8 | 47 | 15 | 43 | 28 | 27 | 34 |
| 19 | 15 | 13 | 5.0 | 3.4 | 8.1 | 9.6 | 41 | 15 | 43 | 29 | 28 | 34 |
| 20 | 15 | 13 | 5.0 | 3.0 | 8.9 | 38 | 40 | 14 | 41 | 31 | 27 | 34 |
| 21 | 15 | 13 | 5.0 | 2.5 | 13 | 190 | 38 | 14 | 39 | 30 | 26 | 33 |
| 22 | 15 | 10 | 5.0 | 2.1 | 42 | 278 | 33 | 14 | 39 | 30 | 28 | 32 |
| 23 | 15 | 12 | 4.5 | 1.9 | 41 | 245 | 26 | 13 | 37 | 32 | 31 | 32 |
| 24 | 15 | 11 | 4.5 | 2.0 | 45 | 300 | 25 | 12 | 37 | 32 | 30 | 33 |
| 25 | 15 | 10 | 4.5 | 2.2 | 58 | 320 | 24 | 25 | 35 | 33 | 31 | 33 |
| 26 | 14 | 9.1 | 4.5 | 2.6 | 50 | 215 | 22 | 33 | 34 | 33 | 33 | 31 |
| 27 | 13 | 8.4 | 4.1 | 3.5 | 39 | 149 | 20 | 39 | 34 | 33 | 31 | 31 |
| 28 | 13 | 8.6 | 4.6 | 4.5 | 30 | 111 | 15 | 39 | 33 | 33 | 27 | 32 |
| 29 | 13 | 9.1 | 4.5 | 5.6 | 24 | 102 | 11 | 37 | 32 | 32 | 29 | 32 |
| 30 | 13 | 9.1 | 4.1 | 5.6 | --- | 85 | 13 | 36 | 31 | 32 | 33 | 32 |
| 31 | 13 | --- | 3.8 | 4.7 | --- | 72 | --- | 40 | --- | 34 | 35 | --- |
| TOTAL | 516 | 353.3 | 193.5 | 105.9 | 478.4 | 2299.2 | 1311 | 1089 | 1279 | 937 | 869 | 1033 |
| MEAN | 16.6 | 11.8 | 6.24 | 3.42 | 16.5 | 74.2 | 43.7 | 35.1 | 42.6 | 30.2 | 28.0 | 34.4 |
| MAX | 22 | 14 | 9.0 | 5.6 | 58 | 320 | 110 | 92 | 56 | 34 | 35 | 41 |
| MIN | 13 | 8.4 | 3.8 | 1.9 | 4.7 | 6.6 | 11 | 12 | 31 | 28 | 18 | 31 |
| AC-FT | 1020 | 701 | 384 | 210 | 949 | 4560 | 2600 | 2160 | 2540 | 1860 | 1720 | 2050 |
| CAL YR 1983 | TOTAL | 7820.93 | | MEAN | 21.4 | MAX | 410 | MIN | .12 | AC-FT | 15510 | |
| WTR YR 1984 | TOTAL | 10464.3 | | MEAN | 28.6 | MAX | 320 | MIN | 1.9 | AC-FT | 20760 | |

PAINTED WOODS CREEK BASIN

247

06341800 PAINTED WOODS CREEK NEAR WILTON, ND--CONTINUED

PERIOD OF RECORD---Water years 1959-64, 1970 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | | | |
|--------------|---|--|---|--|--|--|--|---|--|--|--|--|
| | | OCT 21... | 1228 | 15 | 3500 | -- | 11.0 | 6.0 | -- | | | |
| | | DEC 05... | 1150 | 8.4 | 4180 | 8.1 | - .9 | .0 | 2.5 | | | |
| | | JAN 09... | 1136 | 3.7 | 4400 | -- | - .4 | .0 | -- | | | |
| | | FEB 24... | 1230 | 45 | 1320 | -- | 5.0 | .5 | -- | | | |
| | | MAR 12... | 1300 | 6.6 | 3950 | 8.0 | - .9 | .0 | 3.0 | | | |
| | | 21... | 1415 | 157 | 625 | 8.0 | 1.5 | .0 | 40 | | | |
| | | 27... | 1510 | 138 | 820 | -- | 1.0 | 2.0 | -- | | | |
| | | APR 25... | 1025 | 25 | 1850 | 8.3 | 14.0 | 11.0 | 5.0 | | | |
| | | JUN 06... | 1145 | 54 | 3150 | 8.2 | 14.0 | 15.5 | 6.6 | | | |
| | | JUL 11... | 1310 | 27 | 3290 | 8.5 | 31.0 | 24.5 | 1.2 | | | |
| | | AUG 31... | 1041 | 36 | 3270 | 8.3 | 14.0 | 14.0 | 1.5 | | | |
| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
| DEC 05... | 1700 | 1290 | 280 | 240 | 500 | 38 | 5 | 53 | 398 | 6.1 | 2200 | 59 |
| MAR 12... | 1300 | 858 | 160 | 220 | 410 | 40 | 5 | 45 | 448 | 8.6 | 1800 | 46 |
| 21... | 180 | 91 | 28 | 27 | 55 | 38 | 2 | 12 | 90 | 1.7 | 210 | 6.3 |
| APR 25... | 540 | 217 | 80 | 83 | 210 | 45 | 4 | 13 | 325 | 3.1 | 710 | 15 |
| JUN 06... | 1100 | 812 | 120 | 200 | 410 | 43 | 5 | 41 | 312 | 3.8 | 1600 | 42 |
| JUL 11... | 1200 | 853 | 120 | 210 | 440 | 44 | 6 | 47 | 312 | 1.9 | 1900 | 46 |
| AUG 31... | 1100 | 789 | 110 | 200 | 420 | 44 | 6 | 52 | 310 | 3.0 | 1600 | 52 |
| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | |
| DEC 05... | .10 | 14 | 3750 | 3600 | 5.1 | 85 | <.10 | .040 | .12 | 900 | 30 | |
| MAR 12... | .20 | 21 | 3090 | 3000 | 4.2 | 55 | <.10 | .100 | .31 | 740 | 100 | |
| 21... | <.10 | 8.4 | 416 | 400 | .57 | 176 | .52 | .080 | .25 | 100 | 250 | |
| APR 25... | .20 | 12 | 1360 | 1300 | 1.8 | 92 | <.10 | .030 | .09 | 350 | 57 | |
| JUN 06... | <.10 | 7.4 | 2700 | 2600 | 3.7 | 396 | <.10 | .050 | .15 | 670 | <10 | |
| JUL 11... | .10 | 2.1 | 3040 | 3000 | 4.1 | 222 | <.10 | .010 | .03 | 760 | 50 | |
| AUG 31... | .10 | 11 | 2880 | 2600 | 3.9 | 280 | <.10 | .010 | .03 | 780 | 40 | |

MISSOURI RIVER MAIN STEM

06342020 MISSOURI RIVER AT PRICE, ND

LOCATION.--Lat 47°04'47", long 100°55'55", in NW¼ sec.34, T.142 N., R.81 W., Oliver County, Hydrologic Unit 10130101, on right bank 0.5 mi south of Price, and at mile 1,338.

DRAINAGE AREA.--185,000 mi², approximately.

PERIOD OF RECORD.--November 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,620.00 ft National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Sept. 30, 1964, at datum 20 ft lower.

REMARKS.--Stage regulated by Lake Sakakawea (station 06338000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 30.12 ft Jan. 22, 1967; minimum daily recorded, 17.76 ft Mar. 31, 1968.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-------|-------|-------|-------|-------|-------|-----|-------|-------|-------|-------|
| 1 | | --- | 19.71 | 26.44 | 25.41 | 20.89 | --- | | --- | --- | 21.63 | 21.83 |
| 2 | | --- | 20.22 | 26.35 | 25.49 | 20.87 | --- | | --- | --- | 21.52 | 21.92 |
| 3 | | --- | 20.36 | 25.75 | 25.49 | 20.90 | --- | | --- | --- | 21.65 | 21.76 |
| 4 | | --- | 20.36 | 25.69 | 25.06 | 20.81 | --- | | --- | --- | 21.59 | 21.91 |
| 5 | | --- | 20.74 | 25.92 | 23.36 | 20.95 | --- | | 19.63 | --- | 21.63 | 21.92 |
| 6 | | --- | 20.73 | 26.04 | 23.76 | 20.90 | 19.56 | | 19.59 | --- | 21.85 | 21.78 |
| 7 | | --- | 20.97 | 25.93 | 24.86 | 20.85 | 19.79 | | 19.62 | --- | 21.73 | 21.80 |
| 8 | | 19.50 | 20.93 | 25.63 | 24.95 | 20.77 | 19.88 | | 19.38 | --- | 21.70 | 21.78 |
| 9 | | 19.56 | 20.69 | 25.52 | 24.99 | 20.71 | 19.81 | | 19.45 | --- | 21.57 | 21.68 |
| 10 | | 19.49 | 20.27 | 25.25 | 24.13 | 20.27 | 19.57 | | 19.40 | 20.17 | 21.66 | 21.75 |
| 11 | | 19.69 | 20.38 | 25.17 | 23.38 | 20.16 | 19.63 | | 19.31 | 20.23 | 21.82 | 21.88 |
| 12 | | 19.63 | 20.29 | 25.08 | 22.49 | 20.38 | 19.90 | | 19.25 | 20.50 | 21.74 | 22.00 |
| 13 | | 19.55 | 20.35 | 25.81 | 22.24 | 20.16 | 20.03 | | 19.65 | 21.03 | 21.79 | 21.86 |
| 14 | | 19.54 | 20.14 | 26.03 | 22.09 | 20.23 | 19.78 | | 19.46 | 21.14 | 21.73 | 21.81 |
| 15 | | 19.52 | 20.10 | 26.16 | 21.82 | 20.01 | 19.15 | | 19.29 | 21.06 | 21.79 | 21.86 |
| 16 | | 19.51 | 20.26 | 26.16 | 21.83 | 20.24 | 19.40 | | --- | 21.03 | 21.73 | 21.53 |
| 17 | | 19.56 | 21.77 | 25.71 | 21.91 | 20.23 | 19.80 | | --- | 21.03 | 21.65 | 21.24 |
| 18 | | 19.50 | --- | 25.58 | 21.79 | 19.81 | 19.78 | | --- | 21.19 | 21.86 | 21.10 |
| 19 | | 19.47 | 23.97 | 26.13 | 21.69 | 19.38 | 19.79 | | --- | 21.38 | 21.65 | 21.08 |
| 20 | | 19.48 | 24.53 | 26.31 | 21.74 | 19.35 | 19.82 | | --- | 21.42 | 21.68 | 21.07 |
| 21 | | 19.54 | 25.29 | 26.28 | 21.66 | 19.48 | --- | | --- | 21.78 | 21.72 | 21.03 |
| 22 | | 19.66 | 25.43 | 26.33 | 21.68 | 19.66 | --- | | --- | 21.73 | 21.68 | 21.00 |
| 23 | | 19.59 | 25.24 | 26.52 | 21.71 | 19.85 | --- | | --- | 21.54 | 21.70 | 21.04 |
| 24 | | 19.50 | 25.61 | 26.40 | 21.74 | 19.84 | --- | | --- | 21.63 | 21.71 | 20.99 |
| 25 | | 19.39 | 26.01 | 26.17 | 21.69 | 19.75 | --- | | --- | 21.50 | 21.63 | 20.99 |
| 26 | | 19.47 | 26.38 | 26.05 | 21.26 | 19.68 | --- | | --- | 21.44 | 21.73 | 20.98 |
| 27 | | 19.70 | 26.31 | 25.96 | 21.03 | 19.58 | --- | | --- | 21.46 | 21.80 | 20.98 |
| 28 | | 19.41 | 26.34 | 25.92 | 20.93 | 19.47 | --- | | --- | 21.56 | 21.74 | 20.94 |
| 29 | | 19.41 | 26.15 | 25.78 | 20.90 | 19.40 | --- | | --- | 21.48 | 21.62 | 21.00 |
| 30 | | 19.64 | 26.28 | 25.79 | --- | 19.34 | --- | | --- | 21.56 | 21.67 | 21.03 |
| 31 | | --- | 26.24 | 25.75 | --- | 19.24 | --- | | --- | 21.60 | 21.58 | --- |
| MEAN | | --- | --- | 25.92 | 22.80 | 20.10 | --- | | --- | --- | 21.70 | 21.45 |
| MAX | | --- | --- | 26.52 | 25.49 | 20.95 | --- | | --- | --- | 21.86 | 22.00 |
| MIN | | --- | --- | 25.08 | 20.90 | 19.24 | --- | | --- | --- | 21.52 | 20.94 |

SQUARE BUTTE CREEK BASIN

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06342260 SQUARE BUTTE CREEK BELOW CENTER, ND

LOCATION.--Lat 47°03'25", long 101°11'35", in SE1/4 sec.4, T.141 N., R.83 W., Oliver County, Hydrologic Unit 10130101, on right bank at southeast corner of farmyard, and 6 mi southeast of Center.

DRAINAGE AREA.--146 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1965 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,865 ft, from topographic map.

REMARKS.--Records good except those for period October to March, which are fair. Flow regulated by Nelson Lake 1.5 mi upstream beginning Aug. 24, 1967, capacity, 5,000 acre-ft. The capacity of Nelson Lake was increased to 10,000 acre-ft in August 1975.

AVERAGE DISCHARGE.--19 years, 11.9 ft³/s, 8,620 acre-ft/yr; median of yearly mean discharges, 13 ft³/s, 9,420 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,700 ft³/s June 24, 1966, gage height, 14.35 ft; no flow Feb. 14-26, 1966.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 455 ft³/s Apr. 28, gage height, 5.66 ft; minimum daily 0.90 ft³/s Sept. 19.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|------|-------|--------|--------|-------|-------|-------|------|-------|
| 1 | 1.9 | 1.4 | 2.5 | 1.8 | 3.0 | 7.2 | 24 | 10 | 1.7 | 1.1 | 1.2 | 1.2 |
| 2 | 2.0 | 1.4 | 2.5 | 1.9 | 2.5 | 7.2 | 7.6 | 10 | 1.9 | 1.3 | 1.2 | 1.3 |
| 3 | 2.1 | 1.5 | 2.5 | 1.9 | 2.5 | 7.3 | 3.0 | 6.4 | 1.7 | 1.2 | 1.4 | 1.2 |
| 4 | 1.7 | 1.5 | 2.5 | 1.9 | 2.5 | 7.4 | 3.2 | 3.7 | 2.0 | 1.1 | 1.4 | 1.5 |
| 5 | 1.5 | 1.4 | 2.5 | 2.4 | 2.5 | 7.4 | 3.0 | 3.5 | 2.2 | 1.2 | 1.2 | 1.4 |
| 6 | 1.6 | 1.4 | 2.4 | 1.9 | 2.5 | 7.2 | 2.0 | 5.8 | 2.5 | 1.0 | 1.1 | 1.1 |
| 7 | 1.7 | 1.4 | 2.3 | 1.9 | 2.5 | 7.5 | 2.2 | 3.3 | 2.3 | 1.2 | 1.3 | 1.2 |
| 8 | 2.0 | 1.4 | 2.3 | 1.6 | 2.5 | 7.6 | 2.1 | 6.3 | 2.3 | 1.3 | 1.0 | 1.2 |
| 9 | 1.9 | 1.2 | 2.3 | 1.4 | 3.0 | 7.7 | 2.1 | 9.3 | 2.5 | 1.2 | 1.3 | 1.3 |
| 10 | 2.0 | 1.2 | 2.3 | 1.4 | 3.5 | 7.9 | 2.1 | 40 | 2.3 | 1.0 | 1.2 | 1.4 |
| 11 | 1.2 | 1.2 | 2.3 | 1.4 | 4.0 | 7.7 | 4.3 | 41 | 2.0 | 1.1 | 1.2 | 1.3 |
| 12 | 1.6 | 1.2 | 2.4 | 1.6 | 4.0 | 7.8 | 8.4 | 41 | 1.8 | .94 | 1.3 | 1.4 |
| 13 | 1.5 | 1.3 | 2.5 | 1.4 | 4.0 | 7.9 | 27 | 41 | 1.7 | 1.3 | 1.3 | 1.3 |
| 14 | 1.5 | 1.4 | 2.5 | 1.3 | 4.5 | 8.1 | 41 | 40 | 1.9 | 1.1 | 1.3 | 1.0 |
| 15 | 1.6 | 1.4 | 2.5 | 1.2 | 4.5 | 8.1 | 42 | 40 | 1.8 | 1.3 | 1.1 | 1.1 |
| 16 | 1.5 | 1.5 | 2.5 | 1.2 | 10 | 8.1 | 41 | 34 | 1.8 | 1.0 | 1.2 | 1.0 |
| 17 | 1.3 | 2.1 | 2.3 | 1.2 | 8.0 | 8.3 | 41 | 8.7 | 2.0 | 1.3 | 1.2 | 1.2 |
| 18 | 1.3 | 2.2 | 2.1 | 1.4 | 8.0 | 8.8 | 21 | 8.4 | 1.8 | 1.2 | 1.2 | 1.2 |
| 19 | 1.3 | 2.4 | 2.1 | 1.5 | 8.0 | 15 | 6.0 | 8.3 | 2.2 | 1.1 | 1.1 | .90 |
| 20 | 1.2 | 2.5 | 1.9 | 1.5 | 9.5 | 30 | 1.4 | 8.3 | 1.5 | 1.7 | 1.5 | 1.1 |
| 21 | 1.3 | 2.5 | 1.9 | 1.4 | 9.5 | 213 | 1.2 | 8.3 | 1.7 | 2.1 | 1.3 | 1.2 |
| 22 | 1.4 | 2.3 | 1.9 | 1.4 | 8.0 | 172 | 1.2 | 8.3 | 2.6 | 1.2 | 1.3 | 1.0 |
| 23 | 1.6 | 2.3 | 1.7 | 1.3 | 8.0 | 108 | 1.4 | 6.0 | 1.7 | 1.1 | 1.3 | 1.0 |
| 24 | 1.6 | 2.3 | 1.7 | 1.4 | 7.2 | 81 | 1.7 | 1.8 | 1.3 | 1.4 | 1.4 | 1.3 |
| 25 | 1.2 | 2.3 | 1.7 | 1.4 | 7.2 | 79 | 1.5 | 1.6 | 1.3 | 2.2 | 1.3 | 1.4 |
| 26 | 1.2 | 2.3 | 1.7 | 1.3 | 7.4 | 77 | 1.9 | 1.8 | 1.6 | 1.9 | 1.1 | 1.4 |
| 27 | 1.5 | 2.3 | 1.7 | 1.3 | 7.1 | 76 | 131 | 1.8 | 1.3 | 1.2 | 1.2 | 1.4 |
| 28 | 1.5 | 2.4 | 1.7 | 2.0 | 7.1 | 76 | 260 | 1.4 | 1.5 | 1.2 | 1.0 | 1.4 |
| 29 | 1.5 | 2.5 | 1.8 | 4.0 | 7.1 | 68 | 350 | 1.7 | .97 | 1.1 | 1.0 | 1.2 |
| 30 | 1.6 | 2.5 | 1.7 | 3.0 | --- | 43 | 36 | 1.6 | 1.1 | 1.4 | 1.1 | 1.2 |
| 31 | 1.5 | --- | 1.7 | 3.0 | --- | 42 | --- | 1.7 | --- | 1.3 | 1.1 | --- |
| TOTAL | 48.3 | 54.7 | 66.4 | 53.3 | 160.1 | 1219.2 | 1070.3 | 405.0 | 54.97 | 39.74 | 37.8 | 36.80 |
| MEAN | 1.56 | 1.82 | 2.14 | 1.72 | 5.52 | 39.3 | 35.7 | 13.1 | 1.83 | 1.28 | 1.22 | 1.23 |
| MAX | 2.1 | 2.5 | 2.5 | 4.0 | 10 | 213 | 350 | 41 | 2.6 | 2.2 | 1.5 | 1.5 |
| MIN | 1.2 | 1.2 | 1.7 | 1.2 | 2.5 | 7.2 | 1.2 | 1.4 | .97 | .94 | 1.0 | .90 |
| AC-FT | 96 | 108 | 132 | 106 | 318 | 2420 | 2120 | 803 | 109 | 79 | 75 | 73 |
| CAL YR 1983 | TOTAL | 4695.86 | | MEAN | 12.9 | MAX | 969 | MIN | .40 | AC-FT | 9310 | |
| WTR YR 1984 | TOTAL | 3246.61 | | MEAN | 8.87 | MAX | 350 | MIN | .90 | AC-FT | 6440 | |

SQUARE BUTTE CREEK BASIN

06342260 SQUARE BUTTE CREEK BELOW CENTER, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 06... | 1525 | 1.8 | 1450 | 8.4 | 18.0 | 11.0 | -- | -- | -- | -- | -- | |
| NOV 07... | 1450 | 1.4 | 1400 | 9.3 | 12.0 | 7.0 | -- | -- | -- | -- | -- | |
| DEC 19... | 1310 | 2.0 | 1550 | 7.8 | -21.0 | .5 | -- | -- | -- | -- | -- | |
| JAN 23... | 1400 | 1.4 | 1500 | 7.9 | 5.0 | .5 | -- | -- | -- | -- | -- | |
| MAR 12... | 1249 | 7.7 | 1720 | -- | -4.5 | 2.5 | -- | -- | -- | -- | -- | |
| 21... | 0925 | 275 | 1740 | 8.3 | 6.5 | 9.5 | 430 | 176 | 59 | 68 | 240 | |
| 26... | 1403 | 75 | 1600 | -- | 14.0 | 11.5 | -- | -- | -- | -- | -- | |
| APR 03... | 0908 | 2.6 | 1530 | -- | 11.5 | 9.5 | -- | -- | -- | -- | -- | |
| 23... | 1211 | 1.6 | 1530 | -- | 26.0 | 16.0 | -- | -- | -- | -- | -- | |
| JUN 05... | 1205 | 2.1 | 1520 | -- | 18.5 | 16.5 | -- | -- | -- | -- | -- | |
| JUL 09... | 1319 | 1.5 | 1540 | -- | 30.0 | 23.0 | -- | -- | -- | -- | -- | |
| AUG 27... | 1151 | 1.4 | 1540 | 7.4 | 34.5 | 24.0 | 430 | 100 | 95 | 46 | 210 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 21... | 53 | 5 | 21 | 240 | 33 | 250 | 1.9 | 700 | 9.2 | .60 | 2.4 | 1260 |
| AUG 27... | 51 | 5 | 8.5 | 400 | .000 | 330 | 25 | 490 | 9.0 | .40 | 19 | 1130 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 21... | 1300 | 1.7 | 936 | 3 | 2900 | 30 | 0 | 110 | 10 | .5 | 6 | 1300 |
| AUG 27... | 1100 | 1.5 | 4.4 | 1 | 1300 | 10 | 0 | 45 | 70 | .1 | 1 | 1100 |

BURNT CREEK BASIN

251

06342450 BURNT CREEK NEAR BISMARCK, ND

LOCATION.--Lat 46°54'54", long 100°48'48", in SW1/4NW1/4SW1/4 sec.29, T.140 N., R.80 W., Burleigh County, Hydrologic Unit 10130101, on left bank on upstream side of county highway bridge, and 7 mi northwest of Bismarck.

DRAINAGE AREA.--108 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1967 to current year (seasonal records only since 1983).

GAGE.--Water-stage recorder. Altitude of gage is 1,690 ft, from topographic map.

REMARKS.--Records good except those for winter periods, which are fair.

AVERAGE DISCHARGE.--15 years (water years 1968-82), 8.03 ft³/s, 5,820 acre-ft/yr; median of yearly mean discharges, 4.7 ft³/s, 3,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,000 ft³/s Apr. 18, 1979, gage height, 16.93 ft, from rating curve extended above 2,200 ft³/s on basis of culvert and flow-over-road measurement of peak flow; no flow for many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 710 ft³/s Mar. 21, gage height, 10.39 ft; no flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|--------|---------|-------|--------|--------|-------|-----|-----|
| 1 | | | | | .00 | 5.0 | 6.7 | 9.2 | .70 | 1.1 | .00 | .00 |
| 2 | | | | | .00 | 3.5 | 5.5 | 18 | .60 | .83 | .00 | .00 |
| 3 | | | | | .00 | 2.5 | 4.9 | 23 | .50 | .70 | .00 | .00 |
| 4 | | | | | .00 | 1.5 | 4.2 | 21 | .40 | .48 | .00 | .00 |
| 5 | | | | | .00 | .90 | 3.7 | 20 | .53 | .38 | .00 | .00 |
| 6 | | | | | .00 | .80 | 2.9 | 22 | .74 | .32 | .00 | .00 |
| 7 | | | | | .00 | .50 | 2.7 | 19 | .89 | .18 | .00 | .00 |
| 8 | | | | | .00 | .40 | 2.8 | 14 | 2.1 | .16 | .00 | .00 |
| 9 | | | | | .00 | .50 | 2.8 | 10 | 4.2 | .14 | .00 | .00 |
| 10 | | | | | .00 | .70 | 2.8 | 11 | 4.9 | .10 | .00 | .00 |
| 11 | | | | | .15 | 1.0 | 3.0 | 8.5 | 4.3 | .04 | .00 | .00 |
| 12 | | | | | .25 | 1.5 | 4.4 | 7.4 | 4.2 | .01 | .00 | .00 |
| 13 | | | | | .60 | 2.5 | 13 | 6.2 | 3.4 | .00 | .00 | .00 |
| 14 | | | | | 1.1 | 3.5 | 19 | 4.9 | 3.1 | .00 | .00 | .00 |
| 15 | | | | | 3.0 | 5.0 | 11 | 4.2 | 3.0 | .00 | .00 | .00 |
| 16 | | | | | 2.5 | 7.0 | 7.5 | 3.8 | 73 | .00 | .00 | .00 |
| 17 | | | | | 2.0 | 10 | 5.6 | 3.1 | 35 | .00 | .00 | .00 |
| 18 | | | | | 3.0 | 15 | 4.3 | 2.7 | 15 | .00 | .00 | .00 |
| 19 | | | | | 5.0 | 25 | 3.5 | 2.3 | 9.3 | .00 | .00 | .00 |
| 20 | | | | | 8.0 | 38 | 3.0 | 2.0 | 5.8 | .00 | .00 | .00 |
| 21 | | | | | 16 | 310 | 2.9 | 1.9 | 4.6 | .50 | .00 | .00 |
| 22 | | | | | 94 | 154 | 2.7 | 1.8 | 14 | 33 | .00 | .00 |
| 23 | | | | | 70 | 150 | 2.5 | 1.7 | 10 | 8.9 | .00 | .00 |
| 24 | | | | | 45 | 107 | 2.6 | 1.6 | 5.3 | 3.3 | .00 | .00 |
| 25 | | | | | 30 | 77 | 2.8 | 1.5 | 3.8 | 2.1 | .00 | .00 |
| 26 | | | | | 19 | 33 | 3.6 | 1.4 | 2.8 | 1.0 | .00 | .00 |
| 27 | | | | | 13 | 22 | 3.0 | 1.3 | 2.2 | .70 | .00 | .00 |
| 28 | | | | | 8.0 | 19 | 2.0 | 1.2 | 1.9 | .40 | .00 | .00 |
| 29 | | | | | 7.0 | 15 | 2.5 | 1.1 | 1.6 | .10 | .00 | .00 |
| 30 | | | | | --- | 11 | 5.0 | 1.0 | 1.3 | .05 | .00 | .00 |
| 31 | | | | | --- | 8.2 | --- | .90 | --- | .01 | .00 | --- |
| TOTAL | | | | | 327.60 | 1031.00 | 142.9 | 227.70 | 219.16 | 54.50 | .00 | .00 |
| MEAN | | | | | 11.3 | 33.3 | 4.76 | 7.35 | 7.31 | 1.76 | .00 | .00 |
| MAX | | | | | 94 | 310 | 19 | 23 | 73 | 33 | .00 | .00 |
| MIN | | | | | .00 | .40 | 2.0 | .90 | .40 | .00 | .00 | .00 |
| AC-FT | | | | | 650 | 2040 | 283 | 452 | 435 | 108 | .00 | .00 |

06342450 BURNT CREEK NEAR BISMARCK, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|-------|--|--|--|---|--|--|--|--|---|---|--|---|
| FEB | | | | | | | | | | | | |
| 22... | 0955 | 100 | 390 | -- | -- | .0 | -- | -- | -- | -- | -- | |
| 24... | 1005 | 45 | 200 | 6.8 | .0 | .5 | 77 | 5 | 16 | 9.0 | 13 | |
| MAR | | | | | | | | | | | | |
| 20... | 1445 | 38 | 410 | -- | 5.0 | .5 | -- | -- | -- | -- | -- | |
| 21... | 1155 | 394 | 150 | 7.9 | 2.0 | .5 | 55 | 1 | 12 | 6.0 | 7.5 | |
| 26... | 1055 | 33 | 220 | -- | 8.0 | 1.5 | -- | -- | -- | -- | -- | |
| JUN | | | | | | | | | | | | |
| 04... | 1300 | .41 | 1280 | -- | 16.0 | 15.5 | -- | -- | -- | -- | -- | |
| JUL | | | | | | | | | | | | |
| 09... | 1030 | .17 | 1080 | 8.4 | 23.0 | 20.0 | 370 | 0 | 57 | 54 | 130 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| FEB | | | | | | | | | | | | |
| 24... | 24 | .7 | 9.3 | 88 | .000 | 72 | 22 | 30 | 1.9 | .10 | 6.2 | 146 |
| MAR | | | | | | | | | | | | |
| 21... | 20 | .5 | 7.2 | 65 | .000 | 54 | 1.3 | 19 | .70 | .10 | 4.7 | 76 |
| JUL | | | | | | | | | | | | |
| 09... | 43 | 3 | 7.5 | 460 | .000 | 380 | 2.9 | 250 | 6.1 | .20 | 2.4 | 768 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| FEB | | | | | | | | | | | | |
| 24... | 130 | .20 | 18 | 1 | 60 | 260 | 1 | 8 | 40 | 1.0 | 0 | 130 |
| MAR | | | | | | | | | | | | |
| 21... | 90 | .10 | 81 | 1 | 40 | 240 | 4 | 6 | 60 | .5 | 0 | 75 |
| JUL | | | | | | | | | | | | |
| 09... | 730 | 1.0 | .35 | 2 | 170 | 20 | 0 | 80 | 30 | .2 | 0 | 640 |

06342500 MISSOURI RIVER AT BISMARCK, ND

LOCATION.--Lat 46°48'51", long 100°49'12", in SE1/4NW1/4SE1/4 sec.31, T.139 N., R.80 W., Burleigh County, Hydrologic Unit 10130101, on left bank 40 ft upstream from Bismarck city waterplant, 2,100 ft downstream from Burlington Northern Railway bridge, 1.6 mi northwest of Bismarck Post Office, 3.5 mi upstream from Heart River, and at mile 1,314.5.

DRAINAGE AREA.--186,400 mi², approximately.

PERIOD OF RECORD.--October to November 1927, April 1928 to current year. See WSP 1729 or 1917 for history of data prior to April 1928.

GAGE.--Water-stage recorder. Datum of gage is 1,618.28 ft, revised, National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Sept. 30, 1937.

REMARKS.--Records good. Many diversions from tributaries. Flow regulated by Lake Sakakawea (station 06338000) 75.4 mi upstream since November 1953. Several observations of water temperature and specific conductance were made during the year and are available in files of Bismarck District office.

AVERAGE DISCHARGE.--56 years (1928-84), 22,740 ft³/s, 16,480,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 500,000 ft³/s Apr. 6, 1952, gage height, 27.90 ft. Since completion of Garrison Dam in 1953, maximum discharge, 68,900 ft³/s July 13, 1975, gage height, 14.24 ft; maximum gage height, 14.58 ft Dec. 18, 1979, backwater from ice. Minimum discharge, about 1,800 ft³/s Jan. 3, 1940; minimum gage height, 1.35 ft Sept. 4, 1934, present site and datum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, 31.6 ft Mar. 31, 1881, present site and datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 31,500 ft³/s Sept. 13, gage height, 9.16 ft; maximum gage height, 13.21 ft Dec. 22, backwater from ice; minimum daily, 13,800 ft³/s Oct. 31.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|--------|---------|---------|---------|---------|---------|---------|--------|--------|---------|----------|---------|
| 1 | 22300 | 14900 | 20000 | 25100 | 31000 | 24600 | 17900 | 17100 | 15900 | 15000 | 28200 | 28700 |
| 2 | 21500 | 15700 | 21000 | 25400 | 31000 | 24900 | 16600 | 16700 | 16600 | 14700 | 28400 | 30600 |
| 3 | 21200 | 14600 | 22600 | 26000 | 30500 | 24800 | 16300 | 16900 | 17000 | 15400 | 28400 | 29600 |
| 4 | 21000 | 15700 | 23000 | 24300 | 29100 | 24900 | 16300 | 17200 | 18200 | 15400 | 28700 | 30000 |
| 5 | 20700 | 17700 | 23300 | 25000 | 29100 | 24700 | 16300 | 17200 | 19400 | 15600 | 28500 | 30200 |
| 6 | 20400 | 17100 | 24900 | 25300 | 29000 | 24600 | 17800 | 17700 | 18800 | 17800 | 29200 | 30300 |
| 7 | 18900 | 17000 | 24900 | 26000 | 29300 | 24800 | 19600 | 18000 | 19000 | 17900 | 30100 | 29400 |
| 8 | 18000 | 18600 | 25900 | 26300 | 29600 | 22600 | 20700 | 19000 | 19000 | 17800 | 29200 | 30000 |
| 9 | 15600 | 19000 | 25500 | 26200 | 29500 | 21200 | 20200 | 17600 | 17600 | 18200 | 28800 | 29300 |
| 10 | 14700 | 18900 | 24000 | 26000 | 29100 | 21700 | 20200 | 17600 | 18300 | 20900 | 28400 | 29000 |
| 11 | 14500 | 19600 | 21000 | 26500 | 28600 | 22000 | 19000 | 17200 | 18000 | 21400 | 29300 | 29300 |
| 12 | 14900 | 19700 | 20000 | 27100 | 29100 | 24000 | 20400 | 16900 | 18000 | 22100 | 29900 | 30700 |
| 13 | 14800 | 19500 | 19500 | 28100 | 28800 | 25000 | 21100 | 16000 | 17900 | 24000 | 29000 | 31000 |
| 14 | 14500 | 19300 | 19000 | 28700 | 28200 | 24000 | 21100 | 15400 | 19300 | 25400 | 29300 | 29000 |
| 15 | 14200 | 19200 | 18500 | 30000 | 29400 | 23000 | 19500 | 15500 | 18200 | 25600 | 29300 | 30300 |
| 16 | 14900 | 19100 | 18500 | 30400 | 28700 | 24000 | 17000 | 16500 | 16300 | 25200 | 29400 | 28800 |
| 17 | 14800 | 19300 | 18000 | 29700 | 28600 | 26000 | 18900 | 15400 | 15200 | 24900 | 28700 | 27000 |
| 18 | 14500 | 19300 | 18500 | 29100 | 29200 | 29000 | 20400 | 15100 | 16200 | 25300 | 29300 | 25800 |
| 19 | 14100 | 19100 | 19000 | 31000 | 29200 | 26000 | 20000 | 15300 | 15900 | 26200 | 30200 | 25800 |
| 20 | 14800 | 19100 | 20000 | 31000 | 28600 | 25000 | 20300 | 15600 | 15900 | 26500 | 27900 | 25600 |
| 21 | 14700 | 19100 | 22100 | 31000 | 29100 | 22500 | 19500 | 15200 | 14700 | 27700 | 29400 | 25500 |
| 22 | 14000 | 19600 | 24400 | 30400 | 29000 | 20900 | 17700 | 15400 | 13900 | 29200 | 28900 | 25300 |
| 23 | 14600 | 19600 | 23100 | 30100 | 29000 | 21400 | 16500 | 15200 | 14500 | 28000 | 29000 | 25400 |
| 24 | 14700 | 19600 | 23400 | 31000 | 29400 | 21500 | 16200 | 14900 | 15400 | 27900 | 28600 | 25400 |
| 25 | 15100 | 18800 | 24900 | 30200 | 29300 | 21100 | 15400 | 14000 | 15600 | 28600 | 29000 | 25300 |
| 26 | 14500 | 18800 | 25100 | 30200 | 28000 | 20600 | 16200 | 14400 | 15600 | 27600 | 29000 | 25100 |
| 27 | 16400 | 19500 | 25600 | 30200 | 26000 | 20400 | 17000 | 14700 | 15000 | 27500 | 29200 | 25100 |
| 28 | 16500 | 19600 | 25000 | 30200 | 25000 | 19700 | 16200 | 15100 | 15000 | 27600 | 30000 | 25100 |
| 29 | 14000 | 18600 | 25700 | 30200 | 25000 | 19200 | 17100 | 15100 | 14100 | 28000 | 28600 | 24900 |
| 30 | 14500 | 19100 | 25600 | 30100 | --- | 19000 | 17400 | 14300 | 15000 | 28100 | 28700 | 25400 |
| 31 | 13800 | --- | 24900 | 30600 | --- | 18200 | --- | 14600 | --- | 28200 | 28800 | --- |
| TOTAL | 503100 | 554700 | 696900 | 881400 | 835400 | 711300 | 548800 | 496800 | 499500 | 723700 | 899400 | 832900 |
| MEAN | 16230 | 18490 | 22480 | 28430 | 28810 | 22950 | 18290 | 16030 | 16650 | 23350 | 29010 | 27760 |
| MAX | 22300 | 19700 | 25900 | 31000 | 31000 | 29000 | 21100 | 19000 | 19400 | 29200 | 30200 | 31000 |
| MIN | 13800 | 14600 | 18000 | 24300 | 25000 | 18200 | 15400 | 14000 | 13900 | 14700 | 27900 | 24900 |
| AC-FT | 997900 | 1100000 | 1382000 | 1748000 | 1657000 | 1411000 | 1089000 | 985400 | 990800 | 1435000 | 1784000 | 1652000 |
| CAL YR 1983 | TOTAL | 8424800 | | MEAN | 23080 | MAX | 40200 | MIN | 13800 | AC-FT | 16711000 | |
| WTR YR 1984 | TOTAL | 8183900 | | MEAN | 22360 | MAX | 31000 | MIN | 13800 | AC-FT | 16233000 | |

HEART RIVER BASIN

06343000 HEART RIVER NEAR SOUTH HEART, ND

LOCATION.--Lat 46°51'56", long 102°56'53", in NE1/4 sec.8, T.139 N., R.97 W., Stark County, Hydrologic Unit 10130202, on left bank 1.7 mi downstream from North Creek, 2 mi east of South Heart, and 5.5 mi upstream from Edward Arthur Patterson Lake.

DRAINAGE AREA.--311 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1947 to September 1970, October 1977 to September 1984 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 2,429.45 ft National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers).

REMARKS.--Records good except those for the winter period, which are fair.

AVERAGE DISCHARGE.--31 years, 29.5 ft³/s, 21,370 acre-ft/yr; median of yearly mean discharges, 29 ft³/s, 21,010 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,080 ft³/s May 9, 1970, gage height, 27.77 ft, no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Mar. 20 | 2030 | 446 | a9.19 | June 21 | 1415 | *1500 | 12.63 |
| May 3 | 2045 | 427 | 7.27 | | | | |

Minimum daily discharge, 0.30 ft³/s Sept. 2-4.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|--------|-------|-------|-------|--------|---------|-------|-------|-------|
| 1 | 1.3 | 1.6 | .90 | .40 | 111 | 2.6 | 8.4 | 37 | 1.1 | 4.5 | .57 | .38 |
| 2 | 1.5 | 1.6 | .85 | .37 | 107 | 2.4 | 7.0 | 288 | 1.1 | 3.4 | .68 | .30 |
| 3 | 3.4 | 1.7 | .85 | .36 | 88 | 2.3 | 6.2 | 341 | 1.0 | 2.7 | .88 | .30 |
| 4 | 3.5 | 1.6 | .83 | .40 | 58 | 2.1 | 5.3 | 324 | .96 | 2.2 | 5.1 | .30 |
| 5 | 1.7 | 1.7 | .79 | .87 | 28 | 2.0 | 4.9 | 201 | 1.1 | 2.0 | 6.8 | .38 |
| 6 | 1.1 | 1.9 | .79 | .89 | 22 | 1.8 | 4.4 | 120 | 2.5 | 1.8 | 2.8 | .38 |
| 7 | 1.1 | 1.7 | .75 | 1.0 | 18 | 1.8 | 4.0 | 71 | 2.0 | 1.7 | 1.4 | .35 |
| 8 | 1.1 | 1.8 | .75 | .88 | 16 | 1.6 | 3.3 | 38 | 3.0 | 1.7 | .93 | .39 |
| 9 | .86 | 1.7 | .75 | .90 | 15 | 1.5 | 3.2 | 24 | 2.6 | 1.5 | .87 | .46 |
| 10 | .87 | 1.6 | .71 | 1.4 | 15 | 1.5 | 3.3 | 18 | 13 | 1.4 | .93 | .43 |
| 11 | .77 | 1.4 | .70 | 1.4 | 17 | 1.4 | 3.6 | 13 | 16 | 1.1 | .77 | .41 |
| 12 | 1.2 | 1.4 | .70 | 1.1 | 22 | 1.3 | 7.7 | 9.0 | 5.0 | 1.0 | .61 | .38 |
| 13 | 2.5 | 1.4 | .67 | 1.1 | 25 | 1.3 | 12 | 7.0 | 3.0 | .99 | .58 | .36 |
| 14 | 2.0 | 1.4 | .64 | .92 | 29 | 1.2 | 5.3 | 5.8 | 2.1 | .91 | .55 | .36 |
| 15 | 1.7 | 1.4 | .68 | .71 | 30 | 1.2 | 3.8 | 4.8 | 4.9 | .90 | .55 | .38 |
| 16 | 1.5 | 1.4 | .69 | .59 | 25 | 1.1 | 3.4 | 3.9 | 71 | .87 | .51 | .41 |
| 17 | 1.6 | 1.2 | .64 | .48 | 22 | 1.2 | 2.9 | 3.3 | 190 | .86 | .53 | .43 |
| 18 | 1.4 | 1.2 | .63 | .43 | 17 | 1.2 | 2.5 | 2.9 | 132 | .88 | .76 | .48 |
| 19 | 1.4 | 1.2 | .59 | .46 | 11 | 3.1 | 2.1 | 2.4 | 643 | .80 | .65 | .45 |
| 20 | 1.5 | 1.2 | .59 | .46 | 9.6 | 140 | 1.8 | 2.2 | 639 | .78 | .59 | .45 |
| 21 | 2.0 | 1.2 | .55 | .57 | 9.1 | 210 | 1.7 | 2.1 | 1230 | .87 | .51 | .45 |
| 22 | 2.4 | 1.1 | .53 | .58 | 9.0 | 68 | 1.6 | 1.8 | 974 | .82 | .45 | .44 |
| 23 | 2.2 | .90 | .50 | .55 | 8.2 | 28 | 1.6 | 1.7 | 609 | .75 | .42 | .41 |
| 24 | 2.3 | .89 | .47 | .61 | 7.4 | 20 | 1.5 | 1.6 | 174 | .79 | .40 | .43 |
| 25 | 2.4 | 1.0 | .46 | .77 | 6.6 | 5.6 | 1.5 | 1.6 | 79 | .76 | .39 | .41 |
| 26 | 2.4 | 1.0 | .44 | .92 | 5.3 | 4.8 | 1.9 | 1.5 | 38 | .75 | .41 | .47 |
| 27 | 2.3 | .95 | .46 | 1.1 | 4.4 | 4.0 | 3.2 | 1.2 | 21 | .72 | .41 | .49 |
| 28 | 2.0 | .90 | .46 | 1.9 | 3.4 | 3.5 | 2.2 | 1.3 | 13 | .68 | .38 | .46 |
| 29 | 1.8 | .90 | .42 | 9.8 | 2.9 | 3.3 | 3.1 | 1.3 | 8.5 | .64 | .35 | .50 |
| 30 | 1.7 | .90 | .42 | 35 | --- | 4.5 | 4.4 | 1.2 | 5.9 | .62 | .36 | .57 |
| 31 | 1.7 | --- | .42 | 102 | --- | 6.0 | --- | 1.1 | --- | .50 | .44 | --- |
| TOTAL | 55.20 | 39.84 | 19.63 | 168.92 | 741.9 | 530.3 | 117.8 | 1532.7 | 4886.76 | 39.89 | 31.58 | 12.41 |
| MEAN | 1.78 | 1.33 | .63 | 5.45 | 25.6 | 17.1 | 3.93 | 49.4 | 163 | 1.29 | 1.02 | .41 |
| MAX | 3.5 | 1.9 | .90 | 102 | 111 | 210 | 12 | 341 | 1230 | 4.5 | 6.8 | .57 |
| MIN | .77 | .89 | .42 | .36 | 2.9 | 1.1 | 1.5 | 1.1 | .96 | .50 | .35 | .30 |
| AC-FT | 109 | 79 | 39 | 335 | 1470 | 1050 | 234 | 3040 | 9690 | 79 | 63 | 25 |
| CAL YR 1983 | TOTAL | 7410.06 | | MEAN | 20.3 | MAX | 1060 | MIN | .42 | AC-FT | 14700 | |
| WTR YR 1984 | TOTAL | 8176.93 | | MEAN | 22.3 | MAX | 1230 | MIN | .30 | AC-FT | 16220 | |

HEART RIVER BASIN

255

06343000 HEART RIVER NEAR SOUTH HEART, ND--CONTINUED

PERIOD OF RECORD.--Water years 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|--|---|--|---|---|--|---|--|--|---|---|
| OCT 05... | 1510 | 1.5 | 3510 | 8.6 | 14.0 | 11.0 | -- | -- | -- | -- | -- |
| DEC 09... | 1430 | .70 | 3360 | -- | -15.0 | .0 | -- | -- | -- | -- | -- |
| JAN 24... | 1200 | .60 | 2910 | -- | 8.0 | .0 | -- | -- | -- | -- | -- |
| FEB 08... | 1125 | 14 | 1080 | 7.7 | 9.0 | .0 | 170 | 15 | 32 | 22 | 160 |
| MAR 14... | 1040 | 1.2 | 2590 | -- | 4.5 | .0 | -- | -- | -- | -- | -- |
| 21... | 1135 | 211 | 915 | -- | 3.0 | .0 | -- | -- | -- | -- | -- |
| APR 17... | 1425 | 2.9 | 1940 | -- | 18.0 | 12.0 | -- | -- | -- | -- | -- |
| JUN 13... | 1055 | 3.0 | 1590 | -- | 22.0 | 17.0 | -- | -- | -- | -- | -- |
| JUL 27... | 1155 | .71 | 2500 | 8.2 | 30.0 | 22.0 | 280 | 0 | 57 | 34 | 750 |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | |
| FEB 08... | 64 | 5 | 17 | 190 | .000 | 150 | 6.0 | 380 | 9.3 | .20 | |
| JUL 27... | 85 | 20 | 7.0 | 690 | .000 | 556 | 6.9 | 690 | 22 | .80 | |
| DATE | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| FEB 08... | 9.2 | 760 | 720 | 1.0 | 29 | -- | -- | 2 | -- | 210 | |
| JUL 27... | 12 | 1730 | 1900 | 2.4 | 3.3 | <.10 | .070 | 3 | <100 | 600 | |
| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) | | |
| FEB 08... | -- | 220 | 0 | 20 | 180 | .2 | 0 | 260 | -- | | |
| JUL 27... | 2 | 100 | 1 | 50 | 70 | <.1 | <1 | 670 | <10 | | |

HEART RIVER BASIN

06343500 EDWARD ARTHUR PATTERSON LAKE NEAR DICKINSON, ND

LOCATION.--Lat 46°52'11", long 102°49'37", in NE1/4NW1/4SW1/4 sec.8, T.139 N., R.96 W., Stark County, Hydrologic Unit 10130202, at left edge of spillway, and 2 mi southwest of Dickinson.

DRAINAGE AREA.--400 mi², approximately.

PERIOD OF RECORD.--May 1950 to current year. Prior to October 1958, published as Dickinson Reservoir near Dickinson.

GAGE.--Water-stage recorder. Datum of gage is 2,400.00 ft National Geodetic Vertical Datum of 1929 (levels by Water and Power Resources Service); gage readings have been reduced to elevations NGVD. Prior to Jan. 4, 1961, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earthfill dam; storage began May 23, 1950; dam completed Aug. 9, 1950. Total capacity is 24,600 acre-ft at maximum pool, elevation, 2,428.9 ft. Dead storage is 1,000 acre-ft below lowest point of outlet, elevation, 2,404.0 ft. Conservation storage is 9,100 acre-ft between elevation 2,404.0 ft and 2,420.0 ft, crest of spillway. The crest of the spillway was raised 3.5 ft in 1981 from 2,416.5 ft. Figures given herein represent total contents based on capacity table dated Jan. 1, 1965. The reservoir is for flood control, irrigation and municipal supply.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 11,590 acre-ft June 9, 1982, elevation, 2,421.13 ft; minimum since initial filling of reservoir, 2,950 acre-ft Mar. 16, 1962, elevation, 2,410.41 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents recorded, 11,150 acre-ft May 3, elevation, 2,420.79 ft; minimum, 6,190 acre-ft Jan. 19, 20, 21, elevation 2,415.90 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|-------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 2,416.52 | 6,690 | -- |
| Oct. 31----- | 2,416.53 | 6,700 | +10 |
| Nov. 30----- | 2,416.15 | 6,390 | -310 |
| Dec. 31----- | 2,416.20 | 6,430 | +40 |
| CAL YR 1983----- | -- | -- | -2,680 |
| Jan. 31----- | 2,416.27 | 6,490 | +60 |
| Feb. 29----- | 2,418.32 | 8,340 | +1850 |
| Mar. 31----- | 2,420.10 | 10,290 | +1950 |
| Apr. 30----- | 2,420.08 | 10,270 | -20 |
| May 31----- | 2,419.66 | 9,780 | -490 |
| June 30----- | 2,420.07 | 10,260 | +480 |
| July 31----- | 2,419.25 | 9,320 | -940 |
| Aug. 31----- | 2,418.68 | 8,700 | -620 |
| Sept. 30----- | 2,418.19 | 8,200 | -500 |
| WTR YR 1984 ----- | -- | -- | +1,510 |

HEART RIVER BASIN

257

06343500 E.A. PATTERSON LAKE NEAR DICKINSON, ND

PERIOD OF RECORD.--Water years 1971, 1975, 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | TEMPER- ATURE, AIR (DEG C) (00020) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) |
|--------------|--|--|---|---|--|--|---|---|--|
| OCT 17... | 1055 | 8.0 | 700 | 1610 | 8.7 | 8.0 | 9.8 | 91 | 20 |
| JAN 05... | 1245 | 3.5 | 693 | 1810 | 8.3 | .5 | 10.8 | 83 | 15 |
| APR 25... | 0920 | 8.5 | 690 | 1420 | 8.4 | 11.0 | 9.9 | 100 | 100 |
| JUL 03... | 0905 | 23.0 | 697 | 1010 | 8.0 | 21.5 | 6.8 | 85 | 70 |
| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) |
| OCT 17... | 310 | 35 | 60 | 39 | 260 | 7 | 10 | 276 | 560 |
| JAN 05... | 390 | 37 | 80 | 47 | 310 | 7 | 10 | 357 | 670 |
| APR 25... | 260 | 10 | 51 | 33 | 220 | 6 | 9.1 | 254 | 490 |
| JUL 03... | 190 | 45 | 41 | 21 | 130 | 4 | 7.8 | 144 | 350 |
| DATE | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | BORON, DIS- SOLVED (UG/L AS B) (01020) | |
| OCT 17... | 15 | .30 | .1 | 1140 | 1100 | <.10 | .050 | 310 | |
| JAN 05... | 16 | .40 | 1.6 | 1390 | 1300 | .15 | .030 | 360 | |
| APR 25... | 12 | .30 | 2.9 | 994 | 970 | <.10 | .060 | 290 | |
| JUL 03... | 6.7 | .20 | 6.2 | 667 | 650 | .20 | .050 | 190 | |
| DATE | TIME | SAM- PLING DEPTH (FEET) (00003) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE (DEG C) (00010) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | | |
| OCT 17... | 1051 | .00 | 1610 | 8.0 | 8.7 | 9.8 | 91 | | |
| 17... | 1053 | 1.60 | 1630 | 8.0 | 8.8 | 9.8 | -- | | |
| 17... | 1055 | 3.30 | 1610 | 8.0 | 8.7 | 9.8 | 91 | | |
| 17... | 1057 | 6.60 | 1630 | 8.0 | 8.8 | 9.6 | -- | | |
| 17... | 1059 | 13.2 | 1630 | 8.0 | 8.8 | 9.5 | -- | | |
| 17... | 1101 | 19.7 | 1630 | 7.8 | 8.8 | 9.5 | -- | | |
| 17... | 1103 | 26.0 | 1630 | 7.7 | 8.8 | 9.3 | -- | | |
| JAN 05... | 1240 | .00 | 1810 | .5 | 8.3 | 10.8 | -- | | |
| 05... | 1243 | 1.60 | 1950 | 1.5 | 8.2 | 8.0 | -- | | |
| 05... | 1245 | 3.30 | 1810 | .5 | 8.3 | 10.8 | 83 | | |
| 05... | 1247 | 6.60 | 1960 | 2.0 | 8.2 | 6.3 | -- | | |
| 05... | 1250 | 13.1 | 1970 | 2.5 | 8.1 | 4.7 | -- | | |
| 05... | 1252 | 19.7 | 2050 | 3.0 | 8.0 | 1.2 | -- | | |

HEART RIVER BASIN

06344600 GREEN RIVER NEAR NEW HRADEC, ND

LOCATION.--Lat 47°01'40", long 103°03'10", on line between secs.13 and 14, T.141 N., R.98 W., Billings County, Hydrologic Unit 10130202, on left bank above county highway bridge, and 8 mi west of New Hradec.

DRAINAGE AREA.--152 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1964 to current year.

GAGE.--Water-stage recorder.

REMARKS.--Records fair except those for winter periods, which are poor.

AVERAGE DISCHARGE.--20 years, 18.1 ft³/s, 13,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,120 ft³/s May 9, 1970, gage height, 16.88 ft; maximum gage height, 17.60 ft Mar. 22, 1978, backwater from ice; no flow for several days in some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|-------|------|-----------------------------------|---------------------|
| Mar. 20 | 1900 | 321 | 8.43 | May 2 | 1900 | 673 | 10.74 |
| June 19 | 1600 | *1130 | *12.89 | | | | |

Minimum daily, 0.36 ft³/s Sept. 19-21, 30.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|------|-------|--------|-------|-------|-------|--------|--------|-------|-------|-------|
| 1 | 1.8 | 2.1 | 1.6 | .60 | 57 | 4.3 | 9.5 | 243 | 1.8 | 4.9 | .50 | .44 |
| 2 | 2.5 | 2.1 | 1.5 | .65 | 44 | 3.9 | 9.5 | 497 | 1.6 | 3.6 | .55 | .42 |
| 3 | 2.4 | 2.1 | 1.4 | .70 | 40 | 4.1 | 9.0 | 521 | 1.5 | 3.1 | .68 | .43 |
| 4 | 2.4 | 2.2 | 1.4 | .80 | 40 | 3.6 | 9.5 | 284 | 1.5 | 2.9 | 1.6 | .44 |
| 5 | 2.2 | 2.3 | 1.3 | .90 | 29 | 3.5 | 9.5 | 134 | 1.5 | 2.5 | 2.2 | .47 |
| 6 | 2.1 | 2.4 | 1.2 | 1.0 | 17 | 3.5 | 10 | 74 | 2.5 | 2.3 | 2.4 | .50 |
| 7 | 2.0 | 2.4 | 1.2 | 1.1 | 12 | 3.1 | 11 | 54 | 2.2 | 2.3 | 1.9 | .48 |
| 8 | 2.0 | 2.4 | 1.1 | 1.1 | 8.9 | 3.5 | 12 | 42 | 3.0 | 2.1 | 1.0 | .54 |
| 9 | 1.9 | 2.4 | 1.1 | 1.1 | 9.4 | 3.4 | 13 | 35 | 2.5 | 1.8 | 1.0 | .49 |
| 10 | 1.9 | 2.4 | 1.0 | 1.1 | 13 | 3.1 | 13 | 30 | 10 | 1.4 | 1.1 | .46 |
| 11 | 1.7 | 2.4 | 1.0 | 1.1 | 18 | 2.9 | 15 | 25 | 15 | 1.2 | .92 | .44 |
| 12 | 1.7 | 2.4 | 1.0 | 1.1 | 17 | 2.5 | 18 | 21 | 6.0 | 1.1 | .79 | .42 |
| 13 | 1.6 | 2.5 | .95 | 1.0 | 22 | 2.6 | 19 | 18 | 3.0 | .90 | .72 | .42 |
| 14 | 1.6 | 2.7 | .95 | 1.0 | 28 | 2.7 | 18 | 16 | 2.5 | .83 | .67 | .41 |
| 15 | 1.6 | 2.7 | .90 | 1.0 | 28 | 2.4 | 17 | 13 | 5.0 | .76 | .60 | .40 |
| 16 | 1.6 | 2.7 | .90 | 1.0 | 28 | 2.3 | 16 | 11 | 40 | .74 | .62 | .39 |
| 17 | 1.6 | 2.8 | .85 | 1.0 | 25 | 2.1 | 15 | 10 | 120 | .72 | 1.1 | .38 |
| 18 | 1.6 | 2.9 | .80 | 1.0 | 18 | 2.0 | 14 | 8.6 | 50 | .70 | 1.5 | .37 |
| 19 | 1.6 | 3.0 | .80 | .95 | 13 | 12 | 13 | 7.3 | 475 | .68 | 1.5 | .36 |
| 20 | 1.6 | 3.0 | .75 | .95 | 11 | 146 | 13 | 6.0 | 190 | .65 | 2.0 | .36 |
| 21 | 1.6 | 3.1 | .70 | .95 | 11 | 171 | 12 | 5.0 | 88 | .70 | 2.0 | .36 |
| 22 | 1.7 | 3.1 | .70 | .95 | 11 | 100 | 12 | 4.2 | 60 | .65 | 1.9 | .40 |
| 23 | 1.7 | 3.0 | .60 | .98 | 11 | 71 | 12 | 3.7 | 42 | .62 | 1.7 | .45 |
| 24 | 2.5 | 2.8 | .60 | 1.0 | 10 | 43 | 12 | 3.6 | 36 | .60 | 1.5 | .55 |
| 25 | 3.3 | 2.5 | .50 | 1.0 | 8.7 | 29 | 12 | 3.0 | 23 | .58 | 1.3 | .50 |
| 26 | 2.7 | 2.2 | .50 | 1.0 | 7.0 | 26 | 13 | 2.8 | 15 | .56 | .73 | .45 |
| 27 | 2.4 | 2.0 | .50 | 1.1 | 5.6 | 17 | 24 | 2.6 | 12 | .50 | .56 | .42 |
| 28 | 2.0 | 1.9 | .50 | 2.0 | 4.8 | 13 | 30 | 2.5 | 8.9 | .48 | .53 | .40 |
| 29 | 2.4 | 1.8 | .50 | 15 | 4.5 | 11 | 141 | 2.4 | 7.3 | .48 | .50 | .38 |
| 30 | 2.1 | 1.7 | .52 | 26 | --- | 11 | 149 | 2.2 | 5.7 | .50 | .41 | .36 |
| 31 | 2.1 | --- | .55 | 35 | --- | 10 | --- | 2.0 | --- | .50 | .38 | --- |
| TOTAL | 61.9 | 74.0 | 27.87 | 104.13 | 551.9 | 715.5 | 681.0 | 2083.9 | 1232.5 | 41.35 | 34.86 | 12.89 |
| MEAN | 2.00 | 2.47 | .90 | 3.36 | 19.0 | 23.1 | 22.7 | 67.2 | 41.1 | 1.33 | 1.12 | .43 |
| MAX | 3.3 | 3.1 | 1.6 | .35 | 57 | 171 | 149 | 521 | 475 | 4.9 | 2.4 | .55 |
| MIN | 1.6 | 1.7 | .50 | .60 | 4.5 | 2.0 | 9.0 | 2.0 | 1.5 | .48 | .38 | .36 |
| AC-FT | 123 | 147 | 55 | 207 | 1090 | 1420 | 1350 | 4130 | 2440 | 82 | 69 | 26 |

| CAL YR 1983 | TOTAL | 7389.95 | MEAN | 20.2 | MAX | 596 | MIN | .50 | AC-FT | 14658 |
|-------------|-------|---------|------|------|-----|-----|-----|-----|-------|-------|
| WTR YR 1984 | TOTAL | 5621.80 | MEAN | 15.4 | MAX | 521 | MIN | .36 | AC-FT | 11150 |

HEART RIVER BASIN

259

06344600 GREEN RIVER NEAR NEW HRADEC, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|---|---|---|---|
| OCT 13... | 1205 | 1.6 | 1270 | -- | 12.0 | 7.0 | -- | -- | -- | -- | -- |
| DEC 06... | 1005 | 1.3 | 1800 | -- | -14.0 | .0 | -- | -- | -- | -- | -- |
| JAN 23... | 1105 | 1.0 | 1640 | -- | 1.5 | .0 | -- | -- | -- | -- | -- |
| FEB 02... | 1155 | 44 | 740 | 7.2 | -- | .5 | 160 | 1 | 33 | 18 | 85 |
| MAR 15... | 0900 | 2.2 | 1140 | -- | -10.5 | .0 | -- | -- | -- | -- | -- |
| MAR 28... | 1010 | 13 | 620 | -- | 2.0 | 1.5 | -- | -- | -- | -- | -- |
| JUN 05... | 0940 | 1.5 | 1320 | -- | 17.0 | 10.5 | -- | -- | -- | -- | -- |
| JUN 25... | 1440 | 21 | 800 | -- | 18.0 | 21.0 | -- | -- | -- | -- | -- |
| JUL 26... | 0845 | .54 | 1400 | 8.3 | -- | 20.0 | 320 | 0 | 67 | 38 | 200 |
| SEP 06... | 1005 | .47 | 1520 | -- | 20.0 | 16.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| FEB 02... | 41 | 3 | 85 | 190 | .000 | 160 | 19 | 180 | 16 | .10 | 6.9 | 481 |
| JUL 26... | 57 | 5 | 7.1 | 440 | .000 | 360 | 3.5 | 390 | 7.2 | .40 | 8.2 | 981 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|---|--|--|---|---|---|---|---|---|---|--|---|
| FEB 02... | 520 | .65 | 57 | 1 | 140 | 300 | 1 | 6 | 410 | .3 | 0 | 200 |
| JUL 26... | 930 | 1.3 | 1.4 | 2 | 390 | 40 | 0 | 40 | 20 | .4 | 0 | 590 |

HEART RIVER BASIN

06345500 HEART RIVER NEAR RICHARDTON, ND

LOCATION.--Lat 46°44'46", long 102°18'27", in NE¼ sec.29, T.138 N., R.92 W., Stark County, Hydrologic Unit 10130202, on right bank 5 ft upstream from bridge on State Highway 8, 0.5 mi downstream from Plum Creek, and 9.5 mi south of Richardton.

DRAINAGE AREA.--1,240 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to September 1922, April 1943 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1209: Drainage area. WSP 1239: 1906, 1918(M), 1947(M).

GAGE.--Water-stage recorder. Datum of gage is 2,153.67 ft National Geodetic Vertical Datum of 1929. May 18, 1903, to Sept. 30, 1922, nonrecording gage at 3 sites in 1 mi reach below present site at different datums. Apr. 14, 1943, to July 7, 1947, nonrecording gage at present site and datum.

REMARKS.--Records good except those for the winter period, which are fair. Flow regulated by Edward Arthur Patterson Lake (station 06343500) 84 mi upstream.

AVERAGE DISCHARGE.--60 years, 102 ft³/s, 77,520 acre-ft/yr; median of yearly mean discharges, 99 ft³/s, 71,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,400 ft³/s Apr. 16, 1950, gage height, 28.05 ft, from high-water mark in gage well; no flow at times in some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 5, 1938, reached a stage of about 26 ft, from information by local residents, discharge, 16,000 ft³/s; flood of Mar. 25, 1943, reached a stage of 24.2 ft from floodmarks, discharge, 11,700 ft³/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,170 ft³/s May 5, gage height, 12.42 ft; minimum daily, 4.8 ft³/s Sept. 16.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|------|------|------|-------|-------|-------|-------|-------|
| 1 | 19 | 17 | 17 | 11 | 103 | 24 | 68 | 103 | 18 | 100 | 11 | 6.4 |
| 2 | 21 | 17 | 16 | 11 | 105 | 23 | 58 | 152 | 17 | 80 | 11 | 6.4 |
| 3 | 27 | 17 | 15 | 12 | 86 | 23 | 54 | 216 | 17 | 60 | 11 | 6.5 |
| 4 | 25 | 17 | 14 | 13 | 115 | 23 | 51 | 1070 | 16 | 50 | 11 | 6.1 |
| 5 | 24 | 18 | 15 | 15 | 110 | 24 | 50 | 2060 | 18 | 45 | 13 | 6.0 |
| 6 | 24 | 18 | 15 | 17 | 107 | 25 | 49 | 1260 | 25 | 40 | 14 | 5.9 |
| 7 | 23 | 19 | 15 | 21 | 105 | 27 | 49 | 695 | 29 | 35 | 12 | 6.7 |
| 8 | 23 | 21 | 15 | 20 | 82 | 28 | 50 | 419 | 40 | 31 | 12 | 6.5 |
| 9 | 22 | 21 | 15 | 19 | 80 | 30 | 48 | 227 | 32 | 28 | 13 | 6.2 |
| 10 | 22 | 19 | 15 | 19 | 65 | 32 | 50 | 151 | 30 | 25 | 14 | 5.8 |
| 11 | 21 | 21 | 14 | 17 | 65 | 34 | 57 | 120 | 32 | 23 | 12 | 5.2 |
| 12 | 22 | 22 | 14 | 15 | 65 | 35 | 86 | 103 | 35 | 21 | 11 | 5.6 |
| 13 | 20 | 24 | 14 | 15 | 63 | 36 | 103 | 87 | 39 | 20 | 10 | 6.7 |
| 14 | 19 | 28 | 14 | 15 | 69 | 37 | 96 | 76 | 42 | 19 | 9.7 | 5.9 |
| 15 | 19 | 29 | 13 | 15 | 85 | 36 | 106 | 66 | 36 | 18 | 9.4 | 5.1 |
| 16 | 18 | 29 | 12 | 15 | 84 | 37 | 73 | 56 | 38 | 17 | 8.8 | 4.8 |
| 17 | 18 | 31 | 11 | 14 | 77 | 37 | 58 | 49 | 49 | 16 | 8.9 | 5.1 |
| 18 | 17 | 31 | 10 | 13 | 76 | 37 | 51 | 43 | 300 | 15 | 9.1 | 7.3 |
| 19 | 17 | 30 | 10 | 12 | 73 | 61 | 46 | 41 | 900 | 14 | 9.6 | 8.9 |
| 20 | 17 | 29 | 10 | 11 | 63 | 594 | 43 | 42 | 1500 | 14 | 14 | 9.8 |
| 21 | 17 | 29 | 10 | 10 | 54 | 853 | 41 | 36 | 2500 | 13 | 13 | 9.8 |
| 22 | 17 | 27 | 9.0 | 9.0 | 51 | 717 | 40 | 33 | 4000 | 14 | 18 | 11 |
| 23 | 17 | 26 | 8.0 | 10 | 46 | 705 | 38 | 30 | 3000 | 14 | 15 | 11 |
| 24 | 17 | 27 | 7.0 | 11 | 39 | 543 | 39 | 27 | 2000 | 15 | 11 | 11 |
| 25 | 17 | 26 | 8.0 | 12 | 34 | 302 | 38 | 26 | 1000 | 15 | 10 | 12 |
| 26 | 17 | 24 | 9.0 | 13 | 29 | 169 | 38 | 25 | 700 | 14 | 8.9 | 13 |
| 27 | 16 | 22 | 10 | 14 | 27 | 130 | 34 | 25 | 500 | 13 | 7.6 | 15 |
| 28 | 16 | 20 | 10 | 16 | 25 | 105 | 43 | 23 | 350 | 12 | 6.5 | 15 |
| 29 | 16 | 19 | 10 | 37 | 24 | 85 | 55 | 23 | 250 | 12 | 6.4 | 14 |
| 30 | 16 | 17 | 10 | 70 | --- | 83 | 68 | 21 | 150 | 11 | 6.4 | 13 |
| 31 | 16 | --- | 10 | 78 | --- | 79 | --- | 19 | --- | 11 | 6.7 | --- |
| TOTAL | 600 | 695 | 375.0 | 580.0 | 2007 | 4974 | 1680 | 7324 | 17663 | 815 | 334.0 | 251.7 |
| MEAN | 19.4 | 23.2 | 12.1 | 18.7 | 69.2 | 160 | 56.0 | 236 | 589 | 26.3 | 10.8 | 8.39 |
| MAX | 27 | 31 | 17 | 78 | 115 | 853 | 106 | 2060 | 4000 | 100 | 18 | 15 |
| MIN | 16 | 17 | 7.0 | 9.0 | 24 | 23 | 34 | 19 | 16 | 11 | 6.4 | 4.8 |
| AC-FT | 1190 | 1380 | 744 | 1150 | 3980 | 9870 | 3330 | 14530 | 35030 | 1620 | 662 | 499 |
| CAL YR 1983 | TOTAL | 39041.0 | | MEAN | 107 | MAX | 2550 | MIN | 7.0 | AC-FT | 77440 | |
| WTR YR 1984 | TOTAL | 37298.7 | | MEAN | 102 | MAX | 4000 | MIN | 4.8 | AC-FT | 73980 | |

HEART RIVER BASIN

261

06345500 HEART RIVER NEAR RICHARDTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1950, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 19... | 1335 | 18 | 1790 | -- | 9.0 | 6.0 | -- | -- | -- | -- | -- | |
| DEC 05... | 1515 | 15 | 2340 | -- | -7.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 16... | 1445 | 15 | 2230 | -- | -11.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 02... | 1130 | 105 | 1300 | 7.9 | 3.0 | .0 | 380 | 140 | 74 | 48 | 160 | |
| MAR 05... | 1345 | 24 | 1360 | -- | 2.0 | .0 | -- | -- | -- | -- | -- | |
| APR 09... | 1425 | 51 | 1350 | -- | 9.0 | 8.5 | -- | -- | -- | -- | -- | |
| JUN 04... | 1200 | 16 | 1820 | -- | 16.0 | 15.0 | -- | -- | -- | -- | -- | |
| JUL 30... | 1505 | 11 | 1650 | 8.2 | 32.5 | 29.0 | 470 | 192 | 92 | 59 | 230 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| FEB 02... | 46 | 4 | 19 | 300 | .000 | 240 | 5.9 | 480 | 15 | .20 | 10 | 992 |
| JUL 30... | 51 | 5 | 13 | 340 | .000 | 280 | 3.4 | 620 | 13 | .40 | 10 | 1250 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| FEB 02... | 950 | 1.3 | 281 | 1 | 200 | 170 | 1 | 40 | 210 | .1 | 0 | 940 |
| JUL 30... | 1200 | 1.7 | 37 | 1 | 300 | 20 | 0 | 43 | 20 | .0 | 0 | 1300 |

HEART RIVER BASIN

06346000 LAKE TSCHIDA NEAR GLEN ULLIN, ND

LOCATION.--Lat 46°35'48", long 101°48'34", in SW1/4NE1/4 sec.13, T.136 N., R.89 W., Grant County, Hydrologic Unit 10130202, 10 mi upstream from Heart Butte Creek, and 14 mi north of Elgin.

DRAINAGE AREA.--1,710 mi², approximately.

PERIOD OF RECORD.--August 1949 to current year. Prior to October 1957, published as Heart Butte Reservoir near Glen Ullin.

GAGE.--Nonrecording gage. Datum of gage is at National Geodetic Vertical Datum of 1929, levels by Water and Power Resources Service.

REMARKS.--Reservoir is formed by earthfill dam; storage began Sept. 29, 1949; dam completed Dec. 9, 1949. Total capacity is 430,000 acre-ft at maximum pool, elevation 2,118.2 ft. Dead storage is 6,750 acre-ft below lowest point of outlet, elevation 2,030.0 ft. Active conservation storage is 69,030 acre-ft between elevation 2,030.0 ft and 2,064.5 ft, crest of spillway. Figures given herein represent total contents. Controlled releases are through 4 by 5 ft slide gate. The spillway is uncontrolled "glory hole" type and discharges through a conduit 14 ft in diameter. The reservoir is for flood control, irrigation, and incidental water supply.

COOPERATION.--Record of elevations and contents furnished by Bureau of Reclamation. Monthend elevations interpolated from once-daily readings. Extremes are those observed.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 174,000 acre-ft Apr. 9, 1952, elevation, 2,086.23 ft; minimum since first reaching spillway level, 40,840 acre-ft Mar. 6, 1962, elevation, 2,052.5 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 89,400 acre-ft, elevation, 2,068.33 ft; minimum, 58,100 acre-ft Sept. 30, elevation, 2,058.98 ft.

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 2,061.82 | 69,900 | -- |
| Oct. 31----- | 2,062.12 | 67,900 | +1,000 |
| Nov. 30----- | 2,062.60 | 69,500 | +1,600 |
| Dec. 31----- | 2,062.74 | 69,900 | +400 |
| CAL YR 1983----- | -- | -- | -5,900 |
| Jan. 31----- | 2,063.18 | 71,400 | +1,500 |
| Feb. 29----- | 2,064.45 | 75,600 | +4,200 |
| Mar. 31----- | 2,064.48 | 75,700 | +100 |
| Apr. 30----- | 2,064.60 | 76,100 | +400 |
| May 31----- | 2,064.46 | 75,600 | -500 |
| June 30----- | 2,065.53 | 79,300 | +3,700 |
| July 31----- | 2,062.46 | 69,000 | -10,300 |
| Aug. 31----- | 2,059.84 | 60,700 | -8,300 |
| Sept. 30----- | 2,058.98 | 58,100 | -2,600 |
| WTR YR 1984----- | -- | -- | -8,800 |

HEART RIVER BASIN

263

463547101484000 LAKE TSCHIDA NEAR GLEN ULLIN, ND DEEP--CONTINUED

PERIOD OF RECORD.--Water years 1971, 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | RESER- VOIR DEPTH (FEET) (72025) | TEMPER- ATURE, AIR (DEG C) (00020) | CLOUD COVER (PER- CENT) (00032) | WIND DIREC- TION (DEG. FROM TRUE NORTH) (00036) | WIND SPEED (MILES PER HOUR) (00035) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) | TRANS- PAR- ENCY (SECCHI DISK) (IN) (00077) |
|--------------|------|--|--|---|--|--|---|--|---|--|---|
| OCT 27... | 1414 | 44.0 | 20.0 | 25 | 330 | 3.0 | 745 | 1200 | 9.0 | 9.9 | 62 |
| FEB 02... | 1617 | -- | 5.0 | -- | -- | -- | 747 | 1230 | 10.7 | 1.8 | -- |
| MAY 31... | 1134 | -- | 25.0 | -- | -- | -- | 743 | 1310 | 8.5 | 15.0 | -- |
| AUG 30... | 1350 | -- | 24.5 | -- | -- | -- | 760 | 1300 | 8.0 | 21.3 | -- |

| DATE | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) |
|--------------|--|---|---|---|--|---|---|---|--|--|
| OCT 27... | 12.0 | 109 | 10 | 350 | 109 | 65 | 46 | 170 | 4 | 10 |
| FEB 02... | 10.7 | 79 | <1 | 390 | 116 | 74 | 51 | 190 | 4 | 9.8 |
| MAY 31... | 10.2 | 104 | 25 | 360 | 137 | 68 | 47 | 170 | 4 | 9.6 |
| AUG 30... | 8.1 | 92 | 40 | 350 | 120 | 64 | 45 | 180 | 4 | 9.7 |

| DATE | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|--------------|--|--|--|---|--|---|--|--|---|---|
| OCT 27... | 243 | 480 | 10 | .30 | 1.3 | 933 | 930 | .21 | .040 | 250 |
| FEB 02... | 279 | 480 | 12 | .30 | .6 | 1030 | 990 | .17 | .010 | 270 |
| MAY 31... | 227 | 460 | -- | .30 | 2.3 | 905 | -- | .86 | .040 | 230 |
| AUG 30... | 225 | 460 | 9.0 | .30 | 4.7 | 910 | 910 | <.10 | .010 | 240 |

| DATE | TIME | SAM- PLING DEPTH (FEET) (00003) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE (DEG C) (00010) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|--------------|------|---|--|--|---|--|---|
| OCT 27... | 1410 | .00 | 1190 | 10.1 | 9.0 | 14.2 | 129 |
| 27... | 1412 | 2.13 | 1200 | 10.1 | 9.0 | 14.3 | -- |
| 27... | 1414 | 3.30 | 1200 | 9.9 | 9.0 | 12.0 | 109 |
| 27... | 1416 | 6.60 | 1200 | 9.5 | 9.0 | 14.4 | -- |
| 27... | 1418 | 13.2 | 1190 | 9.3 | 9.0 | 14.2 | -- |
| 27... | 1420 | 19.7 | 1190 | 9.3 | 8.8 | 13.4 | -- |
| 27... | 1422 | 26.2 | 1190 | 9.3 | -- | 13.3 | -- |
| 27... | 1424 | 32.8 | 1190 | 9.2 | 9.2 | 12.7 | -- |
| 27... | 1426 | 39.6 | 1188 | 9.2 | -- | 12.7 | -- |
| 27... | 1430 | 39.4 | 1190 | 9.2 | -- | 12.7 | -- |

HEART RIVER BASIN

463547101484000 LAKE TSCHIDA NEAR GLEN ULLIN, ND DEEP--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAM- PLING DEPTH (FEET) (00003) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE (DEG C) (00010) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-------|------|---|--|--|---|--|--|
| FEB | | | | | | | |
| 02... | 1613 | .00 | 1180 | .4 | 11.2 | 11.2 | -- |
| 02... | 1615 | 1.60 | 1210 | 1.4 | 11.0 | 12.1 | -- |
| 02... | 1617 | 3.30 | 1230 | 1.8 | 10.7 | 10.7 | 79 |
| 02... | 1619 | 6.60 | 1240 | 1.8 | 10.4 | 12.1 | -- |
| 02... | 1621 | 13.2 | 1240 | 1.9 | 10.1 | 11.0 | -- |
| 02... | 1623 | 19.7 | 1250 | 2.0 | 9.7 | 10.8 | -- |
| 02... | 1625 | 26.2 | 1260 | 2.6 | 9.3 | 9.5 | -- |
| 02... | 1627 | 32.8 | 1340 | 3.3 | 8.7 | 6.9 | -- |
| 02... | 1629 | 39.4 | 1520 | 3.8 | 8.2 | 3.6 | -- |
| 02... | 1631 | 45.9 | 1600 | 3.6 | 7.9 | 3.2 | -- |
| AUG | | | | | | | |
| 30... | 1245 | .00 | 1330 | 21.5 | 8.0 | 8.9 | 101 |
| 30... | 1250 | 1.60 | 1330 | 21.5 | 8.0 | 8.9 | -- |
| 30... | 1255 | 3.30 | 1330 | 21.5 | 8.0 | 8.9 | -- |
| 30... | 1300 | 6.60 | 1230 | 21.5 | 8.0 | 8.7 | -- |
| 30... | 1305 | 13.2 | 1270 | 21.4 | 7.9 | 8.5 | -- |
| 30... | 1310 | 19.8 | 1270 | 21.4 | 7.9 | 8.4 | -- |
| 30... | 1315 | 26.4 | 1270 | 21.3 | 7.9 | 8.3 | -- |
| 30... | 1320 | 33.0 | 1300 | 21.3 | 7.9 | 8.3 | -- |
| 30... | 1330 | 39.6 | 1300 | 21.3 | 8.0 | 8.2 | -- |
| 30... | 1340 | 46.2 | 1300 | 21.3 | 8.0 | 8.2 | -- |
| 30... | 1350 | 48.0 | 1300 | 21.3 | 8.0 | 8.1 | 92 |

06348000 HEART RIVER NEAR LARK, ND

LOCATION.--Lat 46°36'37", long 101°22'54", in NW1/4NW1/4SW1/4 sec.9, T.136 N., R.85 W., Grant County, Hydrologic Unit 10130203, on right bank 20 ft downstream from county highway bridge, 0.6 mi downstream from Big Muddy Creek, and 10 mi north of Lark.

DRAINAGE AREA.--2,750 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1946 to current year (seasonal records only since Oct. 1983).

GAGE.--Water-stage recorder. Datum of gage is 1,802.83 ft National Geodetic Vertical Datum of 1929 (levels by Corps of Engineers). Prior to Nov. 16, 1948, nonrecording gage at same site and datum.

REMARKS.--Records good. Flow regulated by Lake Tschida (06346000) 45 mi upstream since 1949.

AVERAGE DISCHARGE.--36 years, (1947-82) 225 ft³/s, 163,000 acre-ft/yr; median of yearly mean discharges, 172 ft³/s, 124,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 29,200 ft³/s Apr. 17, 1950, gage height, 20.70 ft, from rating curve extended above 11,000 ft³/s on basis of contracted-opening measurement of peak flow; no flow Jan. 16 to Mar. 4, 1950, Jan. 17-26, 1962.

EXTREMES FOR CURRENT YEAR.--Maximum recorded discharge, 3,840 ft³/s June 22, gage height, 10.70 ft; minimum daily recorded, 20 ft³/s Sept. 22.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|------|-------|-------|-------|-------|-------|------|------|
| 1 | | | | | 120 | 50 | 120 | 305 | 61 | 917 | 106 | 89 |
| 2 | | | | | 160 | 70 | 107 | 426 | 63 | 719 | 111 | 93 |
| 3 | | | | | 150 | 250 | 97 | 725 | 55 | 725 | 144 | 97 |
| 4 | | | | | 100 | 250 | 91 | 912 | 56 | 295 | 145 | 99 |
| 5 | | | | | 80 | 250 | 115 | 1250 | 62 | 134 | 138 | 95 |
| 6 | | | | | 70 | 280 | 120 | 1400 | 73 | 116 | 135 | 51 |
| 7 | | | | | 60 | 300 | 120 | 1440 | 71 | 107 | 139 | 47 |
| 8 | | | | | 50 | 250 | 122 | 1330 | 78 | 105 | 132 | 44 |
| 9 | | | | | 40 | 120 | 118 | 1160 | 97 | 93 | 124 | 44 |
| 10 | | | | | 30 | 100 | 114 | 995 | 128 | 83 | 123 | 44 |
| 11 | | | | | 30 | 60 | 121 | 854 | 127 | 107 | 118 | 44 |
| 12 | | | | | 50 | 80 | 150 | 725 | 161 | 150 | 120 | 43 |
| 13 | | | | | 70 | 95 | 240 | 623 | 190 | 145 | 109 | 29 |
| 14 | | | | | 80 | 100 | 356 | 538 | 146 | 136 | 101 | 21 |
| 15 | | | | | 100 | 90 | 447 | 456 | 144 | 135 | 102 | 22 |
| 16 | | | | | 150 | 90 | 403 | 404 | 141 | 134 | 106 | 26 |
| 17 | | | | | 150 | 90 | 347 | 372 | 134 | 123 | 88 | 43 |
| 18 | | | | | 180 | 90 | 306 | 344 | 126 | 114 | 62 | 45 |
| 19 | | | | | 250 | 100 | 274 | 302 | 149 | 116 | 70 | 40 |
| 20 | | | | | 250 | 200 | 246 | 272 | 315 | 117 | 80 | 25 |
| 21 | | | | | 220 | 400 | 227 | 251 | 456 | 118 | 82 | 22 |
| 22 | | | | | 200 | 700 | 215 | 193 | 2150 | 115 | 83 | 20 |
| 23 | | | | | 180 | 1180 | 200 | 176 | 2180 | 114 | 85 | 23 |
| 24 | | | | | 130 | 1100 | 200 | 222 | 2610 | 96 | 85 | 27 |
| 25 | | | | | 110 | 1000 | 203 | 209 | 2130 | 69 | 86 | 28 |
| 26 | | | | | 100 | 938 | 191 | 170 | 1800 | 123 | 88 | 28 |
| 27 | | | | | 80 | 809 | 242 | 158 | 1450 | 111 | 85 | 26 |
| 28 | | | | | 70 | 819 | 239 | 150 | 1640 | 108 | 76 | 22 |
| 29 | | | | | 65 | 442 | 254 | 146 | 1330 | 108 | 79 | 21 |
| 30 | | | | | --- | 195 | 242 | 130 | 1080 | 113 | 86 | 21 |
| 31 | | | | | --- | 145 | --- | 71 | --- | 109 | 94 | --- |
| TOTAL | | | | | 3325 | 10643 | 6227 | 16709 | 19203 | 5755 | 3182 | 1279 |
| MEAN | | | | | 115 | 343 | 208 | 539 | 640 | 186 | 103 | 42.6 |
| MAX | | | | | 250 | 1180 | 447 | 1440 | 2610 | 917 | 145 | 99 |
| MIN | | | | | 30 | 50 | 91 | 71 | 55 | 69 | 62 | 20 |
| AC-FT | | | | | 6600 | 21110 | 12350 | 33140 | 38090 | 11420 | 6310 | 2540 |

HEART RIVER BASIN

06349000 HEART RIVER NEAR MANDAN, ND

LOCATION.--Lat 46°50'02", long 100°58'27", in NW1/4NE1/4 sec.25, T.139 N., R.82 W., Morton County, Hydrologic Unit 10130203, on left bank near downstream wingwall of bridge on county highway, 3 mi west of Mandan, and 4 mi downstream from Sweetbriar Creek.

DRAINAGE AREA.--3,310 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to September 1924, March 1928 to June 1933, August 1937 to current year. Published as "at Sunny" 1924, 1928-33.

REVISED RECORDS.--WSP 926: 1938. WSP 1209: Drainage area. WSP 1239: 1924, 1928-29, 1948.

GAGE.--Water-stage recorder. Datum of gage is 1,638.70 ft National Geodetic Vertical Datum of 1929, and 1,623.03 ft above Burlington Northern Railway datum. See WSP 1729 or 1917 for history of changes prior to June 30, 1958.

REMARKS.--Records fair except those for winter period, which are poor. Flow regulated by Lake Tschida (station 06346000) 105 mi upstream since 1949. Some diversions above station.

AVERAGE DISCHARGE.--51 years (1928-32, 1937-84), 269 ft³/s, 194,900 acre-ft/yr; median of yearly mean discharges, 208 ft³/s, 151,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 30,500 ft³/s Apr. 19, 1950, gage height, 23.64 ft; maximum gage height, 25.75 ft Apr. 4, 1952, ice jam; no flow for many days in some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 4,220 ft³/s June 24, gage height, 9.57 ft, minimum daily discharge, 5.0 ft³/s Dec. 21-26.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------------|----------|------|-------|-------|------|-------|-------|-------|-------|-------|--------|------|
| 1 | 36 | 35 | 19 | 8.0 | 120 | 80 | 492 | 460 | 276 | 1510 | 91 | 78 |
| 2 | 44 | 37 | 19 | 9.0 | 200 | 60 | 385 | 500 | 231 | 1260 | 83 | 93 |
| 3 | 47 | 40 | 18 | 9.0 | 200 | 70 | 331 | 600 | 203 | 1010 | 88 | 98 |
| 4 | 46 | 40 | 18 | 9.0 | 200 | 200 | 288 | 1190 | 201 | 904 | 124 | 104 |
| 5 | 41 | 41 | 18 | 9.0 | 150 | 320 | 278 | 1510 | 199 | 691 | 139 | 104 |
| 6 | 41 | 42 | 18 | 9.0 | 120 | 400 | 267 | 1830 | 199 | 338 | 142 | 106 |
| 7 | 42 | 42 | 18 | 9.0 | 90 | 420 | 275 | 1900 | 207 | 240 | 146 | 110 |
| 8 | 40 | 42 | 17 | 8.5 | 70 | 450 | 278 | 1840 | 215 | 184 | 143 | 83 |
| 9 | 39 | 42 | 17 | 8.5 | 50 | 450 | 275 | 1740 | 229 | 146 | 137 | 69 |
| 10 | 39 | 40 | 17 | 8.5 | 40 | 170 | 273 | 1580 | 248 | 120 | 129 | 66 |
| 11 | 38 | 40 | 15 | 8.5 | 35 | 100 | 282 | 1390 | 279 | 100 | 118 | 64 |
| 12 | 34 | 66 | 13 | 8.5 | 35 | 75 | 305 | 1210 | 337 | 81 | 111 | 61 |
| 13 | 34 | 40 | 12 | 8.0 | 32 | 65 | 369 | 1080 | 328 | 86 | 107 | 59 |
| 14 | 34 | 42 | 10 | 8.0 | 45 | 85 | 459 | 947 | 348 | 120 | 103 | 62 |
| 15 | 36 | 43 | 9.5 | 8.0 | 62 | 100 | 627 | 832 | 353 | 111 | 101 | 59 |
| 16 | 38 | 46 | 8.5 | 8.0 | 90 | 100 | 723 | 723 | 319 | 101 | 92 | 50 |
| 17 | 38 | 45 | 7.5 | 8.0 | 130 | 100 | 691 | 660 | 304 | 94 | 93 | 44 |
| 18 | 38 | 41 | 6.5 | 8.0 | 170 | 100 | 607 | 621 | 336 | 96 | 95 | 43 |
| 19 | 38 | 41 | 6.0 | 7.5 | 250 | 110 | 536 | 595 | 339 | 87 | 85 | 47 |
| 20 | 38 | 41 | 5.5 | 7.5 | 300 | 150 | 488 | 537 | 338 | 85 | 71 | 49 |
| 21 | 42 | 37 | 5.0 | 7.5 | 400 | 400 | 446 | 502 | 427 | 115 | 74 | 45 |
| 22 | 41 | 30 | 5.0 | 7.0 | 400 | 1000 | 416 | 488 | 529 | 107 | 75 | 41 |
| 23 | 41 | 25 | 5.0 | 7.0 | 350 | 1500 | 396 | 474 | 2320 | 102 | 78 | 38 |
| 24 | 40 | 22 | 5.0 | 7.0 | 300 | 2000 | 389 | 386 | 3270 | 95 | 82 | 42 |
| 25 | 38 | 20 | 5.0 | 7.0 | 250 | 1800 | 379 | 415 | 3720 | 95 | 81 | 43 |
| 26 | 39 | 18 | 5.0 | 7.0 | 230 | 1700 | 388 | 428 | 3020 | 85 | 90 | 42 |
| 27 | 40 | 18 | 5.5 | 7.0 | 200 | 1500 | 430 | 401 | 2490 | 62 | 92 | 45 |
| 28 | 39 | 19 | 6.0 | 15 | 130 | 1300 | 430 | 362 | 2080 | 79 | 86 | 46 |
| 29 | 37 | 19 | 6.5 | 25 | 95 | 1050 | 450 | 346 | 2340 | 81 | 81 | 44 |
| 30 | 35 | 19 | 7.0 | 40 | --- | 950 | 430 | 324 | 1930 | 81 | 72 | 42 |
| 31 | 32 | --- | 7.5 | 70 | --- | 586 | --- | 306 | --- | 82 | 68 | --- |
| TOTAL | 1205 | 1073 | 335.0 | 367.0 | 4744 | 17391 | 12383 | 26177 | 27615 | 8348 | 3077 | 1877 |
| MEAN | 38.9 | 35.8 | 10.8 | 11.8 | 164 | 561 | 413 | 844 | 921 | 269 | 99.3 | 62.6 |
| MAX | 47 | 66 | 19 | 70 | 400 | 2000 | 723 | 1900 | 3720 | 1510 | 146 | 110 |
| MIN | 32 | 18 | 5.0 | 7.0 | 32 | 60 | 267 | 306 | 199 | 62 | 68 | 38 |
| AC-FT | 2390 | 2130 | 664 | 728 | 9410 | 34500 | 24560 | 51920 | 54770 | 16560 | 6100 | 3720 |
| CAL YR 1983 TOTAL | 96713.0 | | | MEAN | 265 | MAX | 5000 | MIN | 5.0 | AC-FT | 191800 | |
| WTR YR 1984 TOTAL | 104592.0 | | | MEAN | 286 | MAX | 3720 | MIN | 5.0 | AC-FT | 207500 | |

HEART RIVER BASIN

267

06349000 HEART RIVER NEAR MANDAN, ND--CONTINUED
(National stream-quality accounting network station)

PERIOD OF RECORD.--Water years 1946-50, 1971-76, 1978 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) | |
|--------------|---|--|---|--|--|--|--|--|---|---|---|--|
| NOV 02... | 1330 | 35 | 1550 | 8.4 | 7.0 | 6.5 | 1.5 | 11.3 | 92 | 18 | 85 | |
| DEC 07... | 1250 | 18 | 2000 | 7.9 | - .9 | .5 | 1.1 | 9.9 | 69 | 7 | 62 | |
| JAN 24... | 1230 | 7.0 | 2450 | 7.3 | 4.0 | .5 | -- | 4.7 | 33 | -- | -- | |
| FEB 27... | 1156 | 206 | 1150 | -- | - .9 | .0 | -- | -- | -- | -- | -- | |
| MAR 14... | 1200 | 83 | 1650 | 8.1 | 3.5 | .5 | 3.4 | 9.8 | 69 | 500 | 53 | |
| 30... | 1300 | 982 | 1200 | -- | 17.0 | 3.5 | -- | -- | -- | -- | -- | |
| APR 02... | 1300 | 386 | 1050 | -- | 12.0 | 6.0 | -- | -- | -- | -- | -- | |
| 04... | 1010 | 290 | 1025 | -- | 13.0 | 5.5 | -- | -- | -- | -- | -- | |
| 17... | 1300 | 680 | 1240 | 8.3 | 16.0 | 12.0 | -- | 9.6 | 89 | 5 | 134 | |
| MAY 22... | 1250 | 487 | 1320 | 8.4 | 17.0 | 15.0 | 13 | 8.6 | 85 | 50 | 192 | |
| JUL 09... | 1015 | 120 | 1370 | 8.2 | 26.0 | 23.0 | -- | 7.5 | 88 | 65 | 60 | |
| AUG 14... | 1210 | 101 | 1410 | 8.3 | 23.0 | 22.5 | 7.0 | 7.7 | 89 | 52 | 25 | |
| SEP 26... | 1115 | 44 | 1490 | 8.3 | 4.5 | 5.5 | -- | 12.1 | 95 | -- | -- | |
| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
| NOV 02... | 340 | 0 | 58 | 46 | 240 | 60 | 6 | 7.1 | 394 | 3.0 | 440 | 17 |
| DEC 07... | 490 | 0 | 93 | 62 | 280 | 55 | 6 | 8.9 | 582 | 14 | 500 | 22 |
| MAR 14... | 370 | 56 | 69 | 48 | 190 | 52 | 4 | 11 | 315 | 4.8 | 490 | 12 |
| MAY 22... | 340 | 73 | 63 | 45 | 170 | 51 | 4 | 8.2 | 271 | 2.1 | 430 | 11 |
| AUG 14... | 360 | 83 | 66 | 46 | 210 | 56 | 5 | 9.5 | 272 | 2.6 | 470 | 11 |
| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) | |
| NOV 02... | .40 | 4.1 | 967 | 1000 | 1.3 | 91 | <.10 | .14 | .70 | .040 | .12 | |
| DEC 07... | .50 | 8.3 | 1370 | 1300 | 1.9 | 67 | .19 | .17 | 1.0 | <.010 | -- | |
| MAR 14... | .30 | 3.6 | 1050 | 1000 | 1.4 | 235 | .18 | .17 | .80 | .030 | .09 | |
| MAY 22... | .30 | 3.0 | 899 | 890 | 1.2 | 1180 | <.10 | .09 | .90 | .060 | .18 | |
| JUL 09... | -- | -- | -- | -- | -- | -- | <.10 | -- | .90 | .060 | -- | |
| AUG 14... | .30 | 5.5 | 963 | 980 | 1.3 | 263 | <.10 | -- | 1.0 | .020 | -- | |

HEART RIVER BASIN

06349000 HEART RIVER NEAR MANDAN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|--------------|---|--|--|--|--|---|--|--|---|---|---|
| NOV 02... | .030 | .020 | .06 | <10 | <1 | 67 | <1 | <1 | <3 | <1 | 8 |
| DEC 07... | <.010 | .010 | .03 | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR 14... | <.010 | .010 | .03 | 10 | 1 | 79 | <1 | <1 | <3 | <1 | 23 |
| MAY 22... | .010 | .020 | .06 | <10 | <1 | 75 | <1 | <1 | <3 | 2 | 9 |
| JUL 09... | .010 | .020 | .06 | -- | -- | -- | -- | -- | -- | -- | -- |
| AUG 14... | <.010 | <.010 | -- | 10 | <1 | 84 | <1 | <1 | <3 | 2 | <3 |
| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
| NOV 02... | <1 | 69 | 12 | <.1 | <10 | 1 | <1 | <1 | 760 | <6 | 6 |
| MAR 14... | <1 | 41 | 9 | <.1 | <10 | 2 | <1 | <1 | 810 | <6 | 17 |
| MAY 22... | 7 | 45 | 6 | <.1 | <10 | <1 | <1 | <1 | 780 | <6 | 8 |
| AUG 14... | <1 | 51 | 3 | <.1 | <10 | <1 | <1 | <1 | 820 | <6 | 22 |
| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) | | | | | | |
| NOV 02... | 1330 | 35 | 38 | 3.6 | 97 | | | | | | |
| MAR 14... | 1200 | 83 | 4 | .90 | -- | | | | | | |
| MAY 22... | 1250 | 487 | 42 | 55 | -- | | | | | | |
| AUG 14... | 1210 | 101 | 55 | 15 | -- | | | | | | |
| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | | | | |
| MAR 14... | 1210 | 3.00 | 1.7 | .5 | 1600 | 8.2 | 9.8 | | | | |
| 14... | 1211 | 9.00 | .50 | .5 | 1600 | 8.2 | -- | | | | |
| 14... | 1213 | 15.0 | .75 | .5 | 1650 | 8.3 | -- | | | | |
| 14... | 1214 | 21.0 | .75 | .5 | 1650 | 8.3 | -- | | | | |
| 14... | 1215 | 27.0 | .75 | .5 | 1650 | 8.2 | -- | | | | |
| 14... | 1216 | 33.0 | .70 | .5 | 1600 | 8.3 | -- | | | | |
| 14... | 1217 | 39.0 | .70 | .5 | 1600 | 8.2 | -- | | | | |
| 14... | 1218 | 45.0 | .75 | .5 | 1600 | 8.3 | -- | | | | |
| 14... | 1220 | 51.0 | .80 | .5 | 1650 | 8.3 | -- | | | | |
| 14... | 1221 | 57.0 | .80 | .5 | 1650 | 8.2 | -- | | | | |
| 14... | 1223 | 65.0 | .90 | .5 | 1650 | 8.2 | 9.8 | | | | |
| AUG 14... | 1120 | 5.00 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1125 | 15.0 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1130 | 25.0 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1135 | 35.0 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1140 | 45.0 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1145 | 55.0 | .00 | 22.0 | 1410 | 8.3 | 7.7 | | | | |
| 14... | 1200 | 65.0 | .00 | 22.0 | 1410 | 8.3 | 7.5 | | | | |

MISSOURI RIVER MAIN STEM

269

06349070 MISSOURI RIVER BELOW MANDAN, ND

LOCATION.--Lat 46°44'32", long 100°49'54", at midsection of west half sec.30, T.138 N., R.80 W., Morton County, Hydrologic Unit 10130102, on right bank 1 mi south of Fort Lincoln State Park, 6 mi southeast of Mandan, and at mile 1,309.

DRAINAGE AREA.--189,800 mi², approximately.

PERIOD OF RECORD.--September 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft National Geodetic Vertical Datum of 1929 (Corps of Engineers bench mark).

REMARKS.--Stage regulated by Lake Sakakawea (station 06338000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 29.71 ft Mar. 17, 1972; minimum daily recorded, 17.40 ft Apr. 1, 1968.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 22.41 | 20.29 | 21.59 | 27.46 | 27.20 | 23.10 | 21.52 | 21.26 | 20.91 | 21.19 | 24.02 | 23.84 |
| 2 | 22.22 | 20.57 | 21.88 | 27.63 | 27.19 | 23.05 | 21.18 | 21.15 | 21.16 | 21.14 | 23.97 | 24.19 |
| 3 | 22.13 | 20.23 | 22.49 | 27.41 | 27.34 | 23.04 | 21.06 | 21.20 | 21.25 | 21.27 | 23.97 | 24.08 |
| 4 | 22.05 | 20.48 | 22.42 | 26.77 | 27.42 | 23.02 | 21.04 | 21.35 | 21.56 | 21.24 | 24.06 | 24.09 |
| 5 | 21.97 | 21.01 | 22.39 | 26.93 | 26.93 | 22.98 | 21.04 | 21.39 | 21.86 | 21.30 | 23.99 | 24.18 |
| 6 | 21.90 | 20.93 | 22.99 | 26.98 | 26.01 | 23.10 | 21.37 | 21.57 | 21.77 | 21.79 | 24.10 | 24.20 |
| 7 | 21.59 | 20.86 | 25.60 | 27.21 | 26.92 | 23.21 | 21.89 | 21.64 | 21.80 | 21.95 | 24.29 | 23.99 |
| 8 | 21.33 | 21.24 | 23.10 | 27.00 | 27.60 | 23.27 | 22.18 | 21.94 | 21.79 | 21.83 | 24.11 | 24.06 |
| 9 | 20.77 | 21.38 | 23.03 | 26.70 | 27.67 | 24.76 | 22.10 | 21.60 | 21.48 | 21.87 | 24.03 | 24.00 |
| 10 | 20.53 | 21.35 | 22.99 | 26.56 | 27.45 | 26.11 | 22.10 | 21.53 | 21.62 | 22.42 | 23.94 | 23.90 |
| 11 | 20.41 | 21.52 | 22.99 | 26.09 | 27.43 | 25.80 | 21.77 | 21.44 | 21.61 | 22.60 | 24.09 | 23.97 |
| 12 | 20.47 | 21.55 | 23.66 | 25.93 | 27.58 | 25.69 | 22.10 | 21.34 | 21.60 | 22.73 | 24.21 | 24.19 |
| 13 | 20.44 | 21.50 | 24.63 | 26.13 | 27.40 | 26.80 | 22.31 | 21.09 | 21.54 | 23.11 | 24.03 | 24.26 |
| 14 | 20.35 | 21.44 | 25.95 | 26.75 | 27.66 | 26.66 | 22.33 | 20.93 | 21.97 | 23.41 | 24.13 | 23.92 |
| 15 | 20.24 | 21.43 | 26.51 | 26.92 | 27.92 | 26.02 | 21.93 | 20.98 | 21.70 | 23.49 | 24.08 | 24.11 |
| 16 | 20.39 | 21.38 | 27.03 | 27.06 | 27.63 | 25.48 | 21.31 | 21.27 | 21.28 | 23.39 | 24.11 | 23.93 |
| 17 | 20.40 | 21.43 | 26.08 | 26.96 | 26.97 | 26.67 | 21.66 | 20.89 | 20.93 | 23.31 | 23.98 | 23.54 |
| 18 | 20.31 | 21.44 | --- | 26.43 | 26.34 | 26.34 | 22.13 | 20.80 | 21.16 | 23.41 | 24.03 | 23.24 |
| 19 | 20.19 | 21.37 | --- | 26.56 | 25.48 | 26.60 | 22.02 | 20.85 | 21.22 | 23.59 | 24.24 | 23.19 |
| 20 | 20.34 | 21.36 | --- | --- | 24.82 | 25.36 | 22.10 | 20.95 | 21.23 | 23.69 | 23.80 | 23.13 |
| 21 | 20.32 | 21.38 | 26.72 | 27.18 | 24.29 | 23.36 | 21.91 | 20.85 | 21.01 | 23.93 | 24.02 | 23.11 |
| 22 | 20.14 | 21.51 | --- | 27.13 | 24.11 | 22.52 | 21.42 | 20.85 | 20.77 | 24.20 | 23.96 | 23.03 |
| 23 | 20.28 | 21.50 | --- | 27.24 | 24.11 | 22.53 | 21.10 | 20.83 | 20.84 | 23.98 | 23.99 | 23.08 |
| 24 | 20.33 | 21.50 | --- | 27.50 | 24.16 | 22.61 | 20.98 | 20.71 | 21.34 | 23.94 | 23.93 | 23.11 |
| 25 | 20.39 | 21.33 | --- | 27.34 | 24.13 | 22.53 | 20.78 | 20.49 | 21.47 | 24.11 | 23.98 | 23.05 |
| 26 | 20.25 | 21.29 | 27.83 | 27.16 | 23.90 | 22.35 | 20.99 | 20.60 | 21.42 | 23.91 | 23.94 | 23.01 |
| 27 | 20.70 | 21.46 | 27.99 | 27.05 | 23.43 | 22.30 | 21.23 | 20.70 | 21.21 | 23.84 | 23.98 | 23.00 |
| 28 | 20.83 | 21.54 | 27.99 | 26.97 | 23.18 | 22.10 | 20.94 | 20.77 | 21.21 | 23.88 | 24.12 | 22.98 |
| 29 | 20.13 | 21.23 | 27.80 | 26.98 | 23.09 | 21.94 | 21.25 | 20.83 | 21.04 | 24.03 | 23.89 | 22.94 |
| 30 | 20.24 | 21.34 | 27.57 | 26.90 | --- | 21.87 | 21.30 | 20.62 | 21.35 | 23.98 | 23.88 | 23.05 |
| 31 | 20.07 | --- | 27.55 | 27.22 | --- | 21.62 | --- | 20.66 | --- | 23.95 | 23.94 | --- |
| MEAN | 20.78 | 21.23 | --- | --- | 26.05 | 23.96 | 21.57 | 21.07 | 21.37 | 22.98 | 24.03 | 23.61 |
| MAX | 22.41 | 21.55 | --- | --- | 27.92 | 26.80 | 22.33 | 21.94 | 21.97 | 24.20 | 24.29 | 24.26 |
| MIN | 20.07 | 20.23 | --- | --- | 23.09 | 21.62 | 20.78 | 20.49 | 20.77 | 21.14 | 23.80 | 22.94 |

APPLE CREEK BASIN

06349500 APPLE CREEK NEAR MENOKEN, ND

LOCATION.--Lat 46°47'40", long 100°39'25", in NW1/4NE1/4 sec.9, T.138 N., R.79 W., Burleigh County, Hydrologic Unit 10130103, on left bank 75 ft downstream from bridge on county highway, 4 mi upstream from Hay Creek, 6.3 mi west of Menoken, and 6.4 mi east of Bismarck.

DRAINAGE AREA.--1,680 mi², approximately, of which about 500 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to June 1905, October 1945 to current year. Published as "near Bismarck" 1905.

REVISED RECORDS.--WSP 1209: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,638.61 ft National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Sept. 30, 1953.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--39 years, 33.6 ft³/s, 24,340 acre-ft/yr; median of yearly mean discharges, 22 ft³/s, 16,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,750 ft³/s Apr. 18, 1950, gage height, 17.07 ft; maximum gage height, 17.46 ft Apr. 19, 1979; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|--------|------|--------------------------------|------------------|
| Feb. 25 | -- | 220 | Ice jam | Mar 27 | 0130 | *654 | 12.28 |

Minimum daily discharge, 0.01 ft³/s Oct. 1, 2, 7-14, 17, 18.

a - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|-------|-------|--------|------|------|------|--------|-------|------|
| 1 | .01 | .35 | .93 | 1.0 | 1.5 | 50 | 84 | 53 | 18 | 16 | .47 | .04 |
| 2 | .01 | .35 | .89 | 1.0 | 1.3 | 40 | 75 | 60 | 17 | 14 | .29 | .04 |
| 3 | .02 | .54 | .89 | 1.0 | 1.2 | 30 | 68 | 120 | 17 | 13 | .36 | .04 |
| 4 | .03 | .64 | .86 | 1.0 | 1.4 | 25 | 62 | 125 | 17 | 12 | .33 | .04 |
| 5 | .02 | .57 | .86 | 1.0 | 1.3 | 18 | 55 | 141 | 18 | 13 | .19 | .04 |
| 6 | .02 | .54 | .86 | 1.0 | 1.1 | 17 | 49 | 157 | 22 | 11 | .11 | .04 |
| 7 | .01 | .74 | .86 | 1.0 | 1.1 | 15 | 46 | 142 | 22 | 12 | .04 | .04 |
| 8 | .01 | .86 | .80 | 1.0 | 1.0 | 13 | 43 | 124 | 20 | 11 | .03 | .04 |
| 9 | .01 | .93 | 1.1 | 1.0 | 1.2 | 11 | 39 | 108 | 19 | 9.7 | .03 | .04 |
| 10 | .01 | .93 | 1.0 | 1.0 | 1.3 | 9.0 | 38 | 96 | 20 | 8.4 | .03 | .05 |
| 11 | .01 | .86 | 1.0 | 1.0 | 1.4 | 7.0 | 37 | 84 | 20 | 7.3 | .03 | .05 |
| 12 | .01 | .93 | 1.1 | 1.0 | 2.0 | 5.0 | 44 | 72 | 23 | 6.7 | .05 | .05 |
| 13 | .01 | .93 | 1.2 | 1.0 | 2.6 | 4.0 | 52 | 65 | 22 | 5.3 | .08 | .05 |
| 14 | .01 | .97 | 1.2 | 1.0 | 2.7 | 4.0 | 52 | 59 | 27 | 4.7 | .08 | .05 |
| 15 | .02 | .89 | 1.1 | .90 | 2.5 | 4.0 | 67 | 52 | 27 | 4.2 | .08 | .05 |
| 16 | .02 | .93 | 1.1 | .80 | 2.5 | 3.0 | 80 | 50 | 25 | 3.4 | .08 | .05 |
| 17 | .01 | .93 | 1.0 | .70 | 2.8 | 3.0 | 74 | 48 | 24 | 3.0 | .08 | .05 |
| 18 | .01 | .93 | 1.0 | .70 | 4.2 | 3.0 | 65 | 42 | 22 | 2.7 | .08 | .05 |
| 19 | .02 | .93 | .99 | .60 | 4.5 | 3.0 | 55 | 37 | 22 | 2.6 | .07 | .05 |
| 20 | .05 | .97 | .98 | .60 | 4.2 | 13 | 48 | 36 | 22 | 2.5 | .07 | .05 |
| 21 | .10 | .89 | 1.0 | .60 | 6.0 | 210 | 44 | 35 | 20 | 2.5 | .06 | .04 |
| 22 | .10 | .89 | 1.0 | .70 | 16 | 310 | 40 | 32 | 22 | 2.3 | .06 | .04 |
| 23 | .20 | .89 | .97 | .80 | 64 | 430 | 37 | 30 | 22 | 2.0 | .06 | .05 |
| 24 | .30 | .89 | .96 | 1.0 | 100 | 510 | 38 | 27 | 25 | 2.1 | .05 | .07 |
| 25 | .30 | .89 | .93 | 1.0 | 180 | 580 | 37 | 26 | 36 | 2.1 | .05 | .08 |
| 26 | .35 | .89 | .94 | 1.0 | 150 | 635 | 38 | 25 | 30 | 2.4 | .05 | .06 |
| 27 | .35 | .89 | .96 | 1.0 | 80 | 610 | 48 | 24 | 27 | 2.4 | .05 | .05 |
| 28 | .35 | .93 | .97 | .91 | 70 | 330 | 41 | 22 | 25 | 2.3 | .05 | .08 |
| 29 | .35 | .93 | 1.0 | 1.4 | 70 | 171 | 30 | 21 | 22 | 1.6 | .05 | .10 |
| 30 | .35 | .93 | 1.0 | 1.5 | --- | 124 | 30 | 20 | 17 | 1.1 | .05 | .14 |
| 31 | .35 | --- | 1.0 | 1.5 | --- | 98 | --- | 19 | --- | .77 | .04 | --- |
| TOTAL | 3.42 | 24.74 | 30.45 | 29.71 | 777.8 | 4285.0 | 1516 | 1952 | 670 | 184.07 | 3.15 | 1.62 |
| MEAN | .11 | .82 | .98 | .96 | 26.8 | 138 | 50.5 | 63.0 | 22.3 | 5.94 | .10 | .05 |
| MAX | .35 | .97 | 1.2 | 1.5 | 180 | 635 | 84 | 157 | 36 | 16 | .47 | .14 |
| MIN | .01 | .35 | .80 | .60 | 1.0 | 3.0 | 30 | 19 | 17 | .77 | .03 | .04 |
| AC-FT | 6.8 | 49 | 60 | 59 | 1540 | 8500 | 3010 | 3870 | 1330 | 365 | 6.2 | 3.2 |
| CAL YR 1983 | TOTAL | 13403.85 | | MEAN | 36.7 | MAX | 900 | MIN | .01 | AC-FT | 26590 | |
| WTR YR 1984 | TOTAL | 9477.96 | | MEAN | 25.9 | MAX | 635 | MIN | .01 | AC-FT | 18800 | |

06349500 APPLE CREEK NEAR MENOKEN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 31... | 1043 | .35 | 1530 | -- | 6.0 | 6.0 | -- | -- | -- | -- | -- |
| DEC 09... | 0945 | 1.1 | 1600 | -- | -11.0 | 1.0 | -- | -- | -- | -- | -- |
| JAN 27... | 0930 | 1.0 | 1950 | -- | -5.0 | 1.0 | -- | -- | -- | -- | -- |
| FEB 23... | 1555 | 71 | 320 | -- | -- | .0 | -- | -- | -- | -- | -- |
| MAR 05... | 1430 | 17 | 430 | -- | -2.5 | .5 | -- | -- | -- | -- | -- |
| 26... | 1429 | 645 | 150 | 7.8 | -- | 1.0 | 49 | 0 | 12 | 4.5 | 9.5 |
| APR 10... | 1410 | 37 | 500 | -- | 11.0 | 9.0 | -- | -- | -- | -- | -- |
| JUN 04... | 1540 | 18 | 960 | -- | 16.0 | 17.0 | -- | -- | -- | -- | -- |
| JUL 09... | 1420 | 9.7 | 1170 | -- | 28.0 | 23.0 | -- | -- | -- | -- | -- |
| AUG 13... | 1430 | .10 | 1340 | -- | 35.5 | 26.5 | -- | -- | -- | -- | -- |
| SEP 20... | 1045 | .04 | 1620 | 8.3 | 15.5 | 14.5 | 270 | 0 | 49 | 35 | 300 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|--------------|------------------------------|--|--|---|--|--|---|--|--|---|
| MAR 26... | 26 | .6 | 7.3 | 60 | .000 | 49 | 1.5 | 11 | 1.0 | .00 |
| SEP 20... | 70 | 8 | 11 | 620 | 48 | 590 | 4.9 | 240 | 42 | 1.0 |

| DATE | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|--------------|--|---|---|--|--|--|---|---|---|---|
| MAR 26... | 4.7 | 100 | 80 | .14 | 174 | .32 | .030 | 2 | 29 | 80 |
| SEP 20... | 18 | 1090 | 1100 | 1.5 | .12 | -- | -- | 9 | -- | 1100 |

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|---|---|---|---|--|---|---|
| MAR 26... | 8 | 150 | 1 | 6 | 110 | .5 | 0 | 81 | 13 |
| SEP 20... | -- | 30 | 1 | 120 | 80 | .2 | 1 | 440 | -- |

MISSOURI RIVER MAIN STEM

06349700 MISSOURI RIVER NEAR SCHMIDT, ND

LOCATION.--Lat 46°39'22", long 100°44'18", in SW1/4NE1/4 sec.26, T.137 N., R.80 W., Morton County, Hydrologic Unit 10130102, on right bank 2 mi southeast of abandoned townsite of Schmidt, 13 mi southeast of Mandan, and at mile 1,298.

DRAINAGE AREA.--191,700 mi², approximately.

PERIOD OF RECORD.--September 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated by releases from Lake Sakakawea (station 06338000) and backwater from Lake Oahe.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 23.56 ft Dec. 9, 1976; minimum daily recorded, 7.92 ft May 30, 1967.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | 15.87 | 13.39 | --- | 21.38 | 20.48 | 15.97 | 14.61 | 15.25 | 15.96 | 18.10 | 18.57 | --- |
| 2 | 15.74 | 13.73 | --- | 21.52 | 20.38 | 15.95 | 14.40 | 15.25 | 16.36 | 18.29 | 18.57 | --- |
| 3 | 15.62 | 13.48 | --- | 21.46 | 20.47 | 15.94 | 14.26 | 15.28 | 16.40 | 18.09 | 18.57 | --- |
| 4 | 15.56 | 13.72 | --- | 20.97 | 20.53 | 15.91 | 14.25 | 15.37 | 16.61 | 18.25 | 18.55 | --- |
| 5 | 15.40 | 14.01 | --- | 20.87 | 20.24 | 15.89 | 14.33 | 15.57 | 16.80 | 18.20 | 18.52 | --- |
| 6 | 15.41 | 14.00 | --- | 21.00 | 19.32 | 15.99 | 14.64 | 15.56 | 16.80 | 18.41 | 18.59 | --- |
| 7 | 15.13 | 13.86 | --- | 21.17 | 19.81 | 16.18 | 15.17 | 15.50 | 16.86 | 18.91 | 18.58 | --- |
| 8 | 15.00 | 14.10 | --- | 21.09 | 20.54 | 17.87 | 15.25 | 15.81 | 16.71 | 18.46 | 18.45 | --- |
| 9 | 14.83 | 14.26 | 15.90 | 20.81 | 20.70 | 20.00 | 15.40 | 16.07 | 16.68 | 18.41 | 18.29 | --- |
| 10 | 14.33 | 14.30 | 16.03 | 20.64 | 20.51 | 20.56 | 15.34 | 15.87 | 16.61 | 18.56 | 18.30 | --- |
| 11 | 13.86 | 14.41 | 16.48 | 20.25 | 20.38 | 20.51 | 15.07 | 15.70 | 17.11 | 18.71 | 18.45 | --- |
| 12 | 13.89 | 14.52 | 18.58 | 20.03 | 20.48 | 20.05 | 15.07 | 16.00 | 17.06 | 18.80 | 18.46 | --- |
| 13 | 13.97 | 14.38 | 21.96 | 20.07 | 20.36 | 20.13 | 15.19 | 15.76 | 16.99 | 18.80 | 18.39 | --- |
| 14 | 13.90 | 14.28 | 22.64 | 20.60 | 20.45 | 20.37 | 15.28 | 16.00 | 17.43 | 18.76 | 18.46 | --- |
| 15 | 13.72 | 14.24 | 21.86 | 20.83 | 20.70 | 20.49 | 15.19 | 16.72 | 17.30 | 18.81 | 18.11 | --- |
| 16 | 13.82 | 14.24 | 21.07 | 20.95 | 20.65 | 19.99 | 14.90 | 16.90 | 17.21 | 18.76 | 18.18 | --- |
| 17 | 13.88 | 14.24 | 20.16 | 20.90 | 20.62 | 19.12 | 14.93 | 15.99 | 17.10 | 18.63 | 18.07 | --- |
| 18 | 13.73 | 14.21 | 19.83 | 20.43 | 20.65 | 19.07 | 15.39 | 15.87 | 17.29 | 18.84 | --- | --- |
| 19 | 13.56 | 14.13 | 19.76 | 20.31 | 20.49 | 19.47 | 15.41 | 15.87 | 17.59 | 18.71 | --- | --- |
| 20 | 13.76 | 14.08 | 19.92 | 20.61 | 20.31 | 19.87 | 15.50 | 16.15 | 17.64 | 18.93 | --- | 16.26 |
| 21 | 13.77 | 14.11 | 20.43 | 20.82 | 19.06 | 19.13 | 15.39 | 16.00 | 17.74 | 19.03 | --- | 16.32 |
| 22 | 13.60 | 14.22 | 21.04 | 20.79 | 17.78 | 16.69 | 15.07 | 15.87 | 17.55 | 18.80 | --- | 16.16 |
| 23 | 13.65 | 14.25 | 21.25 | 20.81 | 17.15 | 15.69 | 14.95 | 16.27 | 17.47 | 18.74 | --- | 16.14 |
| 24 | 13.59 | 14.21 | 21.07 | 20.99 | 17.09 | 15.57 | 14.75 | 15.85 | 17.94 | 18.77 | --- | 16.18 |
| 25 | 13.70 | 14.08 | 21.11 | 20.89 | 17.06 | 15.50 | 14.66 | 15.61 | 18.19 | 18.86 | --- | 16.11 |
| 26 | 13.61 | 13.96 | 21.42 | 20.70 | 16.87 | 15.34 | 14.46 | 15.92 | 17.94 | 18.73 | --- | 16.08 |
| 27 | 13.84 | 14.10 | 21.68 | 20.56 | 16.42 | 15.28 | 14.44 | 16.03 | 18.02 | 18.73 | --- | 16.01 |
| 28 | 14.02 | 14.20 | 21.72 | 20.43 | 16.14 | 15.12 | 14.49 | 16.15 | 18.03 | 18.90 | --- | 16.01 |
| 29 | 13.55 | 13.93 | 21.68 | 20.40 | 16.02 | 14.97 | 15.11 | 16.38 | 18.20 | 19.19 | --- | 15.97 |
| 30 | 13.54 | --- | 21.48 | 20.29 | --- | 14.88 | 15.16 | 16.34 | 18.62 | 18.93 | --- | 16.04 |
| 31 | 13.39 | --- | 21.43 | 20.46 | --- | 14.72 | --- | 16.15 | --- | 18.59 | --- | --- |
| MEAN | 14.23 | --- | --- | 20.74 | 19.37 | 17.49 | 14.94 | 15.91 | 17.27 | 18.67 | --- | --- |
| MAX | 15.87 | --- | --- | 21.52 | 20.70 | 20.56 | 15.50 | 16.90 | 18.62 | 19.19 | --- | --- |
| MIN | 13.39 | --- | --- | 20.03 | 16.02 | 14.72 | 14.25 | 15.25 | 15.96 | 18.09 | --- | --- |

CANNONBALL RIVER BASIN

273

06350000 CANNONBALL RIVER AT REGENT, ND

LOCATION.--Lat 46°25'36", long 102°33'05", in NE¼NE¼ sec.13, T.134 N., R.95 W., Hettinger County, Hydrologic Unit 10130204, on right bank 400 ft from bridge on county highway, and 0.3 mi north of Regent.

DRAINAGE AREA.--580 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,422.90 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for the winter period, which are fair.

AVERAGE DISCHARGE.--34 years, 48.8 ft³/s, 35,360 acre-ft/yr; median of yearly mean discharges, 33 ft³/s, 23,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,000 ft³/s Mar. 27, 1978, gage height, 20.55 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since 1914, 26.1 ft Apr. 16, 1950, from floodmarks, discharge, 20,300 ft³/s, on basis of slope-area measurement at site 4 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| May 4 | 2245 | 734 | 6.76 | June 19 | 1115 | 2660 | 11.52 |
| June 16 | 1100 | 1180 | 8.18 | June 22 | 1930 | *4610 | *14.66 |

Minimum daily discharge, 4.0 ft³/s, Jan. 1-2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|------|-------|-------|--------|---------|-------|-------|-------|
| 1 | 6.4 | 7.6 | 8.0 | 4.0 | 14 | 14 | 23 | 57 | 7.0 | 63 | 6.2 | 4.8 |
| 2 | 7.5 | 7.7 | 7.8 | 4.0 | 20 | 14 | 22 | 76 | 6.5 | 55 | 43 | 4.9 |
| 3 | 8.2 | 7.9 | 7.6 | 4.2 | 24 | 14 | 21 | 166 | 6.5 | 44 | 165 | 5.0 |
| 4 | 8.5 | 8.3 | 7.4 | 4.5 | 26 | 13 | 20 | 529 | 7.6 | 38 | 59 | 5.0 |
| 5 | 8.9 | 8.9 | 7.2 | 5.0 | 30 | 13 | 19 | 637 | 8.5 | 34 | 38 | 5.0 |
| 6 | 8.6 | 9.0 | 7.1 | 6.0 | 25 | 12 | 21 | 386 | 11 | 30 | 24 | 5.1 |
| 7 | 8.3 | 8.8 | 7.0 | 7.0 | 25 | 11 | 19 | 252 | 13 | 28 | 19 | 5.2 |
| 8 | 7.7 | 8.5 | 6.9 | 7.0 | 21 | 9.5 | 18 | 171 | 12 | 27 | 15 | 6.1 |
| 9 | 7.4 | 7.8 | 6.8 | 7.0 | 19 | 9.7 | 17 | 127 | 10 | 23 | 12 | 6.4 |
| 10 | 7.4 | 7.6 | 6.8 | 6.8 | 18 | 11 | 18 | 100 | 12 | 20 | 10 | 5.5 |
| 11 | 7.3 | 7.7 | 6.9 | 6.8 | 18 | 10 | 21 | 80 | 12 | 18 | 9.4 | 5.5 |
| 12 | 6.8 | 8.6 | 6.8 | 6.6 | 17 | 9.8 | 27 | 65 | 58 | 18 | 8.8 | 5.6 |
| 13 | 6.8 | 9.2 | 6.6 | 6.5 | 18 | 9.7 | 29 | 53 | 34 | 16 | 8.3 | 5.4 |
| 14 | 6.8 | 9.7 | 6.8 | 6.5 | 20 | 11 | 30 | 44 | 21 | 14 | 8.5 | 5.0 |
| 15 | 6.9 | 10 | 6.6 | 6.4 | 23 | 11 | 30 | 37 | 18 | 14 | 7.8 | 5.0 |
| 16 | 7.0 | 10 | 6.5 | 6.3 | 25 | 11 | 27 | 31 | 652 | 13 | 7.2 | 4.8 |
| 17 | 7.0 | 10 | 6.3 | 6.3 | 25 | 9.7 | 24 | 27 | 278 | 12 | 7.3 | 4.8 |
| 18 | 7.1 | 11 | 6.0 | 6.2 | 25 | 9.8 | 21 | 24 | 160 | 12 | 7.1 | 4.7 |
| 19 | 7.4 | 10 | 6.0 | 6.1 | 24 | 13 | 20 | 21 | 1590 | 11 | 6.7 | 4.9 |
| 20 | 7.2 | 10 | 6.0 | 6.0 | 23 | 18 | 19 | 20 | 793 | 11 | 9.8 | 4.7 |
| 21 | 7.1 | 9.8 | 5.8 | 5.8 | 24 | 19 | 17 | 17 | 1040 | 9.8 | 29 | 4.4 |
| 22 | 7.4 | 10 | 5.8 | 5.5 | 25 | 27 | 16 | 15 | 3000 | 8.8 | 37 | 4.3 |
| 23 | 7.7 | 9.8 | 5.6 | 5.5 | 23 | 33 | 14 | 14 | 2460 | 9.0 | 19 | 5.0 |
| 24 | 7.9 | 9.5 | 5.5 | 5.7 | 22 | 34 | 14 | 13 | 858 | 9.4 | 13 | 5.8 |
| 25 | 7.9 | 9.5 | 5.0 | 6.0 | 21 | 35 | 14 | 12 | 516 | 9.6 | 11 | 6.3 |
| 26 | 7.9 | 9.3 | 5.0 | 6.0 | 20 | 29 | 16 | 11 | 285 | 9.3 | 8.6 | 6.5 |
| 27 | 8.2 | 9.0 | 4.5 | 6.2 | 18 | 31 | 13 | 10 | 183 | 9.0 | 7.1 | 6.5 |
| 28 | 7.8 | 9.0 | 4.5 | 6.5 | 15 | 31 | 8.1 | 9.4 | 131 | 7.9 | 5.8 | 6.4 |
| 29 | 7.7 | 8.7 | 4.3 | 8.5 | 15 | 29 | 12 | 9.1 | 101 | 8.3 | 5.0 | 6.2 |
| 30 | 7.9 | 8.4 | 4.2 | 8.0 | --- | 26 | 18 | 7.9 | 77 | 7.8 | 4.6 | 6.2 |
| 31 | 7.8 | --- | 4.1 | 10 | --- | 26 | --- | 7.3 | --- | 6.8 | 4.9 | --- |
| TOTAL | 234.5 | 271.3 | 191.4 | 192.9 | 623 | 554.2 | 588.1 | 3028.7 | 12361.1 | 596.7 | 617.1 | 161.0 |
| MEAN | 7.56 | 9.04 | 6.17 | 6.22 | 21.5 | 17.9 | 19.6 | 97.7 | 412 | 19.2 | 19.9 | 5.37 |
| MAX | 8.9 | 11 | 8.0 | 10 | 30 | 35 | 30 | 637 | 3000 | 63 | 165 | 6.5 |
| MIN | 6.4 | 7.6 | 4.1 | 4.0 | 14 | 9.5 | 8.1 | 7.3 | 6.5 | 6.8 | 4.6 | 4.3 |
| AC-FT | 465 | 538 | 380 | 383 | 1240 | 1100 | 1170 | 6010 | 24520 | 1180 | 1220 | 319 |
| CAL YR 1983 | TOTAL | 14348.8 | | MEAN | 39.3 | MAX | 647 | MIN | 3.5 | AC-FT | 28460 | |
| WTR YR 1984 | TOTAL | 19420.0 | | MEAN | 53.1 | MAX | 3000 | MIN | 4.0 | AC-FT | 38520 | |

CANNONBALL RIVER BASIN

06350000 CANNONBALL RIVER AT REGENT, ND--CONTINUED

PERIOD OF RECORD.--Water years 1964-66, 1971 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| OCT 19... | 1705 | 7.2 | 1870 | -- | 8.0 | 6.5 | -- | -- | -- | -- | -- | |
| DEC 06... | 1525 | 7.2 | 2440 | -- | -7.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 17... | 1320 | 6.3 | 2460 | -- | -21.0 | .0 | -- | -- | -- | -- | -- | |
| MAR 05... | 1655 | 13 | 2350 | 8.1 | -- | .0 | 630 | 274 | 110 | 87 | 330 | |
| APR 09... | 1720 | 16 | 2000 | -- | 9.5 | 9.5 | -- | -- | -- | -- | -- | |
| JUN 04... | 1510 | 7.7 | 2180 | -- | 16.0 | 15.5 | -- | -- | -- | -- | -- | |
| JUL 31... | 1010 | 6.9 | 1940 | 8.2 | -- | 24.5 | 510 | 158 | 100 | 64 | 250 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 05... | 53 | 6 | 13 | 440 | .000 | 340 | 5.6 | 1000 | 12 | .40 | 5.9 | 1860 |
| JUL 31... | 51 | 5 | 8.5 | 440 | .000 | 360 | 4.4 | 690 | 9.0 | .50 | 7.0 | 1370 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 05... | 1800 | 2.5 | 63 | 2 | 620 | 80 | 2 | 55 | 230 | .3 | 1 | 1500 |
| JUL 31... | 1300 | 1.9 | 25 | 2 | 480 | 30 | 0 | 50 | 60 | .3 | 2 | 1500 |

06351680 WHITE BUTTE FORK CEDAR CREEK NEAR SCRANTON, ND

LOCATION.--Lat 46°19'20", long 102°59'45", in NW¼ sec.21, T.133 N., R.98 W., Slope County, Hydrologic Unit 10130205, on left bank 1,200 ft downstream from county highway bridge, and 13 mi northeast of Scranton.

DRAINAGE AREA.--42.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1965 to current year (seasonal records only since 1984).

GAGE.--Water-stage recorder. Altitude of gage is 2,825 ft, from topographic map.

REMARKS.--Records good except those for the winter period, which are fair.

AVERAGE DISCHARGE.--18 years (water years 1966-83), 4.45 ft³/s, 3,220 acre-ft/yr, median of yearly mean discharges, 4.54 ft³/s, 3,290 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 645 ft³/s May 8, 1970, gage height, 7.20 ft; maximum gage height, 7.76 ft May 8, 1967; no flow for many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 370 ft³/s June 23, gage height, 6.45 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|------|-----|-----|-----|-------|-------|-------|--------|--------|------|--------|------|
| 1 | .03 | | | | 2.0 | .43 | 1.3 | 114 | .27 | 1.0 | .00 | .01 |
| 2 | .15 | | | | 1.0 | .43 | 1.2 | 157 | .24 | .89 | 2.3 | .01 |
| 3 | .09 | | | | .74 | .44 | 1.1 | 250 | .22 | .78 | 84 | .01 |
| 4 | .05 | | | | .60 | .36 | 1.0 | 155 | .18 | .65 | 18 | .01 |
| 5 | .03 | | | | .34 | .33 | .98 | 116 | .18 | .53 | 3.4 | .01 |
| 6 | .02 | | | | .37 | .33 | .86 | 43 | .34 | .49 | 1.7 | .01 |
| 7 | .03 | | | | .41 | .35 | .98 | 21 | .41 | .41 | 2.2 | .01 |
| 8 | .02 | | | | .51 | .33 | .86 | 12 | .35 | .41 | 1.6 | .01 |
| 9 | .01 | | | | .56 | .33 | .78 | 8.1 | .38 | .36 | .84 | .01 |
| 10 | .01 | | | | .62 | .33 | .73 | 5.8 | .88 | .23 | .52 | .02 |
| 11 | .01 | | | | .78 | .33 | .89 | 4.0 | .81 | .21 | .38 | .02 |
| 12 | .02 | | | | .87 | .27 | 1.5 | 2.9 | .74 | .18 | .25 | .02 |
| 13 | .02 | | | | .80 | .27 | 1.3 | 2.4 | .52 | .17 | .20 | .02 |
| 14 | .02 | | | | .84 | .41 | 1.1 | 1.9 | .41 | .14 | .18 | .02 |
| 15 | .02 | | | | .78 | .43 | 1.2 | 1.3 | .38 | .10 | .14 | .02 |
| 16 | .02 | | | | .72 | .43 | 1.7 | 1.2 | 25 | .08 | .12 | .02 |
| 17 | .03 | | | | .75 | .41 | 1.5 | 1.0 | 134 | .07 | .12 | .02 |
| 18 | .04 | | | | .81 | .39 | 1.3 | .87 | 37 | .06 | .15 | .03 |
| 19 | .05 | | | | .86 | .51 | 1.0 | .84 | 16 | .05 | .21 | .03 |
| 20 | .06 | | | | .88 | .80 | .84 | .79 | 55 | .04 | .21 | .03 |
| 21 | .05 | | | | .94 | .80 | .75 | .71 | 31 | .03 | .16 | .03 |
| 22 | .05 | | | | .90 | .70 | .67 | .62 | 130 | .03 | .11 | .04 |
| 23 | .05 | | | | .73 | .70 | .56 | .57 | 258 | .02 | .07 | .08 |
| 24 | .05 | | | | .65 | .80 | .55 | .51 | 64 | .02 | .07 | .14 |
| 25 | .05 | | | | .62 | 1.4 | .51 | .45 | 20 | .02 | .07 | .15 |
| 26 | .05 | | | | .57 | 1.3 | .73 | .42 | 7.6 | .01 | .04 | .32 |
| 27 | .05 | | | | .61 | 1.6 | 6.1 | .40 | 4.0 | .01 | .03 | .28 |
| 28 | .05 | | | | .58 | 1.8 | 12 | .41 | 2.6 | .00 | .03 | .22 |
| 29 | .05 | | | | .66 | 2.0 | 21 | .39 | 1.8 | .00 | .02 | .21 |
| 30 | .05 | | | | --- | 1.6 | 29 | .27 | 1.3 | .00 | .02 | .19 |
| 31 | .05 | | | | --- | 1.4 | --- | .27 | --- | .00 | .01 | --- |
| TOTAL | 1.28 | | | | 21.50 | 22.01 | 93.99 | 904.12 | 793.61 | 6.99 | 117.15 | 2.00 |
| MEAN | .04 | | | | .74 | .71 | 3.13 | 29.2 | 26.5 | .23 | 3.78 | .07 |
| MAX | .15 | | | | 2.0 | 2.0 | 29 | 250 | 258 | 1.0 | .84 | .32 |
| MIN | .01 | | | | .34 | .27 | .51 | .27 | .18 | .00 | .00 | .01 |
| AC-FT | 2.5 | | | | 43 | 44 | 186 | 1790 | 1570 | 14 | 232 | 4.0 |

CANNONBALL RIVER BASIN

06351680 WHITE BUTTE FORK CEDAR CREEK NEAR SCRANTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 21... | 1310 | .09 | 5410 | 7.5 | 15.0 | 9.5 | 2300 | 1990 | 380 | 320 | 840 |
| FEB 03... | 1700 | .78 | 3120 | -- | .5 | .0 | -- | -- | -- | -- | -- |
| MAR 09... | 1600 | .33 | 3190 | -- | -4.0 | .0 | -- | -- | -- | -- | -- |
| APR 10... | 1350 | .72 | 3040 | 8.2 | 12.0 | 10.0 | 1200 | 836 | 230 | 140 | 370 |
| JUN 08... | 1630 | .28 | 3830 | 8.8 | 21.0 | 20.5 | 1200 | 1020 | 190 | 180 | 540 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| OCT 21... | 44 | 8 | 30 | 350 | .000 | 280 | 17 | 3200 | 36 | .30 | 4.8 | 5050 |
| APR 10... | 41 | 5 | 12 | 390 | .000 | 320 | 3.9 | 1500 | 21 | .20 | 5.3 | 2670 |
| JUN 08... | 49 | 7 | 11 | 230 | | 200 | .6 | 2300 | 17 | .20 | .1 | 3330 |

| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|---|--|--|---|---|---|---|---|---|---|--|---|
| OCT 21... | 5000 | 6.9 | 1.2 | 2 | 1400 | 50 | 2 | 200 | 350 | .5 | 3 | 5300 |
| APR 10... | 2500 | 3.6 | 5.2 | 1 | 800 | 40 | 0 | 80 | 460 | .3 | 0 | 3900 |
| JUN 08... | 3400 | 4.5 | 2.5 | 1 | 810 | 40 | 0 | 100 | 40 | .5 | 0 | 4400 |

CANNONBALL RIVER BASIN

277

06352000 CEDAR CREEK NEAR HAYNES, ND

LOCATION.--Lat 46°09'15", long 102°28'25", in W1/2 sec.20, T.131 N., R.94 W., Adams County, Hydrologic Unit 10130205, on left bank 30 ft downstream from bridge on State Highway 8, and 12.5 mi north of Haynes.

DRAINAGE AREA.--553 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,472.90 ft National Geodetic Vertical Datum of 1929, North Dakota Highway Department benchmark. Prior to May 20, 1951, nonrecording gage on former bridge 400 ft upstream at same datum.

REMARKS.--Records good except those for winter period, which are fair.

AVERAGE DISCHARGE.--34 years, 37.5 ft³/s, 27,170 acre-ft/yr; median of yearly mean discharges, 30 ft³/s, 21,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,870 ft³/s Apr. 7, 1952, gage height, 21.25 ft; maximum gage height, 22.05 ft Mar. 28, 1978, backwater from ice and snow; no flow at times in some years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 17, 1950 reached a stage of about 23 ft, discharge, 26,900 ft³/s, by slope-area measurement at site 9 mi upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 400 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| May 6 | 0600 | 534 | 9.90 | June 23 | 0545 | 1030 | 12.85 |
| June 19 | 2245 | *1080 | *13.05 | | | | |

Minimum daily discharge, 1.6 ft³/s Dec. 25.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|-------|------|--------|--------|-------|-------|------|
| 1 | 4.0 | 4.3 | 3.4 | 2.9 | 11 | 7.2 | 11 | 35 | 6.4 | 48 | 2.9 | 2.0 |
| 2 | 4.8 | 4.2 | 3.7 | 3.2 | 14 | 7.0 | 18 | 98 | 6.0 | 35 | 4.2 | 2.1 |
| 3 | 4.9 | 4.4 | 4.1 | 3.0 | 11 | 7.2 | 19 | 154 | 5.5 | 27 | 133 | 2.1 |
| 4 | 5.0 | 4.5 | 4.6 | 3.4 | 7.5 | 7.3 | 17 | 266 | 5.5 | 21 | 35 | 2.1 |
| 5 | 4.7 | 4.4 | 4.6 | 3.9 | 6.5 | 7.6 | 16 | 471 | 5.9 | 18 | 19 | 1.9 |
| 6 | 4.7 | 4.4 | 4.6 | 4.6 | 4.5 | 7.9 | 16 | 523 | 7.7 | 15 | 39 | 1.9 |
| 7 | 5.8 | 4.3 | 4.7 | 4.4 | 6.0 | 8.1 | 15 | 415 | 7.7 | 13 | 178 | 2.1 |
| 8 | 5.6 | 4.1 | 4.6 | 4.6 | 7.0 | 8.0 | 14 | 273 | 8.0 | 12 | 115 | 2.1 |
| 9 | 5.4 | 4.2 | 4.2 | 4.9 | 7.5 | 8.0 | 13 | 187 | 8.4 | 11 | 72 | 2.1 |
| 10 | 5.2 | 4.1 | 4.0 | 5.2 | 7.5 | 8.1 | 13 | 134 | 13 | 9.9 | 44 | 2.1 |
| 11 | 5.1 | 4.1 | 4.4 | 4.6 | 7.0 | 7.8 | 15 | 102 | 14 | 8.7 | 30 | 2.2 |
| 12 | 4.8 | 4.5 | 4.2 | 4.8 | 6.5 | 8.1 | 19 | 83 | 15 | 8.0 | 22 | 2.2 |
| 13 | 4.6 | 4.5 | 4.0 | 4.8 | 7.0 | 8.0 | 21 | 64 | 31 | 7.5 | 16 | 2.2 |
| 14 | 4.8 | 4.5 | 4.0 | 5.0 | 8.0 | 8.8 | 21 | 47 | 45 | 6.8 | 13 | 2.2 |
| 15 | 4.8 | 4.7 | 3.6 | 4.8 | 7.5 | 8.4 | 23 | 38 | 27 | 6.2 | 10 | 2.2 |
| 16 | 5.4 | 4.7 | 3.6 | 4.6 | 7.0 | 8.0 | 22 | 31 | 43 | 5.8 | 8.2 | 2.2 |
| 17 | 5.3 | 4.7 | 3.2 | 4.5 | 7.0 | 8.2 | 19 | 26 | 71 | 5.4 | 7.0 | 2.2 |
| 18 | 5.0 | 5.1 | 3.2 | 4.5 | 7.0 | 7.3 | 16 | 21 | 85 | 5.1 | 6.1 | 2.3 |
| 19 | 5.0 | 4.6 | 3.0 | 4.4 | 7.0 | 9.4 | 15 | 18 | 519 | 4.8 | 5.3 | 2.2 |
| 20 | 5.1 | 4.3 | 3.2 | 4.2 | 6.8 | 12 | 15 | 17 | 707 | 4.7 | 4.8 | 2.2 |
| 21 | 5.2 | 4.3 | 3.0 | 4.0 | 7.2 | 12 | 14 | 16 | 539 | 4.5 | 4.3 | 2.3 |
| 22 | 5.0 | 4.2 | 2.9 | 4.4 | 7.9 | 11 | 13 | 14 | 542 | 4.2 | 3.7 | 2.5 |
| 23 | 5.2 | 4.3 | 2.8 | 5.0 | 7.9 | 12 | 12 | 12 | 950 | 4.0 | 3.4 | 2.9 |
| 24 | 5.3 | 3.9 | 2.4 | 5.2 | 7.9 | 14 | 12 | 11 | 654 | 3.9 | 3.2 | 3.5 |
| 25 | 4.9 | 3.8 | 1.6 | 5.4 | 7.9 | 13 | 11 | 9.6 | 505 | 3.8 | 3.1 | 3.7 |
| 26 | 5.1 | 3.7 | 1.7 | 5.8 | 7.8 | 14 | 14 | 8.8 | 344 | 3.8 | 2.8 | 3.7 |
| 27 | 4.4 | 3.5 | 2.2 | 5.9 | 7.4 | 13 | 27 | 8.5 | 213 | 3.7 | 2.6 | 3.8 |
| 28 | 4.0 | 3.4 | 3.0 | 5.6 | 7.3 | 13 | 36 | 8.2 | 144 | 3.5 | 2.4 | 4.0 |
| 29 | 4.2 | 3.4 | 2.8 | 5.8 | 7.1 | 13 | 27 | 7.7 | 100 | 3.2 | 2.2 | 4.0 |
| 30 | 4.3 | 3.3 | 2.6 | 6.5 | --- | 13 | 28 | 7.2 | 70 | 3.2 | 2.1 | 4.0 |
| 31 | 4.3 | --- | 2.6 | 8.0 | --- | 11 | --- | 6.7 | --- | 3.0 | 2.1 | --- |
| TOTAL | 151.9 | 126.4 | 106.5 | 147.9 | 221.7 | 301.4 | 532 | 3112.7 | 5692.1 | 313.7 | 796.4 | 77.0 |
| MEAN | 4.90 | 4.21 | 3.44 | 4.77 | 7.64 | 9.72 | 17.7 | 100 | 190 | 10.1 | 25.7 | 2.57 |
| MAX | 5.8 | 5.1 | 4.7 | 8.0 | 14 | 14 | 36 | 523 | 950 | 48 | 178 | 4.0 |
| MIN | 4.0 | 3.3 | 1.6 | 2.9 | 4.5 | 7.0 | 11 | 6.7 | 5.5 | 3.0 | 2.1 | 1.9 |
| AC-FT | 301 | 251 | 211 | 293 | 440 | 598 | 1060 | 6170 | 11290 | 622 | 1580 | 153 |
| CAL YR 1983 | TOTAL | 11248.3 | | MEAN | 30.8 | MAX | 357 | MIN | 1.6 | AC-FT | 22310 | |
| WTR YR 1984 | TOTAL | 11579.7 | | MEAN | 31.6 | MAX | 950 | MIN | 1.6 | AC-FT | 22970 | |

CANNONBALL RIVER BASIN

06352000 CEDAR CREEK NEAR HAYNES, ND--CONTINUED

PERIOD OF RECORD.--Water years 1971 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 20... | 1230 | 5.1 | 2970 | -- | 11.0 | 6.5 | -- | -- | -- | -- | -- |
| DEC 06... | 1100 | 4.9 | 3460 | -- | -3.0 | .0 | -- | -- | -- | -- | -- |
| JAN 17... | 1620 | 4.5 | 3260 | -- | -22.0 | .0 | -- | -- | -- | -- | -- |
| FEB 02... | 1620 | 14 | 2500 | 7.9 | -- | .0 | 840 | 459 | 140 | 120 | 330 |
| MAR 06... | 1405 | 8.0 | 2300 | -- | -4.0 | .0 | -- | -- | -- | -- | -- |
| APR 10... | 1050 | 13 | 2350 | -- | 6.5 | 8.0 | -- | -- | -- | -- | -- |
| JUN 05... | 1010 | 5.9 | 2590 | -- | 19.0 | 15.5 | -- | -- | -- | -- | -- |
| JUL 31... | 1345 | 3.0 | 2270 | 8.3 | -- | 26.0 | 630 | 317 | 100 | 92 | 310 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
|--------------|------------------------------|--|--|---|--|--|--|--|--|---|--|---|
| FEB 02... | 45 | 5 | 15 | 470 | .000 | 380 | 9.4 | 1200 | 18 | .40 | 7.5 | 2020 |
| JUL 31... | 51 | 5 | 13 | 380 | .000 | 310 | 3.0 | 930 | 13 | .50 | 5.3 | 1730 |

| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
|--------------|--|--|--|---|---|---|---|---|---|---|--|---|
| FEB 02... | 2100 | 2.7 | 76 | 2 | 440 | 130 | 0 | 60 | 140 | .2 | 0 | 160 |
| JUL 31... | 1700 | 2.4 | 14 | 2 | 610 | 20 | 0 | 66 | 60 | .0 | 0 | 1700 |

CANNONBALL RIVER BASIN

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06353000 CEDAR CREEK NEAR RALEIGH, ND

LOCATION.--Lat 46°05'30", long 101°20'00", in NE1/4SE1/4 sec.8, T.130 N., R.85 W., Grant County, Hydrologic Unit 10130205, on left bank at upstream side of bridge on N.D. Highway 31, 6 mi upstream from mouth, and 19 mi south of Raleigh.

DRAINAGE AREA.--1,750 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to September 1939, March 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,881.23 ft National Geodetic Vertical Datum of 1929. Prior to June 6, 1962, nonrecording gage at same site and datum, and June 6, 1962, to Sept. 7, 1972, at site 1 mi upstream at datum 9.58 ft higher.

REMARKS.--Records good except those for the winter period, which are fair.

AVERAGE DISCHARGE.--22 years (water years 1963-84), 103 ft³/s, 74,620 acre-ft/yr; median of yearly mean discharges, 80 ft³/s, 58,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,400 ft³/s Mar. 28, 1978, gage height, 13.70 ft; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since 1950, about 18 ft Apr. 18, 1950, discharge 45,000 ft³/s, on basis of slope-area measurement 5 mi upstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 700 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 22 | -- | 800 | Ice jam | June 20 | 2130 | *1210 | 5.44 |
| June 16 | 1145 | 857 | 4.79 | June 22 | 1900 | 1120 | 5.28 |
| June 17 | 2200 | 1180 | 5.38 | June 26 | 1115 | 777 | 4.58 |

Minimum daily, 3.0 ft³/s Dec. 24-27, Sept. 23-24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|------|------|------|-------|-------|--------|--------|-------|
| 1 | 3.9 | 11 | 9.5 | 4.0 | 80 | 40 | 72 | 293 | 33 | 272 | 4.7 | 8.5 |
| 2 | 5.3 | 11 | 9.5 | 4.5 | 85 | 40 | 66 | 238 | 32 | 224 | 5.6 | 7.7 |
| 3 | 5.6 | 12 | 10 | 4.5 | 110 | 35 | 59 | 364 | 29 | 178 | 58 | 7.5 |
| 4 | 5.3 | 12 | 11 | 5.0 | 100 | 30 | 55 | 428 | 31 | 143 | 107 | 7.2 |
| 5 | 5.4 | 11 | 11 | 5.5 | 100 | 25 | 54 | 441 | 33 | 118 | 235 | 7.2 |
| 6 | 5.0 | 11 | 11 | 6.0 | 90 | 20 | 48 | 410 | 33 | 100 | 436 | 6.7 |
| 7 | 5.4 | 11 | 10 | 7.0 | 65 | 15 | 44 | 401 | 32 | 83 | 525 | 5.9 |
| 8 | 7.1 | 11 | 10 | 7.0 | 55 | 15 | 41 | 454 | 30 | 71 | 337 | 5.2 |
| 9 | 7.4 | 11 | 9.5 | 6.5 | 50 | 15 | 41 | 497 | 33 | 61 | 222 | 5.5 |
| 10 | 7.3 | 11 | 9.0 | 6.0 | 45 | 20 | 44 | 450 | 58 | 53 | 148 | 5.4 |
| 11 | 6.8 | 11 | 9.0 | 6.0 | 50 | 20 | 48 | 368 | 68 | 45 | 104 | 5.4 |
| 12 | 7.2 | 13 | 9.0 | 5.5 | 65 | 20 | 54 | 302 | 80 | 40 | 148 | 5.0 |
| 13 | 7.5 | 14 | 8.5 | 5.5 | 60 | 20 | 94 | 253 | 74 | 34 | 125 | 4.6 |
| 14 | 8.2 | 14 | 8.5 | 5.0 | 60 | 25 | 109 | 213 | 155 | 30 | 97 | 4.6 |
| 15 | 12 | 13 | 8.0 | 5.0 | 65 | 30 | 80 | 179 | 207 | 27 | 75 | 4.9 |
| 16 | 16 | 13 | 6.5 | 4.5 | 70 | 35 | 78 | 153 | 532 | 23 | 58 | 4.9 |
| 17 | 13 | 14 | 6.0 | 4.5 | 60 | 45 | 80 | 130 | 696 | 21 | 48 | 4.8 |
| 18 | 11 | 15 | 5.0 | 5.0 | 50 | 60 | 82 | 112 | 764 | 19 | 40 | 4.6 |
| 19 | 18 | 14 | 5.0 | 5.0 | 45 | 100 | 79 | 98 | 535 | 17 | 32 | 3.8 |
| 20 | 20 | 16 | 4.5 | 5.0 | 45 | 400 | 74 | 90 | 750 | 16 | 27 | 3.8 |
| 21 | 16 | 17 | 4.0 | 4.5 | 50 | 500 | 70 | 83 | 849 | 14 | 24 | 3.2 |
| 22 | 14 | 16 | 4.0 | 4.5 | 50 | 600 | 68 | 74 | 960 | 13 | 22 | 3.1 |
| 23 | 14 | 16 | 3.5 | 4.5 | 55 | 250 | 63 | 69 | 883 | 11 | 20 | 3.0 |
| 24 | 12 | 15 | 3.0 | 4.5 | 60 | 200 | 61 | 62 | 607 | 11 | 18 | 3.0 |
| 25 | 12 | 14 | 3.0 | 4.5 | 60 | 140 | 59 | 58 | 590 | 9.7 | 17 | 8.9 |
| 26 | 12 | 13 | 3.0 | 4.5 | 55 | 105 | 101 | 55 | 737 | 8.8 | 16 | 11 |
| 27 | 12 | 12 | 3.0 | 6.0 | 45 | 113 | 194 | 52 | 615 | 8.7 | 14 | 9.2 |
| 28 | 11 | 11 | 3.5 | 10 | 40 | 109 | 126 | 50 | 505 | 8.4 | 12 | 9.1 |
| 29 | 11 | 10 | 3.5 | 50 | 40 | 101 | 307 | 45 | 432 | 8.0 | 11 | 7.9 |
| 30 | 11 | 9.5 | 3.5 | 140 | --- | 92 | 383 | 41 | 345 | 6.8 | 9.8 | 7.4 |
| 31 | 11 | --- | 4.0 | 90 | --- | 80 | --- | 37 | --- | 5.6 | 9.1 | --- |
| TOTAL | 313.4 | 382.5 | 208.5 | 430.0 | 1805 | 3300 | 2734 | 6500 | 10728 | 1680.0 | 3005.2 | 179.0 |
| MEAN | 10.1 | 12.7 | 6.73 | 13.9 | 62.2 | 106 | 91.1 | 210 | 358 | 54.2 | 96.9 | 5.97 |
| MAX | 20 | 17 | 11 | 140 | 110 | 600 | 383 | 497 | 960 | 272 | 525 | 11 |
| MIN | 3.9 | 9.5 | 3.0 | 4.0 | 40 | 15 | 41 | 37 | 29 | 5.6 | 4.7 | 3.0 |
| AC-FT | 622 | 759 | 414 | 853 | 3580 | 6550 | 5420 | 12890 | 21280 | 3330 | 5960 | 355 |
| CAL YR 1983 | TOTAL | 25511.4 | | MEAN | 69.9 | MAX | 704 | MIN | 2.6 | AC-FT | 50600 | |
| WTR YR 1984 | TOTAL | 31265.6 | | MEAN | 85.4 | MAX | 960 | MIN | 3.0 | AC-FT | 62020 | |

CANNONBALL RIVER BASIN

06353000 CEDAR CREEK NEAR RALEIGH, ND--CONTINUED

PERIOD OF RECORD---Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|--|--|--|---|--|--|--|--|---|---|--|---|
| NOV 04... | 1140 | 12 | 2100 | -- | 10.5 | 9.5 | -- | -- | -- | -- | -- | |
| DEC 06... | 1405 | 11 | 2930 | -- | -8.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 23... | 1251 | 4.4 | 4400 | 7.9 | 4.0 | .5 | -- | -- | -- | -- | -- | |
| 30... | 1500 | 152 | 1750 | -- | 9.0 | 1.0 | -- | -- | -- | -- | -- | |
| MAR 12... | 1201 | 21 | 2150 | -- | 3.5 | .0 | -- | -- | -- | -- | -- | |
| 20... | 1715 | 431 | 800 | 6.8 | 8.0 | 1.0 | 190 | 59 | 33 | 26 | 99 | |
| 23... | 1445 | 246 | 850 | -- | 11.0 | 1.0 | -- | -- | -- | -- | -- | |
| 26... | 1355 | 103 | 975 | -- | 10.0 | 2.0 | -- | -- | -- | -- | -- | |
| 29... | 1308 | 95 | 975 | -- | 7.5 | 1.5 | -- | -- | -- | -- | -- | |
| APR 16... | 1307 | 78 | 1630 | -- | 16.0 | 12.0 | -- | -- | -- | -- | -- | |
| MAY 21... | 1445 | 82 | 2890 | -- | 19.0 | 17.0 | -- | -- | -- | -- | -- | |
| AUG 15... | 1440 | 75 | 1300 | -- | 29.0 | 25.0 | -- | -- | -- | -- | -- | |
| SEP 27... | 1550 | 9.2 | 2000 | 8.2 | -- | 9.0 | 550 | 274 | 90 | 78 | 270 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 20... | 52 | 3 | 9.7 | 160 | .000 | 130 | 40 | 260 | 5.9 | .20 | 4.2 | 550 |
| SEP 27... | 51 | 5 | 14 | 330 | .000 | 270 | 3.3 | 860 | 11 | .30 | 6.2 | 1510 |
| DATE | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 20... | 520 | .75 | 640 | 5 | 190 | 120 | 1 | 32 | 100 | .7 | 0 | 440 |
| SEP 27... | 1500 | 2.1 | 37 | 2 | 460 | 40 | 0 | 67 | 40 | .2 | 1 | 1200 |

CANNONBALL RIVER BASIN

281

06354000 CANNONBALL RIVER AT BREIEN, ND

LOCATION.--Lat 46°22'33", long 100°56'03", in sec.36, T.134 N., R.82 W., Morton County, Hydrologic Unit 10130206, on left bank at downstream side of bridge on State Highway 6, 1,500 ft downstream from Louise Creek, and 0.6 mi southeast of Breien. Prior to June 12, 1973, at site 600 ft upstream on right bank.

DRAINAGE AREA.--4,100 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1934 to current year.

REVISED RECORDS.--WSP 786: 1934. WSP 1146: 1943. WSP 1279: 1936-37(M), 1947(M). WSP 1509: 1955(M).

GAGE.--Water-stage recorder. Datum of gage is 1,673.54 ft National Geodetic Vertical Datum of 1929. Prior to June 12, 1973, at site 600 ft upstream at datum 3.00 ft higher. June 13, 1973, to April 8, 1980, at datum 2.00 ft higher.

REMARKS.--Records good, except those for winter period which are fair. Some storage in several small lakes above station.

AVERAGE DISCHARGE.--50 years, 255 ft³/s, 185,000 acre-ft/yr; median of yearly mean discharges, 200 ft³/s, 140,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 94,800 ft³/s Apr. 19, 1950, gage height, 22.30 ft, from floodmarks, from rating curve extended above 16,000 ft³/s on basis of slope area and contracted-opening measurements of peak flow, site and datum then in use; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 1,000 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|---------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 22 | ice jam | 1500 | 10.53 | June 25 | 1800 | *4880 | 9.88 |
| May 8 | 1320 | 1690 | 6.28 | Aug. 4 | 0015 | 1170 | 5.82 |
| June 17 | 0515 | 3410 | 8.56 | | | | |

Minimum daily discharge, 10 ft³/s Jan. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|-------|------|------|------|-------|-------|-------|-------|-------|--------|------|
| 1 | 19 | 62 | 23 | 16 | 70 | 140 | 280 | 870 | 75 | 755 | 44 | 35 |
| 2 | 23 | 51 | 23 | 17 | 80 | 120 | 266 | 764 | 74 | 627 | 45 | 31 |
| 3 | 26 | 46 | 23 | 17 | 75 | 105 | 228 | 798 | 71 | 530 | 88 | 27 |
| 4 | 29 | 43 | 22 | 18 | 70 | 105 | 194 | 1060 | 107 | 441 | 744 | 25 |
| 5 | 28 | 41 | 22 | 18 | 40 | 90 | 169 | 1140 | 93 | 370 | 278 | 26 |
| 6 | 27 | 42 | 21 | 17 | 35 | 75 | 158 | 1130 | 97 | 320 | 406 | 26 |
| 7 | 28 | 40 | 21 | 16 | 40 | 70 | 152 | 1280 | 85 | 281 | 835 | 28 |
| 8 | 27 | 39 | 20 | 15 | 45 | 70 | 144 | 1530 | 80 | 249 | 714 | 31 |
| 9 | 27 | 39 | 18 | 14 | 50 | 60 | 141 | 1320 | 85 | 229 | 477 | 34 |
| 10 | 27 | 38 | 18 | 13 | 60 | 55 | 139 | 1100 | 94 | 206 | 341 | 36 |
| 11 | 43 | 35 | 18 | 12 | 80 | 50 | 143 | 922 | 145 | 185 | 255 | 35 |
| 12 | 40 | 30 | 17 | 12 | 90 | 40 | 162 | 744 | 168 | 165 | 192 | 34 |
| 13 | 34 | 38 | 17 | 12 | 110 | 35 | 241 | 616 | 179 | 153 | 205 | 32 |
| 14 | 31 | 48 | 17 | 12 | 115 | 30 | 331 | 513 | 353 | 140 | 184 | 33 |
| 15 | 32 | 52 | 17 | 12 | 120 | 35 | 318 | 437 | 563 | 127 | 161 | 30 |
| 16 | 44 | 48 | 16 | 12 | 110 | 40 | 264 | 374 | 1740 | 115 | 132 | 29 |
| 17 | 62 | 48 | 16 | 12 | 95 | 40 | 226 | 321 | 2070 | 102 | 113 | 28 |
| 18 | 48 | 49 | 15 | 11 | 90 | 35 | 196 | 284 | 1440 | 97 | 98 | 27 |
| 19 | 42 | 50 | 14 | 11 | 95 | 50 | 188 | 251 | 1700 | 90 | 82 | 27 |
| 20 | 53 | 50 | 13 | 10 | 110 | 180 | 181 | 222 | 2200 | 85 | 75 | 27 |
| 21 | 86 | 46 | 13 | 11 | 120 | 800 | 163 | 197 | 2070 | 79 | 66 | 27 |
| 22 | 60 | 36 | 12 | 12 | 150 | 1000 | 154 | 179 | 2710 | 74 | 62 | 29 |
| 23 | 52 | 32 | 12 | 13 | 160 | 900 | 145 | 162 | 2640 | 68 | 60 | 31 |
| 24 | 48 | 31 | 12 | 15 | 170 | 800 | 147 | 151 | 3080 | 64 | 57 | 32 |
| 25 | 45 | 30 | 13 | 17 | 170 | 700 | 132 | 140 | 4480 | 63 | 54 | 33 |
| 26 | 42 | 30 | 13 | 19 | 165 | 600 | 190 | 135 | 3770 | 123 | 52 | 33 |
| 27 | 41 | 29 | 14 | 22 | 160 | 500 | 414 | 130 | 2180 | 73 | 48 | 33 |
| 28 | 39 | 29 | 14 | 25 | 150 | 450 | 418 | 115 | 1550 | 62 | 44 | 32 |
| 29 | 37 | 28 | 15 | 40 | 140 | 370 | 477 | 99 | 1180 | 56 | 42 | 32 |
| 30 | 37 | 24 | 16 | 160 | --- | 310 | 911 | 88 | 930 | 50 | 41 | 31 |
| 31 | 54 | --- | 16 | 100 | --- | 290 | --- | 80 | --- | 47 | 39 | --- |
| TOTAL | 1231 | 1204 | 521 | 711 | 2965 | 8145 | 7272 | 17152 | 36009 | 6026 | 6034 | 914 |
| MEAN | 39.7 | 40.1 | 16.8 | 22.9 | 102 | 263 | 242 | 553 | 1200 | 194 | 195 | 30.5 |
| MAX | 86 | 62 | 23 | 160 | 170 | 1000 | 911 | 1530 | 4480 | 755 | 835 | 36 |
| MIN | 19 | 24 | 12 | 10 | 35 | 30 | 132 | 80 | 71 | 47 | 39 | 25 |
| AC-FT | 2440 | 2390 | 1030 | 1410 | 5880 | 16160 | 14420 | 34020 | 71420 | 11950 | 11970 | 1810 |
| CAL YR 1983 | TOTAL | 63790 | | MEAN | 175 | MAX | 1900 | MIN | 12 | AC-FT | 126500 | |
| WTR YR 1984 | TOTAL | 88184 | | MEAN | 241 | MAX | 4480 | MIN | 10 | AC-FT | 174900 | |

CANNONBALL RIVER BASIN

06354000 CANNONBALL RIVER AT BREIEN, ND
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD---Water years 1946-50 (partial-record station), 1970-72, 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | TUR- BID- ITY (NTU) (00076) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | COLI- FORM, FECAL, O.7 UM-MF (COLS./ 100 ML) (31625) | STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673) |
|-----------|------|--|--|---|--|--|---|--|---|---|---|
| OCT 28... | 1230 | 38 | 1850 | 8.5 | 9.5 | 7.0 | 62 | 11.0 | 90 | 55 | 427 |
| NOV 23... | 1310 | 31 | 2040 | -- | - .9 | .5 | -- | -- | -- | -- | -- |
| DEC 08... | 1315 | 21 | 2900 | 8.1 | -1 .9 | .0 | -- | 11.5 | 79 | 5 | 102 |
| 27... | 1345 | 13 | 3000 | -- | -1 .9 | .0 | -- | -- | -- | -- | -- |
| JAN 26... | 1230 | 20 | 3150 | 8.9 | .0 | .0 | -- | 9.2 | 63 | -- | -- |
| FEB 27... | 1650 | 160 | 1300 | 8.4 | - .9 | .0 | -- | 17.0 | 115 | -- | -- |
| MAR 08... | 1415 | 74 | 1940 | 8.7 | - .9 | .0 | 8.5 | 11.9 | 81 | -- | -- |
| 23... | 1710 | 895 | 530 | -- | 13.0 | 1.0 | -- | -- | -- | -- | -- |
| 28... | 1430 | 426 | 910 | 8.5 | 5.0 | 1.0 | 160 | 12.0 | 84 | 100 | 4500 |
| APR 13... | 1220 | 246 | 1250 | -- | 5.0 | 6.0 | -- | -- | -- | -- | -- |
| MAY 29... | 1330 | 103 | 2450 | 8.5 | 21.0 | 18.0 | 7.4 | 10.2 | 107 | 34 | 47 |
| JUL 10... | 1230 | 208 | 1720 | 8.4 | -- | 27.0 | -- | 8.2 | 104 | -- | -- |
| 24... | 1650 | 63 | -- | -- | -- | 25.0 | -- | -- | -- | -- | -- |
| AUG 15... | 1250 | 154 | 1430 | 8.4 | 30.0 | 24.0 | 25 | 8.6 | 102 | -- | -- |
| SEP 25... | 1405 | 33 | 1530 | 8.3 | 4.0 | 3.0 | -- | 11.4 | 84 | -- | -- |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|-----------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| OCT 28... | 440 | 104 | 73 | 62 | 270 | 57 | 6 | 11 | 335 | 2.0 | 710 | 11 |
| MAR 08... | 530 | 189 | 92 | 72 | 240 | 49 | 5 | 9.9 | 339 | 1.3 | 720 | 10 |
| 28... | 240 | 79 | 44 | 31 | 100 | 47 | 3 | 7.3 | 159 | 1.0 | 290 | 5.5 |
| MAY 29... | 750 | 441 | 120 | 110 | 330 | 48 | 5 | 10 | 314 | 1.9 | 1100 | 16 |
| AUG 15... | 400 | 187 | 69 | 55 | 180 | 48 | 4 | 14 | 213 | 1.6 | 550 | 7.9 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS PO4) (71886) |
|-----------|---|--|---|--|--|--|--|--|---|--|---|
| OCT 28... | .40 | 4.6 | 1320 | 1300 | 1.8 | 135 | <.10 | .08 | 1.3 | .030 | .09 |
| MAR 08... | .30 | 4.7 | 1390 | 1400 | 1.9 | 278 | <.10 | .10 | 1.2 | .050 | .15 |
| 28... | .20 | 4.8 | 612 | 580 | .83 | 704 | .19 | .17 | 2.1 | .310 | .95 |
| MAY 29... | .30 | 5.7 | 1920 | 1900 | 2.6 | 534 | <.10 | .08 | 1.0 | .030 | -- |
| AUG 15... | .30 | 8.3 | 1050 | 1000 | 1.4 | 437 | <.10 | .08 | 1.0 | .060 | -- |

06354000 CANNONBALL RIVER AT BREIEN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COBALT, DIS- SOLVED (UG/L AS CO) (01035) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) |
|--------------|---|--|--|---|--|---|--|--|---|---|---|
| OCT 28... | <.010 | <.010 | -- | 20 | 1 | 73 | <1 | <1 | <3 | 2 | 12 |
| MAR 08... | .020 | .030 | .09 | 10 | 1 | 47 | <1 | <1 | <3 | 1 | 34 |
| 28... | .070 | .030 | .09 | <10 | <1 | 37 | <1 | <1 | <3 | 5 | 18 |
| MAY 29... | .020 | .020 | .06 | <10 | <1 | 200 | <1 | <1 | <1 | <1 | 10 |
| AUG 15... | .010 | <.010 | -- | 10 | 1 | 69 | <1 | <1 | <3 | 3 | <3 |
| DATE | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | SILVER, DIS- SOLVED (UG/L AS AG) (01075) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
| OCT 28... | <1 | 76 | 7 | .1 | <10 | 5 | <1 | <1 | 980 | <6 | 12 |
| MAR 08... | <1 | 63 | 20 | <.1 | <10 | 1 | 1 | <1 | 1100 | <6 | 78 |
| 28... | 3 | 36 | 27 | .1 | <10 | 2 | <1 | <1 | 520 | <6 | 7 |
| MAY 29... | 3 | 70 | 20 | .2 | 4 | 4 | 1 | <1 | 1700 | 2 | <10 |
| AUG 15... | 2 | 59 | 6 | .1 | <10 | 2 | <1 | <1 | 890 | <6 | 7 |
| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155) | SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331) | | | | | | |
| OCT 28... | 1230 | 38 | 164 | 17 | 100 | | | | | | |
| MAR 08... | 1415 | 74 | 22 | 4.4 | 99 | | | | | | |
| 28... | 1430 | 426 | 672 | 773 | 90 | | | | | | |
| MAY 29... | 1330 | 103 | 19 | 5.3 | 99 | | | | | | |
| AUG 15... | 1250 | 154 | 46 | 19 | 99 | | | | | | |
| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | | | | |
| MAY 29... | 1330 | 5.00 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1332 | 10.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1334 | 15.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1336 | 20.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1338 | 25.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1340 | 30.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1342 | 35.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1344 | 40.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1346 | 45.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1348 | 50.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1350 | 55.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1352 | 60.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1354 | 65.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1356 | 70.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |
| 29... | 1358 | 75.0 | .00 | 18.0 | 2450 | 8.5 | 10.2 | | | | |

CANNONBALL RIVER BASIN

06354000 CANNONBALL RIVER AT BREIEN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (000009) | DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015) | TEMPER- ATURE (DEG C) (00010) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) |
|-------|------|---|---|--|--|---|--|
| AUG | | | | | | | |
| 15... | 1430 | 100 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1432 | 95.0 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1434 | 90.0 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1436 | 85.0 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1438 | 80.0 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1440 | 75.0 | .00 | 25.5 | 1430 | 8.4 | 8.5 |
| 15... | 1442 | 70.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1444 | 65.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1446 | 60.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1448 | 55.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1450 | 50.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1452 | 45.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1454 | 40.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1456 | 35.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1458 | 30.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1500 | 25.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1502 | 20.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1504 | 15.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1506 | 10.0 | .00 | 25.5 | 1430 | 8.4 | 8.6 |
| 15... | 1508 | 5.00 | .00 | 25.5 | 1430 | 8.4 | 8.6 |

BEAVER CREEK BASIN

285

06354500 BEAVER CREEK AT LINTON, ND

LOCATION.--Lat 46°15'27", long 100°13'58", on line between secs.17 and 18, T.132 N., R.76 W., Emmons County, Hydrologic Unit 10130104, on left bank 60 ft downstream from bridge on U.S. Highway 83, 0.7 mi south of railway station in Linton, and 1 mi upstream from Spring Creek.

DRAINAGE AREA.--717 mi², of which about 100 mi² is probably noncontributing.

PERIOD OF RECORD.--August 1949 to current year.

REVISED RECORDS.--WSP 1209: Drainage area. WSP 1239: 1950(M).

GAGE.--Water-stage recorder. Datum of gage is 1,690.55 ft National Geodetic Vertical Datum of 1929. Prior to June 18, 1958, nonrecording gage at site 60 ft upstream at same datum.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--35 years, 41.0 ft³/s, 29,700 acre-ft/yr; median of yearly mean discharges, 27 ft³/s, 19,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,800 ft³/s Apr. 8, 1952, gage height, 17.50 ft; no flow at times in some years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Feb. 21 | --- | a 250 | --- | | | | |
| Mar. 24 | 1315 | *a1100 | b13.3 | June 19 | 1400 | 431 | 10.51 |

No flow for several days.

a - About

b - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|-------|---------|-------|------|--------|--------|--------|--------|-------|
| 1 | .02 | .18 | 1.8 | 1.1 | .65 | 70 | 200 | 122 | 7.6 | 108 | 4.5 | 1.9 |
| 2 | .00 | .20 | 1.7 | 1.2 | .70 | 50 | 178 | 119 | 7.4 | 105 | 3.8 | 1.7 |
| 3 | .00 | .25 | 1.5 | 1.3 | .70 | 40 | 165 | 102 | 8.0 | 107 | 5.5 | 1.6 |
| 4 | .00 | .26 | 1.5 | 1.3 | .64 | 30 | 151 | 96 | 9.0 | 108 | 10 | 1.4 |
| 5 | .00 | .45 | 1.5 | 1.2 | .54 | 25 | 139 | 89 | 10 | 92 | 68 | 1.3 |
| 6 | .00 | 1.0 | 1.4 | 1.2 | .60 | 18 | 128 | 81 | 11 | 73 | 170 | 1.2 |
| 7 | .00 | 1.2 | 1.4 | 1.1 | 1.0 | 16 | 120 | 73 | 12 | 58 | 142 | 1.1 |
| 8 | .00 | 1.1 | 1.4 | 1.0 | 2.0 | 15 | 111 | 68 | 12 | 48 | 129 | .96 |
| 9 | .00 | 1.1 | 1.3 | .90 | 5.0 | 14 | 103 | 65 | 12 | 40 | 116 | .91 |
| 10 | .00 | .99 | 1.3 | .90 | 10 | 13 | 97 | 62 | 13 | 33 | 104 | .90 |
| 11 | .00 | .95 | 1.3 | .80 | 15 | 15 | 90 | 57 | 15 | 54 | 89 | .81 |
| 12 | .00 | 1.0 | 1.3 | .70 | 18 | 18 | 87 | 55 | 19 | 71 | 53 | .82 |
| 13 | .00 | 1.3 | 1.3 | .70 | 19 | 15 | 90 | 50 | 22 | 32 | 26 | .80 |
| 14 | .00 | 1.7 | 1.2 | .70 | 18 | 12 | 96 | 43 | 24 | 22 | 17 | .76 |
| 15 | .03 | 2.9 | 1.2 | .70 | 17 | 14 | 109 | 35 | 30 | 18 | 13 | .71 |
| 16 | .07 | 3.3 | 1.1 | .70 | 15 | 20 | 102 | 30 | 42 | 16 | 11 | .71 |
| 17 | .01 | 3.0 | 1.1 | .60 | 14 | 19 | 93 | 25 | 80 | 15 | 9.8 | .71 |
| 18 | .00 | 2.8 | 1.1 | .50 | 13 | 18 | 85 | 20 | 242 | 12 | 8.6 | .74 |
| 19 | .00 | 2.6 | 1.1 | .48 | 20 | 20 | 76 | 17 | 349 | 11 | 7.2 | .76 |
| 20 | .00 | 2.7 | 1.1 | .45 | 50 | 80 | 69 | 18 | 234 | 10 | 6.7 | .69 |
| 21 | .03 | 2.7 | 1.1 | .45 | 200 | 600 | 65 | 20 | 198 | 9.8 | 5.4 | .62 |
| 22 | .03 | 2.7 | 1.1 | .50 | 150 | 500 | 60 | 20 | 216 | 8.9 | 4.8 | .66 |
| 23 | .02 | 2.8 | 1.1 | .52 | 130 | 850 | 57 | 18 | 154 | 8.4 | 4.4 | .81 |
| 24 | .05 | 2.7 | 1.0 | .52 | 120 | 1000 | 54 | 16 | 121 | 8.2 | 4.2 | 1.3 |
| 25 | .06 | 2.6 | 1.0 | .52 | 130 | 900 | 51 | 14 | 106 | 7.9 | 4.0 | 1.2 |
| 26 | .09 | 2.5 | 1.0 | .54 | 140 | 600 | 54 | 12 | 96 | 7.6 | 3.8 | 1.2 |
| 27 | .11 | 2.1 | 1.0 | .54 | 150 | 330 | 61 | 11 | 85 | 7.3 | 3.4 | 1.3 |
| 28 | .14 | 2.0 | 1.0 | .56 | 135 | 280 | 65 | 10 | 74 | 6.9 | 3.1 | 1.6 |
| 29 | .14 | 1.9 | 1.0 | .56 | 100 | 250 | 81 | 9.0 | 63 | 6.6 | 2.7 | 1.9 |
| 30 | .17 | 1.9 | 1.0 | .58 | --- | 230 | 90 | 8.5 | 65 | 5.5 | 2.3 | 2.0 |
| 31 | .15 | --- | 1.0 | .58 | --- | 215 | --- | 8.0 | --- | 5.0 | 2.1 | --- |
| TOTAL | 1.12 | 52.88 | 37.9 | 23.40 | 1475.83 | 6277 | 2927 | 1373.5 | 2337.0 | 1115.1 | 1034.3 | 33.07 |
| MEAN | .04 | 1.76 | 1.22 | .75 | 50.9 | 202 | 97.6 | 44.3 | 77.9 | 36.0 | 33.4 | 1.10 |
| MAX | .17 | 3.3 | 1.8 | 1.3 | 200 | 1000 | 200 | 122 | 349 | 108 | 170 | 2.0 |
| MIN | .00 | .18 | 1.0 | .45 | .54 | 12 | 51 | 8.0 | 7.4 | 5.0 | 2.1 | .62 |
| AC-FT | 2.2 | 105 | 75 | 46 | 2930 | 12450 | 5810 | 2720 | 4640 | 2210 | 2050 | 66 |
| CAL YR 1983 | TOTAL | 5395.52 | | MEAN | 14.8 | MAX | 150 | MIN | .00 | AC-FT | 10700 | |
| WTR YR 1984 | TOTAL | 16688.10 | | MEAN | 45.6 | MAX | 1000 | MIN | .00 | AC-FT | 33100 | |

BEAVER CREEK BASIN

06354500 BEAVER CREEK AT LINTON, ND--CONTINUED

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) |
|--------------|------|--|--|---|--|--|---|--|---|---|---|
| NOV 14... | 1125 | 1.7 | 1040 | -- | .0 | 3.0 | -- | -- | -- | -- | -- |
| DEC 22... | 1145 | 1.0 | 1280 | -- | -23.0 | .5 | -- | -- | -- | -- | -- |
| JAN 30... | 1220 | .58 | 1420 | -- | -5.0 | .0 | -- | -- | -- | -- | -- |
| FEB 23... | 1240 | 130 | -- | -- | -3.0 | .5 | -- | -- | -- | -- | -- |
| 28... | 1333 | 136 | 240 | -- | -3.0 | .0 | -- | -- | -- | -- | -- |
| MAR 15... | 1420 | 14 | 510 | -- | -1.5 | .0 | -- | -- | -- | -- | -- |
| 21... | 1350 | 597 | 150 | 6.7 | 5.0 | 1.0 | 44 | 5 | 11 | 4.0 | 11 |
| APR 02... | 1625 | 177 | 550 | -- | 9.0 | 6.0 | -- | -- | -- | -- | -- |
| 12... | 1230 | 88 | 580 | -- | -- | 8.0 | -- | -- | -- | -- | -- |
| JUN 13... | 1325 | 22 | 850 | -- | 22.0 | 19.5 | -- | -- | -- | -- | -- |
| JUL 13... | 1200 | 30 | 535 | -- | 28.0 | 24.0 | -- | -- | -- | -- | -- |
| AUG 16... | 1330 | 11 | 640 | -- | 30.0 | 24.5 | -- | -- | -- | -- | -- |
| SEP 24... | 1315 | 1.4 | 885 | 8.0 | 3.5 | 4.0 | 320 | 0 | 74 | 32 | 81 |

| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) |
|------|------------------------------|--|--|---|--|--|--|--|--|---|
|------|------------------------------|--|--|---|--|--|--|--|--|---|

| | | | | | | | | | | |
|--------------|----|----|-----|-----|------|-----|-----|-----|-----|-----|
| MAR 21... | 31 | .7 | 7.3 | 47 | .000 | 39 | 15 | 33 | 1.9 | .10 |
| SEP 24... | 35 | 2 | 13 | 400 | .000 | 320 | 6.3 | 170 | 10 | .20 |

| DATE | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BARIUM, DIS- SOLVED (UG/L AS BA) (01005) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|------|--|---|--|--|--|--|---|---|---|---|
|------|--|---|--|--|--|--|---|---|---|---|

| | | | | | | | | | | |
|--------------|-----|-----|-----|-----|-----|------|------|---|----|-----|
| MAR 21... | 4.5 | 82 | 96 | .11 | 132 | -- | -- | 0 | -- | 60 |
| SEP 24... | 18 | 587 | 580 | .80 | 2.2 | <.10 | .100 | 4 | 80 | 230 |

| DATE | COPPER, DIS- SOLVED (UG/L AS CU) (01040) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|------|---|---|---|---|---|---|--|---|---|
|------|---|---|---|---|---|---|--|---|---|

| | | | | | | | | | |
|--------------|----|-----|---|-----|-----|-----|----|-----|----|
| MAR 21... | -- | 100 | 0 | 12 | 80 | .4 | 0 | 0 | -- |
| SEP 24... | 1 | 6 | 4 | 110 | 170 | <.1 | <1 | 380 | 4 |

GRAND RIVER BASIN

287

06354988 BOWMAN-HALEY LAKE NEAR HALEY, ND

LOCATION.--Lat 45°59'06", long 103°14'43", in NE1/4 sec.24, T.129 N., R.101 W., Bowman County, Hydrologic Unit 10130301, at dam on North Fork Grand River, and 6 mi west of Haley.

DRAINAGE AREA.--446 mi², approximately.

PERIOD OF RECORD.--August 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is at National Geodetic Vertical Datum of 1929.

REMARKS.--Reservoir is formed by a rolled earth-fill dam; storage began Aug. 22, 1966; dam completed April 1967. Total capacity is 93,000 acre-ft at maximum pool, elevation, 2,777.0 ft. Dead storage is 4,280 acre-ft below lowest point of outlet, elevation, 2,740.0 ft. Normal operating storage is 20,100 acre-ft at elevation 2,755.0 ft, crest of spillway. Figures given herein represent total contents. Controlled releases are through a 30-inch or 8-inch gate valve. The spillway is uncontrolled "glory hole" type and discharges through a conduit 9 ft in diameter. The reservoir is for flood control, water supply, and recreation.

COOPERATION.--Records of elevations and contents furnished by Corps of Engineers from capacity table dated August 1966. Elevations affected by wind.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 37,540 acre-ft Mar. 28, 1978, elevation, 2,762.66 ft; minimum since first reaching spillway level, 12,660 acre-ft Sept. 16-20, 1982, elevation, 2,749.93 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 21,850 acre-ft Mar. 15-16, elevation, 2,755.94 ft; minimum, 17,840 acre-ft Sept. 30, elevation, 2,753.64 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 2,753.90 | 18,250 | -- |
| Oct. 31----- | 2,753.80 | 18,090 | -160 |
| Nov. 30----- | 2,753.80 | 18,090 | 0 |
| Dec. 31----- | 2,753.98 | 18,380 | +290 |
| CAL YR 1983----- | -- | -- | -2,000 |
| Jan. 31----- | 2,754.00 | 18,410 | +30 |
| Feb. 29----- | 2,754.23 | 18,800 | +390 |
| Mar. 31----- | 2,754.46 | 19,200 | +400 |
| Apr. 30----- | 2,754.72 | 19,640 | +440 |
| May 31----- | 2,755.21 | 20,510 | +870 |
| June 30----- | 2,755.47 | 20,980 | +470 |
| July 31----- | 2,754.81 | 19,800 | -1,180 |
| Aug. 31----- | 2,754.04 | 18,480 | -1,320 |
| Sept. 30----- | 2,753.64 | 17,840 | -640 |
| WTR YR 1984----- | -- | -- | -410 |

GRAND RIVER BASIN

06355000 NORTH FORK GRAND RIVER AT HALEY, ND

LOCATION.--Lat 45°57'39", long 103°07'09", at southwest corner of sec.30, T.129 N., R.99 W., Bowman County, Hydrologic Unit 10130301, on left bank 10 ft downstream from county highway bridge, 300 ft south of post office at Haley, and 1 mi north of South Dakota state line.

DRAINAGE AREA.--509 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1908 to September 1917, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1239: 1908-10, 1913-15(M), 1917(M).

GAGE.--Water-stage recorder. Datum of gage is 2,658.60 ft National Geodetic Vertical Datum of 1929. Oct. 23, 1945, to June 18, 1951, nonrecording gage on downstream side of bridge near left abutment at present datum. See WSP 1729 or 1917 for history of changes prior to Oct. 23, 1945.

REMARKS.--Records fair. Flow regulated since August 1966 by Bowman-Haley Lake (station 06354988) 8 mi upstream.

AVERAGE DISCHARGE.--48 years, 27.8 ft³/s, 20,100 acre-ft/yr; median of yearly mean discharges, 21 ft³/s, 15,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,100 ft³/s Apr. 7, 1952, gage height, 17.03 ft, from rating curve extended above 4,500 ft³/s on basis of discharge measurement at gage height, 15.09 ft, half of which was indirect measurement of flow over roadway outside of main channel; maximum gage height, 17.10 ft Apr. 15, 1950; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 93 ft³/s May 7, gage height, 6.05 ft; minimum daily discharge, 0.64 ft³/s Sept. 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|------|------|------|--------|-------|-------|-------|-------|
| 1 | 2.2 | 1.9 | 1.8 | .95 | 1.6 | 2.0 | 1.8 | 25 | 7.0 | 19 | 1.1 | .71 |
| 2 | 2.3 | 1.9 | 1.8 | 1.2 | 1.6 | 2.0 | 1.8 | 21 | 5.5 | 17 | 1.1 | .71 |
| 3 | 2.1 | 1.9 | 1.8 | 1.4 | 1.6 | 2.1 | 1.7 | 19 | 5.2 | 15 | 1.5 | .71 |
| 4 | 1.8 | 1.9 | 1.9 | 1.5 | 1.5 | 2.1 | 1.6 | 19 | 4.6 | 13 | 1.5 | .71 |
| 5 | 1.5 | 2.0 | 1.9 | 1.5 | 1.5 | 2.1 | 1.6 | 28 | 4.5 | 12 | 1.4 | .68 |
| 6 | 1.5 | 2.0 | 1.9 | 1.5 | 1.5 | 2.1 | 1.4 | 68 | 4.2 | 11 | 1.2 | .64 |
| 7 | 1.7 | 2.0 | 1.9 | 1.3 | 1.6 | 2.2 | 1.3 | 88 | 5.9 | 9.7 | 1.5 | .68 |
| 8 | 1.7 | 2.3 | 1.8 | 1.2 | 1.6 | 2.2 | 1.5 | 88 | 6.7 | 9.4 | 1.5 | .69 |
| 9 | 1.4 | 2.3 | 1.8 | 1.1 | 1.7 | 2.2 | 1.7 | 85 | 8.5 | 9.0 | 1.4 | .84 |
| 10 | 1.4 | 2.6 | 1.9 | 1.1 | 1.7 | 2.2 | 1.8 | 81 | 7.3 | 7.6 | .90 | 1.2 |
| 11 | 1.3 | 2.5 | 1.9 | 1.0 | 1.7 | 2.2 | 2.4 | 73 | 7.0 | 6.8 | .87 | 1.2 |
| 12 | 1.1 | 2.4 | 1.9 | 1.1 | 1.7 | 2.2 | 2.9 | 64 | 7.5 | 5.9 | 1.0 | 1.0 |
| 13 | 1.1 | 2.4 | 1.9 | 1.0 | 1.7 | 2.2 | 2.6 | 58 | 11 | 5.5 | 1.0 | .97 |
| 14 | 1.0 | 2.4 | 1.9 | 1.0 | 1.7 | 2.3 | 2.7 | 49 | 10 | 5.2 | 1.0 | .95 |
| 15 | .93 | 2.3 | 1.8 | .95 | 1.8 | 2.3 | 2.7 | 41 | 12 | 5.1 | .89 | 1.0 |
| 16 | .83 | 2.3 | 1.7 | .95 | 1.8 | 2.2 | 2.8 | 38 | 13 | 4.1 | .71 | 1.0 |
| 17 | 1.1 | 2.3 | 1.6 | .90 | 1.8 | 2.2 | 3.1 | 37 | 13 | 3.5 | .71 | .96 |
| 18 | 1.2 | 2.2 | 1.6 | .90 | 1.8 | 2.2 | 2.6 | 29 | 13 | 3.4 | .77 | 1.0 |
| 19 | 1.1 | 2.3 | 1.3 | .85 | 1.8 | 2.2 | 2.6 | 17 | 13 | 3.3 | .79 | .89 |
| 20 | 1.0 | 2.2 | 1.2 | .85 | 1.7 | 2.3 | 2.5 | 15 | 14 | 3.1 | .79 | .79 |
| 21 | .99 | 2.1 | 1.2 | .95 | 1.9 | 2.3 | 2.4 | 14 | 26 | 2.7 | .79 | .79 |
| 22 | .98 | 2.1 | 1.2 | 1.2 | 1.9 | 2.2 | 2.3 | 18 | 27 | 2.5 | .79 | .79 |
| 23 | 1.1 | 2.1 | 1.1 | 1.6 | 2.0 | 2.2 | 2.3 | 17 | 35 | 2.1 | .79 | .89 |
| 24 | 1.4 | 2.3 | 1.0 | 1.7 | 1.9 | 2.2 | 2.3 | 13 | 36 | 2.1 | .79 | 1.2 |
| 25 | 1.4 | 2.2 | 1.0 | 1.5 | 2.0 | 2.2 | 2.3 | 12 | 36 | 2.1 | .79 | 1.3 |
| 26 | 1.6 | 2.0 | 1.0 | 1.7 | 2.0 | 2.2 | 2.7 | 9.9 | 38 | 1.9 | .79 | 1.3 |
| 27 | 1.6 | 1.9 | 1.0 | 1.7 | 1.9 | 2.1 | 5.3 | 9.4 | 35 | 1.6 | .78 | 1.3 |
| 28 | 1.9 | 1.9 | 1.0 | 2.1 | 1.9 | 2.1 | 5.3 | 8.4 | 31 | 1.5 | .71 | 1.2 |
| 29 | 2.0 | 1.9 | 1.0 | 2.3 | 1.9 | 2.1 | 9.8 | 8.2 | 26 | 1.4 | .71 | 1.1 |
| 30 | 2.1 | 1.8 | .95 | 1.9 | --- | 2.0 | 21 | 7.0 | 23 | 1.3 | .71 | .95 |
| 31 | 2.0 | --- | .90 | 1.5 | --- | 1.8 | --- | 6.5 | --- | 1.2 | .71 | --- |
| TOTAL | 45.33 | 64.4 | 46.65 | 40.40 | 50.8 | 66.9 | 98.8 | 1066.4 | 485.9 | 189.0 | 29.99 | 28.15 |
| MEAN | 1.46 | 2.15 | 1.50 | 1.30 | 1.75 | 2.16 | 3.29 | 34.4 | 16.2 | 6.10 | .97 | .94 |
| MAX | 2.3 | 2.6 | 1.9 | 2.3 | 2.0 | 2.3 | 21 | 88 | 38 | 19 | 1.5 | 1.3 |
| MIN | .83 | 1.8 | .90 | .85 | 1.5 | 1.8 | 1.3 | 6.5 | 4.2 | 1.2 | .71 | .64 |
| AC-FT | 90 | 128 | 93 | 80 | 101 | 133 | 196 | 2120 | 964 | 375 | 59 | 56 |
| CAL YR 1983 | TOTAL | 5715.95 | | MEAN | 15.7 | MAX | 172 | MIN | .58 | AC-FT | 11340 | |
| WTR YR 1984 | TOTAL | 2212.72 | | MEAN | 6.05 | MAX | 88 | MIN | .64 | AC-FT | 4390 | |

06355000 NORTH FORK GRAND RIVER AT HALEY, ND--CONTINUED

PERIOD OF RECORD.--Water years 1951, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| OCT 11... | 1645 | 1.3 | 2750 | 8.4 | 6.0 | 9.0 | -- | -- | -- | -- | -- | |
| DEC 07... | 1550 | 1.8 | 3260 | -- | -9.0 | .0 | -- | -- | -- | -- | -- | |
| JAN 20... | 1155 | .83 | 3290 | -- | 13.0 | .0 | -- | -- | -- | -- | -- | |
| MAR 08... | 1620 | 2.1 | 2270 | 8.1 | -- | 1.0 | 340 | 0 | 64 | 44 | 410 | |
| APR 12... | 1250 | 2.8 | 2150 | -- | 12.0 | 9.0 | -- | -- | -- | -- | -- | |
| MAY 07... | 1515 | 93 | 2270 | 8.8 | 9.5 | 9.5 | -- | -- | -- | -- | -- | |
| JUN 06... | 1630 | 4.2 | 2410 | 8.4 | 26.0 | 21.5 | -- | -- | -- | -- | -- | |
| JUL 11... | 1630 | 6.4 | 2450 | 8.5 | 34.0 | 26.5 | -- | -- | -- | -- | -- | |
| AUG 01... | 1645 | .94 | 2770 | 8.4 | -- | 23.0 | 380 | 0 | 61 | 55 | 500 | |
| SEP 05... | 1520 | .67 | 3080 | -- | 30.0 | 19.0 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 08... | 72 | 10 | 9.5 | 500 | .000 | 410 | 6.3 | 880 | 5.2 | .60 | 5.7 | 1680 |
| AUG 01... | 73 | 11 | 12 | 580 | .000 | 480 | 3.7 | 1000 | 11 | .60 | 8.0 | 2030 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 08... | 1700 | 2.3 | 9.6 | 1 | 1100 | 20 | 2 | 47 | 180 | .3 | 1 | 950 |
| AUG 01... | 1900 | 2.8 | 5.2 | 3 | 1100 | 40 | 1 | 70 | 10 | .2 | 3 | 860 |

GRAND RIVER BASIN

06355310 BUFFALO CREEK TRIBUTARY NEAR GASCOYNE, ND

LOCATION.--Lat 46°06'40", long 103°02'20", in SE1/4NE1/4 sec.3, T.130 N., R.99 W., Bowman County, Hydrologic Unit 10130301, on left bank 46 ft downstream from Chicago, Milwaukee, St. Paul, Pacific Railway bridge, and 1.8 mi east of Gascoyne.

DRAINAGE AREA.--15.7 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to current year.

REVISED RECORDS.--WDR ND-76-1: 1975.

GAGE.--Water-stage recorder. Altitude of gage is 2,725 ft, from topographic map.

REMARKS.--Records fair. Some regulation by strip mine above station.

AVERAGE DISCHARGE.--10 years, 1.29 ft³/s, 935 acre-ft/yr; median of yearly mean discharges, 1.0 ft³/s, 720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 100 ft³/s May 9, 1975, gage height, 8.41 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 9.2 ft³/s June 22, gage height, 6.84 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|--------|-----|------|-------|-------|-------|-------|-------|-------|-----|-----|
| 1 | .00 | .00 | .00 | .00 | 3.0 | .13 | 1.1 | .95 | 2.6 | .04 | .01 | .00 |
| 2 | .00 | .00 | .01 | .00 | 2.0 | .12 | 1.7 | .54 | 2.7 | .00 | .01 | .00 |
| 3 | .00 | .00 | .01 | .00 | 1.0 | .24 | 2.3 | 1.5 | 3.4 | .16 | .01 | .00 |
| 4 | .00 | .00 | .01 | .00 | .50 | .32 | 2.8 | 2.5 | .82 | .05 | .01 | .00 |
| 5 | .00 | .00 | .01 | .00 | .30 | .28 | 3.3 | .93 | .45 | .01 | .01 | .00 |
| 6 | .00 | .00 | .02 | .00 | .40 | .28 | 4.3 | .76 | .33 | .00 | .01 | .00 |
| 7 | .00 | .00 | .02 | .00 | .66 | .25 | 4.1 | .93 | .04 | .01 | .00 | .00 |
| 8 | .00 | .00 | .02 | .00 | .65 | .14 | 3.4 | .56 | .15 | .03 | .01 | .00 |
| 9 | .00 | .00 | .02 | .00 | .69 | .10 | 2.7 | .23 | .17 | .00 | .01 | .00 |
| 10 | .00 | .00 | .02 | .00 | .70 | .07 | 2.4 | .08 | .64 | 1.4 | .01 | .00 |
| 11 | .00 | .00 | .01 | .00 | .68 | .05 | 2.6 | .11 | .12 | .00 | .01 | .00 |
| 12 | .00 | .00 | .01 | .00 | .72 | .03 | .35 | .17 | .02 | .00 | .01 | .00 |
| 13 | .00 | .00 | .01 | .00 | 1.6 | .02 | .03 | .31 | .15 | .00 | .24 | .00 |
| 14 | .00 | .00 | .01 | .00 | 2.6 | .03 | .02 | .84 | .24 | .00 | .24 | .00 |
| 15 | .00 | .00 | .01 | .00 | 2.5 | .06 | .11 | .87 | .09 | .02 | .12 | .00 |
| 16 | .00 | .00 | .00 | .00 | 1.6 | .06 | 1.0 | .84 | .07 | .07 | .05 | .00 |
| 17 | .00 | .00 | .00 | .00 | 1.3 | .03 | .77 | .06 | .30 | .01 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .97 | .01 | .04 | .14 | .24 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .61 | .02 | .03 | .24 | .11 | .01 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .57 | .18 | .03 | 1.1 | .06 | .01 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .78 | .38 | .04 | 2.5 | 2.5 | .01 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | 1.2 | .26 | .27 | 1.5 | 5.5 | .01 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | 1.1 | .50 | .65 | 1.7 | 1.8 | .01 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | 1.2 | 2.1 | .63 | 1.5 | .17 | .01 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .95 | 4.8 | .67 | 1.5 | .17 | .01 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .59 | 3.7 | 1.1 | 1.7 | .11 | .01 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .35 | 3.1 | 1.4 | 4.1 | .00 | .01 | .00 | .00 |
| 28 | .00 | .00 | .00 | .25 | .20 | .44 | .06 | 4.0 | .21 | .01 | .00 | .00 |
| 29 | .00 | .00 | .00 | 2.0 | .15 | .15 | 1.0 | 1.9 | .00 | .01 | .00 | .00 |
| 30 | .00 | .00 | .00 | 3.0 | --- | .42 | 1.7 | 1.3 | .00 | .01 | .00 | .00 |
| 31 | .00 | --- | .00 | 3.5 | --- | .75 | --- | 1.9 | --- | .01 | .00 | --- |
| TOTAL | .00 | .00 | .19 | 8.75 | 29.57 | 19.02 | 40.60 | 37.26 | 23.16 | 1.93 | .76 | .00 |
| MEAN | .00 | .00 | .01 | .28 | 1.02 | .61 | 1.35 | 1.20 | .77 | .06 | .02 | .00 |
| MAX | .00 | .00 | .02 | 3.5 | 3.0 | 4.8 | 4.3 | 4.1 | 5.5 | 1.4 | .24 | .00 |
| MIN | .00 | .00 | .00 | .00 | .15 | .01 | .02 | .06 | .00 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .4 | 17 | 59 | 38 | 81 | 74 | 46 | 3.8 | 1.5 | .00 |
| CAL YR 1983 | TOTAL | 249.94 | | MEAN | .68 | MAX | 31 | MIN | .00 | AC-FT | 496 | |
| WTR YR 1984 | TOTAL | 161.24 | | MEAN | .44 | MAX | 5.5 | MIN | .00 | AC-FT | 320 | |

GRAND RIVER BASIN

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06355310 BUFFALO CREEK TRIBUTARY NEAR GASCOYNE, ND--CONTINUED

PERIOD OF RECORD.--Water years 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) |
|--------------|--|--|---|---|---|--|--|---|---|---|
| DEC 08... | 1150 | .02 | 6950 | 7.9 | -1 .9 | .0 | 6.6 | 51 | 1700 | 992 |
| MAR 09... | 1110 | .10 | 5950 | 8.2 | - .9 | 1.0 | 21.0 | 105000 | 1500 | 977 |
| JUN 05... | 1330 | .44 | 4800 | 8.5 | 20.5 | 18.0 | 9.6 | 116 | 680 | 124 |
| AUG 03... | 1500 | .01 | 5000 | 9.0 | 28.0 | 25.0 | 13.2 | -- | -- | -- |
| DATE | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
| DEC 08... | 210 | 280 | 1300 | 62 | 14 | 19 | 687 | 17 | 3800 | 24 |
| MAR 09... | 210 | 240 | 1000 | 59 | 11 | 14 | 537 | 6.5 | 3200 | 16 |
| JUN 05... | 91 | 110 | 940 | 75 | 16 | 13 | 557 | 3.4 | 2300 | 17 |
| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610) | NITRO- GEN, ORGANIC TOTAL (MG/L AS N) (00605) | NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625) |
| DEC 08... | 1.2 | 7.7 | 6170 | 6100 | 8.4 | .33 | <.10 | .070 | 1.9 | 2.0 |
| MAR 09... | .80 | 6.5 | 4850 | 5000 | 6.6 | 1.3 | <.10 | .040 | 1.6 | 1.6 |
| JUN 05... | 1.2 | 9.3 | 3890 | 3800 | 5.3 | 4.6 | <.10 | .050 | 1.4 | 1.4 |
| DATE | NITRO- GEN,NH4 + ORG. SUSP. TOTAL (MG/L AS N) (00624) | NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS TOTAL (MG/L AS P04) (71886) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | CADMIUM DIS- SOLVED (UG/L AS CD) (01025) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030) | COPPER, DIS- SOLVED (UG/L AS CU) (01040) |
| DEC 08... | .70 | 1.3 | .070 | .21 | .010 | 1 | 3500 | <1 | 10 | 5 |
| MAR 09... | .50 | 1.1 | .060 | .18 | .020 | -- | 2700 | -- | -- | -- |
| JUN 05... | -- | 1.4 | .300 | -- | .040 | 2 | 2100 | 1 | <10 | 1 |

06355310 BUFFALO CREEK TRIBUTARY NEAR GASCOYNE, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | NICKEL, DIS- SOLVED (UG/L AS NI) (01065) | NICKEL, SUS- PENDE RECOV- ERABLE (UG/L AS NI) (01066) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092) | ZINC, SUS- PENDE RECOV- ERABLE (UG/L AS ZN) (01091) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|--------------|---|---|--|--|---|--|---|---|--|---|
| DEC 08... | 70 | 2 | 480 | <.1 | 6 | 11 | 1 | 30 | 10 | 20 |
| MAR 09... | 110 | -- | 420 | -- | -- | -- | -- | -- | -- | -- |
| JUN 05... | 70 | <1 | 30 | <.1 | <1 | -- | <1 | 20 | -- | 20 |
| DATE | GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030) | GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040) | GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515) | GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137) (03516) | GROSS BETA, DIS- SOLVED (PCI/L AS SR/ YT-90) (80050) | GROSS BETA, SUSP. TOTAL (PCI/L AS SR/ YT-90) (80060) | CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681) | CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689) | CYANIDE TOTAL (MG/L AS CN) (00720) | |
| DEC 08... | <160 | <1.3 | <72 | 3.4 | <62 | 3.1 | 28 | 1.4 | <.01 | |
| MAR 09... | -- | -- | -- | -- | -- | -- | 27 | 1.1 | -- | |
| JUN 05... | -- | -- | -- | -- | -- | -- | 29 | .7 | <.01 | |

MISSOURI RIVER MAIN STEM

293

06439980 LAKE OAHE NEAR PIERRE, SD

LOCATION.--Lat 44°27'30", long 100°23'29", in NE¼ sec.1, T.111 N., R.80 W., 5th principal meridian, Hughes County, Hydrologic Unit 10130105, in Pier A of Control Tower No. 1 of powerhouse intake structure of dam on Missouri River, 6.0 mi northwest of Pierre, 7.1 mi upstream from Bad River, and at mile 1,072.3.

DRAINAGE AREA.--243,500 mi², approximately.

PERIOD OF RECORD.--August 1958 to current year (monthend contents only). Prior to October 1967, published as Oahe Reservoir near Pierre.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Jan. 14, 1959, nonrecording gages at various locations upstream from outlet works, Jan. 14, 1959, to Sept. 30, 1962, recorder in Tower No. 1 of outlet works, all at same datum.

REMARKS.--Reservoir is formed by an earthfill dam; storage began in August 1958. Maximum capacity, 23,338,000 acre-ft below elevation 1,620.0 ft (top of spillway gates). Normal maximum, 22,240,000 acre-ft below 1,617.0 ft, of which about 2,390,000 acre-ft is designated for flood control. Inactive storage, 5,451,000 acre-ft below elevation 1,540.0 ft. Dead storage, 1,970 acre-ft below elevation 1,425.0 ft (invert of lowest outlet tunnel). Figures given herein represent elevations at powerhouse intake structure and total contents adjusted for wind effect.

The spillway consists of a gated chute with flat crest at elevation 1,596.5 ft, 8 gates, 50 by 23.5 ft each; design capacity, 300,000 ft³/s. The outlet works consist of 7 turbines with a generating capacity of 85,000 kilowatts each. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--Elevation and contents furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 22,681,000 acre-ft Aug. 22, 1975, affected by wind; minimum since initial filling, 14,815,000 acre-ft Sept. 25, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 22,583,000 acre-ft July 8; minimum contents, 18,481,000 acre-ft Dec. 30.

MONTHEND ELEVATION, IN FEET NGVD, AND CONTENTS,
IN ACRE-FEET, AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation | Contents | Change in contents |
|-----------------------|-----------|----------|--------------------|
| Sept. 30 | 1612.59 | 20649000 | |
| Oct. 31 | 1609.80 | 19763000 | -886000 |
| Nov. 30 | 1607.63 | 19114000 | -649000 |
| Dec. 31 | 1605.70 | 18483000 | -631000 |
| CAL YR 1983 | | | -652000 |
| Jan. 31 | 1608.40 | 19300000 | +817000 |
| Feb. 29 | 1610.68 | 20064000 | +764000 |
| Mar. 31 | 1611.40 | 20298000 | +234000 |
| Apr. 30 | 1613.28 | 20876000 | +578000 |
| May 31 | 1615.60 | 21577000 | +701000 |
| June 30 | 1618.27 | 22524000 | +947000 |
| July 31 | 1616.78 | 22178000 | -346000 |
| Aug. 31 | 1613.80 | 21055000 | -1123000 |
| Sept. 30 | 1610.23 | 19959000 | -1096000 |
| WTR YR 1984 | | | -690000 |

JAMES RIVER BASIN

06467600 JAMES RIVER NEAR MANFRED, ND

LOCATION.--Lat 47°38'40", long 99°49'40", near midpoint of north line sec.15, T.148 N., R.72 W., Wells County, Hydrologic Unit 10160001, on right upstream wingwall of bridge on county highway, and 5 mi southwest of Manfred.

DRAINAGE AREA.--253 mi², of which about 197 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1954 to August 1957 (annual maximum only), September 1957 to current year. Seasonal records only since 1983.

GAGE.--Water-stage recorder. Datum of gage is 1,605.73 ft National Geodetic Vertical Datum of 1929. Prior to Sept. 16, 1957, crest-stage gage only on downstream side of bridge at same datum.

REMARKS.--Records fair except those for February and March, which are poor.

AVERAGE DISCHARGE.--25 years (1957-82), 3.52 ft³/s, 2,550 acre-ft/yr; median of yearly mean discharges, 3.3 ft³/s, 2,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 2,000 ft³/s Apr. 18 or 19, 1979, gage height, 9.2 ft, from highwater mark, backwater from snow; no flow for long periods each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 300 ft³/s, Mar. 24, gage height 5.85 ft, backwater from ice; maximum gage height observed, 7.80 ft, Mar. 22. No flow for days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------|-----|-----|-----|-----|--------|---------|------|-------|--------|------|-----|-----|
| 1 | | | | | .00 | 10 | 110 | 51 | 1.3 | .70 | .00 | .00 |
| 2 | | | | | .00 | 5.0 | 96 | 59 | 1.2 | .54 | .00 | .00 |
| 3 | | | | | .00 | 3.0 | 82 | 78 | 1.1 | .35 | .00 | .00 |
| 4 | | | | | .00 | 1.0 | 67 | 102 | 1.4 | .26 | .00 | .00 |
| 5 | | | | | .00 | .80 | 50 | 100 | 2.0 | .22 | .00 | .00 |
| 6 | | | | | .00 | .50 | 40 | 110 | 2.2 | .16 | .00 | .00 |
| 7 | | | | | .00 | .20 | 33 | 93 | 2.5 | .12 | .00 | .00 |
| 8 | | | | | .00 | .10 | 28 | 77 | 3.0 | .12 | .00 | .00 |
| 9 | | | | | .00 | .00 | 24 | 63 | 3.4 | .09 | .00 | .00 |
| 10 | | | | | .00 | .00 | 20 | 51 | 4.3 | .08 | .00 | .00 |
| 11 | | | | | .00 | .00 | 21 | 40 | 13 | .08 | .00 | .00 |
| 12 | | | | | .00 | .00 | 36 | 30 | 14 | .07 | .00 | .00 |
| 13 | | | | | .00 | .00 | 69 | 22 | 10 | .05 | .00 | .00 |
| 14 | | | | | .00 | .00 | 94 | 16 | 8.0 | .08 | .00 | .00 |
| 15 | | | | | .00 | .00 | 83 | 14 | 6.7 | .06 | .00 | .00 |
| 16 | | | | | .00 | .00 | 68 | 12 | 5.7 | .05 | .00 | .00 |
| 17 | | | | | .00 | .00 | 55 | 9.8 | 4.7 | .03 | .00 | .00 |
| 18 | | | | | .00 | .00 | 42 | 8.0 | 4.0 | .02 | .00 | .00 |
| 19 | | | | | .00 | .00 | 32 | 6.0 | 4.1 | .00 | .00 | .00 |
| 20 | | | | | .50 | 1.0 | 26 | 4.8 | 3.9 | .00 | .00 | .00 |
| 21 | | | | | 1.0 | 20 | 22 | 4.4 | 3.8 | .00 | .00 | .00 |
| 22 | | | | | 5.0 | 70 | 18 | 4.0 | 3.4 | .00 | .00 | .00 |
| 23 | | | | | 10 | 200 | 16 | 3.4 | 2.9 | .00 | .00 | .00 |
| 24 | | | | | 15 | 220 | 14 | 2.9 | 2.8 | .00 | .00 | .00 |
| 25 | | | | | 25 | 180 | 13 | 2.8 | 2.3 | .00 | .00 | .00 |
| 26 | | | | | 30 | 150 | 12 | 2.6 | 1.9 | .00 | .00 | .00 |
| 27 | | | | | 27 | 120 | 11 | 2.3 | 1.5 | .00 | .00 | .00 |
| 28 | | | | | 25 | 90 | 10 | 2.1 | 1.2 | .00 | .00 | .00 |
| 29 | | | | | 15 | 70 | 15 | 1.9 | .98 | .00 | .00 | .00 |
| 30 | | | | | --- | 101 | 20 | 1.7 | .74 | .00 | .00 | .00 |
| 31 | | | | | --- | 114 | --- | 1.5 | --- | .00 | .00 | --- |
| TOTAL | | | | | 153.50 | 1356.60 | 1227 | 976.2 | 118.02 | 3.08 | .00 | .00 |
| MEAN | | | | | 5.29 | 43.8 | 40.9 | 31.5 | 3.93 | .10 | .00 | .00 |
| MAX | | | | | 30 | 220 | 110 | 110 | 14 | .70 | .00 | .00 |
| MIN | | | | | .00 | .00 | 10 | 1.5 | .74 | .00 | .00 | .00 |
| AC-FT | | | | | 304 | 2690 | 2430 | 1940 | 234 | 6.1 | .00 | .00 |

JAMES RIVER BASIN

295

06467600 JAMES RIVER NEAR MANFRED

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1959-60, 1962-64, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | | | | | | | |
|--------------|---|--|--|--|---|---|--|--|---|--|--|---|
| FEB 27... | 1350 | 27 | 530 | -5.0 | .0 | | | | | | | |
| MAR 26... | 1200 | 150 | 380 | .5 | 2.0 | | | | | | | |
| APR 23... | 1025 | 15 | 990 | 12.0 | 13.0 | | | | | | | |
| JUN 04... | 1020 | 1.3 | 1120 | -- | 15.5 | | | | | | | |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINEITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
| MAR 26... | 27 | 1 | 13 | 110 | 5.1 | 71 | 3.8 | .10 | 9.5 | 215 | 220 | .29 |
| DATE | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | |
| MAR 26... | 60 | 3 | 90 | 170 | 0 | 14 | 150 | 1.3 | 2 | 0 | 97 | |

JAMES RIVER BASIN

06468170 JAMES RIVER NEAR GRACE CITY, ND

LOCATION.--Lat 47°33'29", long 98°51'45", in NW1/4NW1/4NW1/4 sec.17, T.147 N., R.64 W., Foster County, Hydrologic Unit 10160001, on left bank on downstream side of county highway bridge, and 2.5 mi northwest of Grace City.

DRAINAGE AREA.--1,060 mi², approximately, of which about 650 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,457.60 ft, National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except for winter period and August, which are poor.

AVERAGE DISCHARGE.--16 years, 33.1 ft³/s, 23,980 acre-ft/yr; median of yearly mean discharges, 26 ft³/s, 18,840 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,100 ft³/s Apr. 13, 1969, gage height, 12.00 ft; no flow at times most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 200 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|--------|------|--------------------------------|------------------|
| Mar. 27 | 2145 | -- | b*8.91 | Apr. 1 | 0015 | *650 | 8.31 |
| Mar. 24 | ---- | 250 | Ice jam | | | | |

Minimum discharge, no flow for many days.

b - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-------|-------|--------|--------|-------|------|------|-------|-------|------|
| 1 | .53 | .94 | 1.3 | .00 | .40 | 12 | 600 | 161 | 24 | 13 | .87 | .00 |
| 2 | .91 | .95 | 1.2 | .00 | .35 | 11 | 510 | 153 | 22 | 12 | .88 | .06 |
| 3 | .83 | .96 | 1.2 | .00 | .35 | 11 | 480 | 150 | 21 | 10 | .88 | .04 |
| 4 | .92 | .99 | 1.2 | .40 | .30 | 10 | 450 | 165 | 20 | 9.0 | .91 | .08 |
| 5 | .85 | 1.1 | 1.2 | .70 | .30 | 10 | 407 | 170 | 19 | 7.7 | .84 | .11 |
| 6 | .85 | 1.1 | 1.1 | .80 | .35 | 9.0 | 380 | 160 | 17 | 6.2 | .90 | .07 |
| 7 | .88 | 1.2 | 1.1 | .80 | .40 | 8.0 | 333 | 150 | 17 | 5.0 | .91 | .12 |
| 8 | .77 | 1.2 | 1.1 | .80 | .60 | 7.0 | 284 | 140 | 16 | 3.8 | .75 | .15 |
| 9 | .91 | 1.0 | 1.0 | .70 | 1.0 | 6.0 | 250 | 135 | 17 | 2.9 | .42 | .22 |
| 10 | 1.1 | .90 | 1.0 | .65 | 2.0 | 5.0 | 217 | 125 | 16 | 2.6 | .57 | .24 |
| 11 | 1.1 | .85 | 1.0 | .60 | 3.0 | 4.0 | 203 | 115 | 17 | 2.4 | .45 | .47 |
| 12 | .97 | .96 | 1.0 | .60 | 4.0 | 3.0 | 200 | 105 | 15 | 2.0 | .37 | .54 |
| 13 | .86 | 1.1 | 1.0 | .55 | 5.0 | 2.5 | 203 | 98 | 14 | 1.5 | .25 | .11 |
| 14 | .86 | 1.2 | 1.0 | .45 | 6.0 | 2.0 | 198 | 90 | 14 | 1.1 | .11 | .20 |
| 15 | .94 | 1.2 | .90 | .40 | 7.0 | 2.0 | 181 | 84 | 15 | .97 | .02 | .40 |
| 16 | .95 | 1.2 | .60 | .30 | 7.5 | 1.8 | 162 | 78 | 16 | 1.2 | .00 | .70 |
| 17 | .89 | 1.2 | .50 | .20 | 8.5 | 1.6 | 149 | 72 | 16 | 1.1 | .00 | .72 |
| 18 | .94 | 1.2 | .30 | .20 | 9.5 | 1.5 | 139 | 66 | 15 | .94 | .00 | .72 |
| 19 | 1.0 | 1.2 | .10 | .20 | 11 | 1.6 | 135 | 60 | 17 | .90 | .00 | .81 |
| 20 | 1.1 | 1.2 | .00 | .30 | 12 | 6.0 | 129 | 56 | 17 | .87 | .00 | .65 |
| 21 | 1.1 | 1.2 | .00 | .40 | 13 | 20 | 123 | 52 | 19 | .74 | .01 | .52 |
| 22 | 1.1 | 1.2 | .00 | .60 | 14 | 80 | 128 | 48 | 18 | .73 | .00 | .18 |
| 23 | 1.1 | 1.2 | .00 | .70 | 14 | 200 | 128 | 45 | 15 | .64 | .00 | .00 |
| 24 | 1.1 | 1.3 | .00 | .80 | 14 | 220 | 121 | 42 | 15 | .72 | .00 | .16 |
| 25 | 1.0 | 1.3 | .00 | .80 | 14 | 220 | 117 | 39 | 16 | .59 | .00 | .18 |
| 26 | 1.0 | 1.3 | .00 | .80 | 14 | 190 | 114 | 36 | 13 | .55 | .02 | .11 |
| 27 | 1.0 | 1.3 | .00 | .80 | 13 | 170 | 110 | 33 | 13 | .50 | .07 | .02 |
| 28 | .93 | 1.3 | .00 | .75 | 12 | 150 | 105 | 31 | 13 | .33 | .12 | .02 |
| 29 | .89 | 1.3 | .00 | .70 | 12 | 140 | 110 | 29 | 13 | .23 | .09 | .00 |
| 30 | .95 | 1.3 | .00 | .55 | --- | 300 | 132 | 27 | 12 | .21 | .00 | .00 |
| 31 | .95 | --- | .00 | .45 | --- | 500 | --- | 25 | --- | .76 | .00 | --- |
| TOTAL | 29.28 | 34.35 | 17.80 | 16.00 | 199.55 | 2305.0 | 6798 | 2740 | 492 | 91.18 | 9.44 | 7.60 |
| MEAN | .94 | 1.14 | .57 | .52 | 6.88 | 74.4 | 227 | 88.4 | 16.4 | 2.94 | .30 | .25 |
| MAX | 1.1 | 1.3 | 1.3 | .80 | 14 | 500 | 600 | 170 | 24 | 13 | .91 | .81 |
| MIN | .53 | .85 | .00 | .00 | .30 | 1.5 | 105 | 25 | 12 | .21 | .00 | .00 |
| AC-FT | 58 | 68 | 35 | 32 | 396 | 4570 | 13480 | 5430 | 976 | 181 | 19 | 15 |
| CAL YR 1983 | TOTAL | 23889.63 | | MEAN | 65.5 | MAX | 1020 | MIN | .00 | AC-FT | 47390 | |
| WTR YR 1984 | TOTAL | 12740.20 | | MEAN | 34.8 | MAX | 600 | MIN | .00 | AC-FT | 25270 | |

JAMES RIVER BASIN

297

06468170 JAMES RIVER NEAR GRACE CITY, ND

WATER QUALITY RECORDS

PERIOD OF RECORD.--Water years 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|--------------|------|---|---|--------------------------------|-------------------------------------|-----------------------------|--|---|--|--|--|
| OCT 17... | 1330 | .88 | 1040 | -- | 7.0 | 6.0 | -- | -- | -- | -- | -- |
| NOV 28... | 1435 | 1.4 | 1370 | -- | -8.0 | .5 | -- | -- | -- | -- | -- |
| FEB 28... | 1130 | 12 | -- | -- | -4.0 | .5 | -- | -- | -- | -- | -- |
| MAR 29... | 1530 | 143 | 380 | 8.0 | 4.0 | .5 | 120 | 2 | 24 | 14 | 26 |
| APR 23... | 1530 | 131 | 800 | -- | 20.0 | 16.5 | -- | -- | -- | -- | -- |
| JUN 04... | 1515 | 21 | 1220 | -- | 15.5 | 16.0 | -- | -- | -- | -- | -- |
| JUL 19... | 0900 | .89 | 1220 | -- | 20.0 | 22.0 | -- | -- | -- | -- | -- |

| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
|--------------|-------------------|---|---|---|---|---|---|--|---|--|---|---|
| MAR 29... | 30 | 1 | 11 | 120 | 2.2 | 62 | 4.4 | .10 | 8.7 | 231 | 220 | .31 |

| DATE | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) |
|--------------|---|--|--|--|--|--|--|--|---|---|--|
| MAR 29... | 89 | 2 | 50 | 110 | 0 | 16 | 80 | .8 | 1 | 0 | 93 |

JAMES RIVER BASIN

06468500 JAMES RIVER NEAR PINGREE, N. DAK.

WATER QUALITY RECORDS

LOCATION.--Lat 47°08'30", long 98°47'00", in SW¼SW¼ sec.3, T.142 N., R.64 W., Stutsman County, Hydrologic Unit 10160001, on right bank 500 ft upstream from dam at outlet of DePuy Marsh, 6.5 mi southeast of Pingree, and 6.25 mi northeast of Buchanan.

DRAINAGE AREA.--1,670 mi², approximately, of which about 900 mi² is probably noncontributing.

PERIOD OF RECORD.--Water years 1965, 1979 to current year.

REMARKS.--Current sampling site is located at bridge 2 mi upstream from former stream gaging station.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | COLOR (PLAT- INUM- COBALT UNITS) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) |
|--------------|------|---|--------------------------------|-------------------------------------|-----------------------------|--|--|---|--|--|--|
| OCT 03... | 1400 | 600 | 9.0 | 10.0 | 10.0 | 25 | 190 | 0 | 31 | 28 | 55 |
| MAR 29... | 1330 | 930 | 8.1 | 4.0 | 3.0 | 40 | 290 | 0 | 49 | 41 | 79 |
| APR 24... | 0930 | 430 | 8.4 | 10.0 | 11.5 | 200 | 130 | 0 | 26 | 17 | 33 |
| JUN 05... | 0900 | 640 | 7.8 | 15.0 | 16.0 | 50 | 210 | 8 | 39 | 27 | 50 |
| JUL 18... | 1400 | 730 | 8.8 | 25.0 | 23.0 | 55 | 250 | 13 | 49 | 32 | 62 |
| AUG 29... | 1430 | 730 | 7.9 | 24.0 | 19.0 | 150 | 220 | 0 | 34 | 32 | 70 |

| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINIT LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
|--------------|-------------------|---|---|--|---|---|---|--|---|--|---|---|
| OCT 03... | 35 | 2 | 22 | 239 | .4 | 81 | 10 | .10 | .2 | 390 | 370 | .53 |
| MAR 29... | 35 | 2 | 19 | 364 | 5.6 | 130 | 16 | .20 | 10 | 592 | 560 | .81 |
| APR 24... | 33 | 1 | 11 | 155 | 1.2 | 64 | 7.5 | .10 | .5 | 266 | 250 | .36 |
| JUN 05... | 33 | 2 | 13 | 201 | 6.2 | 110 | 11 | .20 | <.0 | 378 | -- | .51 |
| JUL 18... | 33 | 2 | 15 | 241 | .7 | 140 | 11 | .20 | 10 | 477 | 460 | .65 |
| AUG 29... | 39 | 2 | 17 | 224 | 5.4 | 140 | 10 | .20 | 9.9 | 437 | 450 | .59 |

| DATE | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) | ALUM- INUM, DIS- SOLVED (UG/L AS AL) | ARSENIC DIS- SOLVED (UG/L AS AS) | BARIUM, DIS- SOLVED (UG/L AS BA) | BORON, DIS- SOLVED (UG/L AS B) | CADMIUM DIS- SOLVED (UG/L AS CD) | CHRO- MIUM, DIS- SOLVED (UG/L AS CR) | COBALT, DIS- SOLVED (UG/L AS CO) | COPPER, DIS- SOLVED (UG/L AS CU) | IRON, DIS- SOLVED (UG/L AS FE) |
|--------------|---|--|---|--|--|--|--|---|--|--|--|
| OCT 03... | <.10 | .030 | -- | -- | -- | 130 | -- | -- | -- | -- | -- |
| MAR 29... | <.10 | .030 | <10 | 2 | 95 | 160 | <1 | <10 | <1 | 2 | 21 |
| APR 24... | <.10 | .260 | -- | -- | -- | 60 | -- | -- | -- | -- | -- |
| JUN 05... | <.10 | .040 | -- | -- | -- | 90 | -- | -- | -- | -- | -- |
| JUL 18... | <.10 | .020 | -- | -- | -- | 110 | -- | -- | -- | -- | -- |
| AUG 29... | .20 | .030 | 20 | 2 | 86 | 120 | <1 | <10 | 1 | 1 | 20 |

06468500 JAMES RIVER NEAR PINGREE, N. DAK.--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | NICKEL, DIS- SOLVED (UG/L AS NI) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | VANA- DIUM, DIS- SOLVED (UG/L AS V) | ZINC, DIS- SOLVED (UG/L AS ZN) | CYANIDE TOTAL (MG/L AS CN) |
|--------------|--|--|--|--|---|--|---|--|--|--|-------------------------------------|
| OCT 03... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MAR 29... | 4 | 53 | 1600 | .5 | 2 | 2 | <1 | 280 | 4 | 19 | <.01 |
| APR 24... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUN 05... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| JUL 18... | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| AUG 29... | 3 | 43 | 52 | 1.0 | <1 | 3 | <1 | 210 | <1 | 12 | <.01 |

JAMES RIVER BASIN

06469000 JAMESTOWN RESERVOIR NEAR JAMESTOWN, ND

LOCATION.--Lat 46°55'50", long 98°42'23", in SE1/4NW1/4 sec.24, T.140 N., R.64 W., Stutsman County, Hydrologic Unit 10160001, on left bank in control house below Jamestown Dam on James River, 1.7 mi north of Jamestown Post Office, and 3.3 mi upstream from Pipestem Creek.

DRAINAGE AREA.--1,760 mi², approximately, of which about 1,010 mi² is probably noncontributing.

PERIOD OF RECORD.--November 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft National Geodetic Vertical Datum of 1929; gage readings have been reduced to elevations NGVD. June 22, 1959, to June 3, 1971 at site 0.2 mi upstream at same datum. Prior to June 22, 1959, nonrecording gages at different locations.

REMARKS.--Reservoir is formed by earth-fill dam, completed Oct. 1, 1953. Closure made May 7, 1953, and filling of dead storage started. Gates initially closed Feb. 8, 1954. Usable capacity, 229,470 acre-ft between elevations 1,400 ft, sill of outlet and 1,454 ft, crest of spillway. Dead storage below elevation 1,400 ft, 820 acre-ft. Maximum design pool, 389,000 acre-ft, elevation, 1,464.6 ft. Figures given herein represent total contents based on capacity table dated Oct. 1, 1965. Reservoir is used for flood control and municipal supply. Elevations are adjusted for wind effect.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 103,100 acre-ft May 1, 1969, elevation, 1,443.60 ft; minimum since initial filling of reservoir, 18,220 acre-ft Mar. 4, 5, 1965, elevation, 1,423.66 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 45,670 acre-ft May 11, elevation, 1,436.13 ft; minimum 28,280 acre-ft Oct. 23, elevation, 1,429.49 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| Date | Elevation (feet) | Contents (acre-feet) | Change in contents (acre-feet) |
|------------------|---------------------|-------------------------|-----------------------------------|
| Sept. 30----- | 1,430.93 | 31,360 | -- |
| Oct. 31----- | 1,429.67 | 28,640 | -2,720 |
| Nov. 30----- | 1,430.05 | 29,430 | +790 |
| Dec. 31----- | 1,430.00 | 29,320 | -110 |
| CAL YR 1983----- | -- | -- | -1,380 |
| Jan. 31----- | 1,429.99 | 29,300 | -20 |
| Feb. 29----- | 1,430.38 | 30,150 | +850 |
| Mar. 31----- | 1,431.85 | 33,500 | +3,350 |
| Apr. 30----- | 1,435.78 | 44,540 | +11,040 |
| May 31----- | 1,435.63 | 44,060 | -480 |
| June 30----- | 1,433.50 | 37,740 | -6,320 |
| July 31----- | 1,432.44 | 34,960 | -2,780 |
| Aug. 31----- | 1,431.27 | 32,140 | -2,820 |
| Sept. 30----- | 1,430.10 | 29,540 | -2,600 |
| WTR YR 1984----- | -- | -- | -1,820 |

JAMES RIVER BASIN

301

06469000 JAMESTOWN RESERVOIR NEAR JAMESTOWN, ND---CONTINUED

PERIOD OF RECORD.--Water years 1960 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | RESER- VOIR DEPTH (FEET) (72025) | TEMPER- ATURE, AIR (DEG C) (00020) | CLOUD COVER (PER- CENT) (00032) | WIND DIREC- TION (DEG. FROM TRUE NORTH) (00036) | WIND SPEED (MILES PER HOUR). (00035) | BARO- METRIC PRES- SURE (MM OF HG) (00025) | ICE THICK- NESS (FEET) (82130) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE (DEG C) (00010) |
|--------------|------|--|--|---|--|---|---|--|--|---|--|
| NOV 15... | 1206 | 34.0 | 6.0 | 100 | 135 | 5.0 | 773 | -- | 474 | 9.0 | 4.3 |
| FEB 01... | 1316 | 33.0 | 1.0 | 100 | 165 | 5.0 | 761 | 2.20 | 575 | 8.7 | 1.0 |
| JUN 01... | 0944 | -- | 16.0 | -- | -- | -- | 767 | -- | 530 | -- | 14.5 |
| AUG 29... | 1330 | -- | 24.0 | -- | -- | -- | 771 | -- | 603 | 8.0 | 21.5 |

| DATE | TRANS- PAR- ENCY (SECCHI DISK) (IN) (00077) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (00301) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) |
|--------------|---|---|---|---|---|--|---|---|---|--|--|
| NOV 15... | 25 | 13.5 | 102 | 40 | 180 | 0 | 37 | 22 | 40 | 1 | 16 |
| FEB 01... | 106 | 11.2 | 79 | <1 | 230 | 0 | 47 | 28 | 50 | 1 | 19 |
| JUN 01... | -- | 9.1 | 89 | 20 | 190 | 0 | 38 | 23 | 44 | 1 | 14 |
| AUG 29... | -- | 6.8 | 76 | 60 | 190 | 0 | 40 | 23 | 46 | 1 | 15 |

| DATE | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SIO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | BORON, DIS- SOLVED (UG/L AS B) (01020) |
|--------------|--|--|--|---|--|---|--|--|---|---|
| NOV 15... | 207 | 67 | 8.3 | .20 | 7.7 | 332 | 320 | .10 | .050 | 90 |
| FEB 01... | 265 | 78 | 13 | .20 | 5.7 | 401 | 400 | <.10 | .020 | 110 |
| JUN 01... | 230 | 73 | 8.4 | .20 | 3.0 | 310 | 340 | <.10 | .060 | 80 |
| AUG 29... | 209 | 87 | 9.7 | .10 | 11 | 363 | 360 | .31 | .100 | 90 |

| DATE | TIME | SAM- PLING DEPTH (FEET) (00003) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE (DEG C) (00010) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|--------------|------|---|--|--|---|--|---|
| NOV 15... | 1202 | .00 | 482 | 4.3 | 9.0 | 13.2 | 100 |
| 15... | 1204 | 1.60 | 478 | 4.3 | 9.0 | 13.2 | -- |
| 15... | 1206 | 3.30 | 474 | 4.3 | 9.0 | 13.5 | 102 |
| 15... | 1208 | 6.60 | 468 | 3.4 | 9.0 | 13.2 | -- |
| 15... | 1210 | 13.2 | 468 | 4.3 | 9.0 | 13.2 | -- |
| 15... | 1212 | 19.7 | 470 | 4.3 | 9.0 | 13.4 | -- |
| 15... | 1214 | 26.2 | 473 | 4.2 | 9.0 | 13.3 | -- |
| 15... | 1215 | 32.8 | 475 | 2.8 | 9.0 | 13.3 | -- |
| 15... | 1216 | 33.0 | 475 | 2.8 | 9.0 | 13.2 | -- |

06469000 JAMESTOWN RESERVOIR NR JAMESTOWN, ND--CONTINUED
 WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SAM- PLING DEPTH (FEET) (00003) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | TEMPER- ATURE (DEG C) (00010) | PH (STAND- ARD UNITS) (00400) | OXYGEN, DIS- SOLVED (MG/L) (00300) | DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-------|------|---|--|--|---|--|--|
| FEB | | | | | | | |
| 01... | 1312 | .00 | 645 | .4 | 8.7 | 11.2 | -- |
| 01... | 1314 | 1.60 | 609 | .3 | 8.7 | 11.3 | -- |
| 01... | 1316 | 3.30 | 575 | 1.0 | 8.7 | 11.2 | 79 |
| 01... | 1318 | 6.60 | 568 | 2.1 | 8.7 | 10.6 | -- |
| 01... | 1320 | 13.2 | 567 | 2.8 | 8.7 | 9.2 | -- |
| 01... | 1322 | 19.7 | 581 | 3.3 | 8.5 | 7.2 | -- |
| 01... | 1324 | 26.2 | 604 | 3.6 | 8.5 | 7.2 | -- |
| 01... | 1329 | 3.30 | 576 | 1.2 | 8.8 | 10.8 | -- |
| AUG | | | | | | | |
| 29... | 1316 | .00 | 595 | 21.4 | 7.8 | 6.4 | 72 |
| 29... | 1318 | 1.60 | 600 | 21.4 | 7.8 | 6.9 | -- |
| 29... | 1320 | 3.30 | 600 | 21.4 | 7.8 | 6.9 | -- |
| 29... | 1322 | 6.60 | 600 | 21.4 | 7.8 | 6.9 | -- |
| 29... | 1324 | 13.2 | 601 | 21.4 | 7.8 | 6.9 | -- |
| 29... | 1326 | 19.8 | 601 | 21.5 | 7.9 | 6.9 | -- |
| 29... | 1328 | 26.4 | 603 | 21.5 | 8.0 | 6.9 | -- |
| 29... | 1330 | 33.0 | 603 | 21.5 | 8.0 | 6.8 | 76 |

06469400 PIPESTEM CREEK NEAR PINGREE, ND

LOCATION.--Lat 47°10'03", long 98°58'07", in NE1/4NE1/4NW1/4 sec.31, T.143 N., R.65 W., Stutsman County, Hydrologic Unit 10160002, on right bank on downstream side of State Highway 36 bridge, and 3 mi west of Pingree.

DRAINAGE AREA.--700 mi², of which about 440 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1973 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,500.63 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

AVERAGE DISCHARGE.--11 years, 28.8 ft³/s, 20,870 acre-ft/yr; median of yearly mean discharges, 19 ft³/s, 13,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,520 ft³/s Apr. 20, 1979, gage height, 11.60 ft, backwater from ice; no flow at times.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 100 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Mar. 26 | 0045 | *865 | 9.61 | Apr. 15 | 1315 | 191 | 6.61 |
| May 5 | 1545 | 196 | 6.58 | | | | |

No flow for several weeks.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|------|------|--------|--------|------|------|-------|-------|-------|-----|
| 1 | .60 | .45 | .30 | .00 | .00 | 14 | 474 | 60 | 9.0 | 2.0 | .00 | .00 |
| 2 | .55 | .40 | .30 | .00 | .00 | 13 | 414 | 100 | 8.0 | 2.5 | .00 | .00 |
| 3 | .50 | .38 | .28 | .00 | .00 | 13 | 344 | 120 | 7.5 | 3.0 | .00 | .00 |
| 4 | .45 | .38 | .28 | .00 | .00 | 12 | 291 | 165 | 7.0 | 3.0 | .00 | .00 |
| 5 | .42 | .38 | .28 | .00 | .00 | 12 | 254 | 193 | 6.5 | 2.0 | .00 | .00 |
| 6 | .40 | .36 | .26 | .00 | .00 | 11 | 225 | 195 | 6.0 | 1.0 | .00 | .00 |
| 7 | .40 | .36 | .24 | .00 | .50 | 11 | 188 | 182 | 5.0 | .80 | .00 | .00 |
| 8 | .38 | .38 | .24 | .00 | 1.0 | 11 | 164 | 172 | 19 | .60 | .00 | .00 |
| 9 | .36 | .40 | .22 | .00 | 1.1 | 11 | 153 | 147 | 34 | .40 | .00 | .00 |
| 10 | .34 | .40 | .22 | .00 | 1.1 | 11 | 134 | 133 | 37 | .20 | .00 | .00 |
| 11 | .32 | .42 | .20 | .00 | 1.2 | 10 | 129 | 121 | 24 | .15 | .00 | .00 |
| 12 | .30 | .42 | .10 | .00 | 1.3 | 10 | 141 | 111 | 18 | .10 | .00 | .00 |
| 13 | .30 | .44 | .05 | .00 | 1.4 | 10 | 169 | 100 | 12 | .07 | .00 | .00 |
| 14 | .30 | .46 | .00 | .00 | 1.5 | 9.5 | 184 | 86 | 10 | .05 | .00 | .00 |
| 15 | .30 | .48 | .00 | .00 | 1.6 | 9.0 | 189 | 73 | 9.0 | .02 | .00 | .00 |
| 16 | .30 | .50 | .00 | .00 | 1.7 | 9.0 | 187 | 63 | 8.0 | .00 | .00 | .00 |
| 17 | .30 | .50 | .00 | .00 | 1.8 | 8.5 | 165 | 60 | 7.0 | .00 | .00 | .00 |
| 18 | .28 | .50 | .00 | .00 | 1.9 | 8.5 | 145 | 50 | 7.0 | .00 | .00 | .00 |
| 19 | .28 | .48 | .00 | .00 | 2.0 | 8.0 | 136 | 45 | 6.5 | .00 | .00 | .00 |
| 20 | .26 | .48 | .00 | .00 | 2.0 | 15 | 122 | 39 | 6.5 | .00 | .00 | .00 |
| 21 | .26 | .46 | .00 | .00 | 10 | 30 | 111 | 37 | 6.0 | .00 | .00 | .00 |
| 22 | .25 | .44 | .00 | .00 | 15 | 50 | 100 | 33 | 6.0 | .00 | .00 | .00 |
| 23 | .25 | .42 | .00 | .00 | 20 | 200 | 90 | 26 | 5.5 | .00 | .00 | .00 |
| 24 | .25 | .40 | .00 | .00 | 20 | 500 | 81 | 25 | 5.0 | .00 | .00 | .00 |
| 25 | .30 | .38 | .00 | .00 | 18 | 700 | 72 | 21 | 5.0 | .00 | .00 | .00 |
| 26 | .40 | .36 | .00 | .00 | 17 | 845 | 67 | 19 | 4.5 | .00 | .00 | .00 |
| 27 | .50 | .34 | .00 | .00 | 16 | 800 | 65 | 17 | 4.0 | .00 | .00 | .00 |
| 28 | .50 | .32 | .00 | .00 | 15 | 723 | 60 | 15 | 3.5 | .00 | .00 | .00 |
| 29 | .52 | .30 | .00 | .00 | 14 | 621 | 60 | 12 | 3.0 | .00 | .00 | .00 |
| 30 | .52 | .30 | .00 | .00 | --- | 551 | 55 | 10 | 2.5 | .00 | .00 | .00 |
| 31 | .50 | --- | .00 | .00 | --- | 494 | --- | 10 | --- | .00 | .00 | --- |
| TOTAL | 11.59 | 12.29 | 2.97 | .00 | 165.10 | 5730.5 | 4969 | 2440 | 292.0 | 15.89 | .00 | .00 |
| MEAN | .37 | .41 | .10 | .00 | 5.69 | 185 | 166 | 78.7 | 9.73 | .51 | .00 | .00 |
| MAX | .60 | .50 | .30 | .00 | 20 | 845 | 474 | 195 | 37 | 3.0 | .00 | .00 |
| MIN | .25 | .30 | .00 | .00 | .00 | 8.0 | 55 | 10 | 2.5 | .00 | .00 | .00 |
| AC-FT | 23 | 24 | 5.9 | .00 | 327 | 11370 | 9860 | 4840 | 579 | 32 | .00 | .00 |
| CAL YR 1983 | TOTAL | 22009.93 | | MEAN | 60.3 | MAX | 1200 | MIN | .00 | AC-FT | 43660 | |
| WTR YR 1984 | TOTAL | 13639.34 | | MEAN | 37.3 | MAX | 845 | MIN | .00 | AC-FT | 27050 | |

JAMES RIVER BASIN

06469400 PIPESTEM CREEK NEAR PINGREE, ND

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1974 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE, AIR (DEG C) | TEMPER- ATURE (DEG C) | HARD- NESS (MG/L AS CACO3) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) | CALCIUM DIS- SOLVED (MG/L AS CA) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) | SODIUM, DIS- SOLVED (MG/L AS NA) | |
|--------------|---|---|---|--|---|---|--|---|---|--|---|---|
| MAR 27... | 1000 | 814 | 290 | 7.5 | 1.0 | .5 | 98 | 7 | 21 | 11 | 18 | |
| APR 24... | 0840 | 84 | 930 | -- | 7.0 | 13.5 | -- | -- | -- | -- | -- | |
| MAY 29... | 1110 | 13 | 1280 | -- | 20.0 | 14.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINIT LAB (MG/L AS CACO3) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) | SILICA, DIS- SOLVED (MG/L AS SIO2) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) |
| MAR 27... | 26 | .8 | 10 | 91 | 5.6 | 43 | 4.1 | .10 | 7.5 | 202 | 170 | .27 |
| DATE | SOLIDS, DIS- SOLVED (TONS PER DAY) | ARSENIC DIS- SOLVED (UG/L AS AS) | BORON, DIS- SOLVED (UG/L AS B) | IRON, DIS- SOLVED (UG/L AS FE) | LEAD, DIS- SOLVED (UG/L AS PB) | LITHIUM DIS- SOLVED (UG/L AS LI) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) | MERCURY DIS- SOLVED (UG/L AS HG) | MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) | |
| MAR 27... | 444 | 2 | 80 | 180 | 1 | 13 | 160 | 1.1 | 1 | 0 | 91 | |

06470000 JAMES RIVER AT JAMESTOWN, ND

LOCATION.--Lat 46°53'22", long 98°40'58", in NW¼NE¼ sec.6, T.139 N., R.63 W., Stutsman County, Hydrologic Unit 10160003, on left bank 200 ft upstream from Interstate 94 bridge at southeast corner of Jamestown, and 3 mi downstream from Pipestem Creek.

DRAINAGE AREA.--2,820 mi², approximately, of which about 1,650 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1928 to September 1933, March to May 1935, August 1937 to September 1939, April 1943 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1239: 1938(M). WSP 1917: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,373.27 ft National Geodetic Vertical Datum of 1929. Oct. 1, 1949 to Sept. 30, 1965, at former bridge 0.5 mi upstream at datum 2.00 ft higher. See WSP 1729 or 1917 for history of changes prior to Oct. 1, 1949.

REMARKS.--Records good. Flow regulated by Arrowwood, Jim, and Pipestem Lakes, and Jamestown Reservoir, combined capacity, 393,000 acre-ft. Regulation by Jamestown Reservoir (station 06469000) 6 mi upstream since 1953 and by Pipestem Lake, capacity 147,000 acre-ft, since 1973.

AVERAGE DISCHARGE.--48 years (water years 1929-33, 1938-39, 1944-82), 65.0 ft³/s, 47,090 acre-ft/yr; median of yearly mean discharges, 34 ft³/s, 24,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,390 ft³/s May 13, 1950, gage height, 15.82 ft, site and datum then in use; no flow at times in 1933.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 441 ft³/s Mar. 23, gage height, 6.43 ft; minimum daily, 4.0 ft³/s Jan. 13-17.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|--------|-------|-------|-------|--------|------|------|
| 1 | 170 | 115 | 11 | 9.2 | 4.9 | 115 | 153 | 257 | 275 | 290 | 200 | 53 |
| 2 | 163 | 115 | 8.8 | 9.6 | 5.0 | 115 | 150 | 258 | 275 | 253 | 200 | 48 |
| 3 | 161 | 116 | 7.7 | 9.8 | 5.0 | 100 | 150 | 251 | 275 | 204 | 200 | 12 |
| 4 | 164 | 111 | 7.2 | 10 | 4.8 | 110 | 158 | 252 | 275 | 212 | 200 | 19 |
| 5 | 158 | 107 | 7.0 | 10 | 4.6 | 110 | 159 | 259 | 276 | 213 | 200 | 36 |
| 6 | 174 | 110 | 6.7 | 9.0 | 4.8 | 110 | 261 | 258 | 277 | 211 | 200 | 60 |
| 7 | 228 | 106 | 6.6 | 8.0 | 5.2 | 100 | 272 | 257 | 280 | 210 | 200 | 65 |
| 8 | 227 | 102 | 6.2 | 7.0 | 5.8 | 110 | 273 | 258 | 277 | 210 | 200 | 50 |
| 9 | 228 | 37 | 6.5 | 6.0 | 6.0 | 60 | 266 | 257 | 274 | 208 | 200 | 50 |
| 10 | 229 | 21 | 6.5 | 5.0 | 6.2 | 10 | 306 | 265 | 272 | 206 | 200 | 45 |
| 11 | 227 | 34 | 6.7 | 4.8 | 6.4 | 5.0 | 345 | 271 | 272 | 207 | 200 | 45 |
| 12 | 228 | 34 | 6.8 | 4.4 | 6.0 | 10 | 365 | 270 | 270 | 198 | 200 | 40 |
| 13 | 228 | 33 | 8.0 | 4.0 | 6.0 | 18 | 359 | 270 | 269 | 204 | 190 | 35 |
| 14 | 231 | 31 | 7.3 | 4.0 | 5.5 | 20 | 347 | 270 | 284 | 196 | 150 | 35 |
| 15 | 237 | 29 | 7.0 | 4.0 | 5.5 | 18 | 336 | 270 | 274 | 195 | 30 | 35 |
| 16 | 234 | 28 | 7.2 | 4.0 | 5.0 | 20 | 338 | 270 | 270 | 212 | 20 | 35 |
| 17 | 233 | 29 | 7.5 | 4.0 | 5.0 | 20 | 339 | 270 | 268 | 200 | 20 | 35 |
| 18 | 236 | 30 | 7.8 | 4.1 | 5.0 | 20 | 334 | 270 | 268 | 197 | 100 | 30 |
| 19 | 240 | 31 | 8.0 | 4.1 | 5.0 | 25 | 331 | 270 | 281 | 197 | 120 | 30 |
| 20 | 232 | 30 | 8.2 | 4.2 | 8.0 | 30 | 311 | 270 | 271 | 194 | 120 | 30 |
| 21 | 229 | 29 | 8.2 | 4.2 | 10 | 95 | 312 | 270 | 269 | 195 | 121 | 30 |
| 22 | 225 | 29 | 8.3 | 4.3 | 20 | 198 | 328 | 270 | 279 | 193 | 119 | 30 |
| 23 | 134 | 30 | 8.3 | 4.3 | 30 | 348 | 328 | 270 | 271 | 194 | 122 | 30 |
| 24 | 111 | 30 | 8.5 | 4.4 | 40 | 329 | 326 | 270 | 269 | 193 | 116 | 35 |
| 25 | 72 | 31 | 8.5 | 4.4 | 100 | 252 | 317 | 275 | 268 | 193 | 112 | 40 |
| 26 | 20 | 33 | 8.5 | 4.5 | 120 | 166 | 311 | 275 | 268 | 196 | 112 | 40 |
| 27 | 17 | 33 | 9.2 | 4.5 | 130 | 165 | 294 | 275 | 265 | 197 | 111 | 40 |
| 28 | 97 | 30 | 9.2 | 4.5 | 125 | 181 | 266 | 275 | 274 | 195 | 99 | 38 |
| 29 | 111 | 15 | 9.0 | 4.6 | 120 | 179 | 255 | 275 | 267 | 196 | 70 | 36 |
| 30 | 113 | 11 | 8.8 | 4.7 | --- | 163 | 256 | 275 | 267 | 200 | 52 | 35 |
| 31 | 114 | --- | 8.6 | 4.8 | --- | 152 | --- | 275 | --- | 200 | 44 | --- |
| TOTAL | 5471 | 1520 | 243.8 | 174.4 | 804.7 | 3354.0 | 8546 | 8278 | 8180 | 6369 | 4228 | 1142 |
| MEAN | 176 | 50.7 | 7.86 | 5.63 | 27.7 | 108 | 285 | 267 | 273 | 205 | 136 | 38.1 |
| MAX | 240 | 116 | 11 | 10 | 130 | 348 | 365 | 275 | 284 | 290 | 200 | 65 |
| MIN | 17 | 11 | 6.2 | 4.0 | 4.6 | 5.0 | 150 | 251 | 265 | 193 | 20 | 12 |
| AC-FT | 10850 | 3010 | 484 | 346 | 1600 | 6650 | 16950 | 16420 | 16230 | 12630 | 8390 | 2270 |
| CAL YR 1983 | TOTAL | 68749.6 | MEAN | 188 | MAX | 771 | MIN | 3.2 | AC-FT | 136400 | | |
| WTR YR 1984 | TOTAL | 48310.9 | MEAN | 132 | MAX | 365 | MIN | 4.0 | AC-FT | 95820 | | |

JAMES RIVER BASIN

06470000 JAMES RIVER AT JAMESTOWN, ND--CONTINUED

PERIOD OF RECORD.--Water years 1950-51, 1958-65, 1972 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| NOV 17... | 1015 | 29 | 770 | -- | .5 | 2.5 | -- | -- | -- | -- | -- | |
| DEC 19... | 1500 | 8.0 | 1240 | -- | -22.0 | .0 | -- | -- | -- | -- | -- | |
| FEB 01... | 1315 | 4.9 | 1240 | -- | .0 | 1.0 | -- | -- | -- | -- | -- | |
| MAR 13... | 1440 | 18 | 930 | -- | -10.0 | .5 | -- | -- | -- | -- | -- | |
| 27... | 1400 | 153 | 470 | 7.7 | 4.0 | 1.0 | 170 | 24 | 39 | 18 | 30 | |
| APR 24... | 1320 | 323 | 520 | -- | 14.0 | 9.5 | -- | -- | -- | -- | -- | |
| JUN 05... | 1345 | 275 | 580 | -- | 21.0 | 16.0 | -- | -- | -- | -- | -- | |
| JUL 18... | 0940 | 196 | 630 | -- | 23.0 | 22.5 | -- | -- | -- | -- | -- | |
| AUG 29... | 1000 | 72 | 720 | 8.1 | 20.0 | 20.0 | 270 | 88 | 57 | 30 | 53 | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| MAR 27... | 26 | 1 | 13 | 180 | .000 | 150 | 5.7 | 74 | 8.6 | .10 | 7.8 | 266 |
| AUG 29... | 29 | 1 | 15 | 200 | 11 | 160 | 2.5 | 150 | 11 | .30 | 10 | 461 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| MAR 27... | 280 | .36 | 110 | 1 | 130 | 130 | 1 | 22 | 660 | 1.8 | 0 | 89 |
| AUG 29... | 450 | .63 | 89 | 4 | 80 | 0 | 0 | 39 | 540 | 1.4 | 0 | 250 |

06470500 JAMES RIVER AT LA MOURE, ND

LOCATION.--Lat 46°21'20", long 98°18'15", in NE1/4NE1/4 sec.11, T.133 N., R.61 W., LaMoure County, Hydrologic Unit 10160003, on left bank 80 ft downstream from bridge on State Highway 13, 0.5 mi west of LaMoure, and 12 mi upstream from Cottonwood Creek.

DRAINAGE AREA.--4,390 mi², approximately, of which about 2,600 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to July 1903 (gage-height record only), April 1950 to current year. Gage-height records for 1902-11 are contained in reports of the National Oceanic and Atmospheric Administration.

REVISED RECORDS.--WSP 1917: Drainage area.

GAGE.--Water-stage recorder and rubble-masonry control. Datum of gage is 1,290.00 ft National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Apr. 19, 1950.

REMARKS.--Records fair. Flow regulated by Arrowwood, Jim, and Pipestem Lakes, and Jamestown Reservoir, combined capacity, 393,000 acre-ft. Regulation by Jamestown Reservoir (station 06469000) 85 mi upstream since 1953 and by Pipestem Lake, capacity 147,000 acre-ft, since 1973.

AVERAGE DISCHARGE.--34 years (water years 1951-84), 100 ft³/s, 72,450 acre-ft/yr; median of yearly mean discharges, 72 ft³/s, 52,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,800 ft³/s Apr. 14, 1969, gage height, 16.17 ft; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD.--Prior to flood of Apr. 14, 1969, a long-time resident said that the flood of May 16, 1950 was the highest since 1881, with stage in either 1942 or 1943 being almost as high owing to large ice jam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,200 ft³/s Mar. 27, gage height, 12.34 ft, backwater from ice; minimum daily, 5.0 ft³/s Jan. 29.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|------|-------|-------|-------|-------|-------|-------|-------|--------|------|
| 1 | 150 | 100 | 24 | 12 | 6.0 | 170 | 720 | 400 | 271 | 243 | 159 | 76 |
| 2 | 155 | 170 | 22 | 12 | 6.0 | 150 | 680 | 448 | 278 | 243 | 154 | 74 |
| 3 | 160 | 175 | 18 | 12 | 6.0 | 130 | 650 | 467 | 281 | 243 | 161 | 72 |
| 4 | 160 | 180 | 16 | 13 | 6.0 | 125 | 700 | 464 | 289 | 243 | 174 | 64 |
| 5 | 160 | 180 | 15 | 14 | 10 | 120 | 500 | 454 | 297 | 241 | 176 | 55 |
| 6 | 160 | 180 | 15 | 14 | 11 | 120 | 400 | 439 | 304 | 218 | 177 | 44 |
| 7 | 160 | 170 | 14 | 14 | 11 | 120 | 310 | 446 | 301 | 208 | 174 | 41 |
| 8 | 165 | 165 | 13 | 14 | 10 | 125 | 300 | 408 | 295 | 204 | 174 | 53 |
| 9 | 170 | 165 | 12 | 14 | 10 | 125 | 305 | 372 | 288 | 205 | 174 | 75 |
| 10 | 180 | 160 | 12 | 13 | 10 | 120 | 305 | 374 | 284 | 203 | 178 | 85 |
| 11 | 200 | 160 | 12 | 12 | 9.5 | 110 | 329 | 358 | 278 | 191 | 179 | 66 |
| 12 | 240 | 160 | 12 | 12 | 9.5 | 110 | 344 | 346 | 270 | 177 | 179 | 65 |
| 13 | 300 | 80 | 12 | 11 | 9.0 | 115 | 400 | 366 | 263 | 169 | 179 | 62 |
| 14 | 300 | 40 | 13 | 10 | 9.0 | 100 | 450 | 344 | 257 | 169 | 179 | 58 |
| 15 | 300 | 40 | 13 | 10 | 9.0 | 65 | 500 | 329 | 253 | 169 | 179 | 56 |
| 16 | 300 | 36 | 13 | 9.0 | 8.5 | 60 | 473 | 329 | 243 | 167 | 179 | 42 |
| 17 | 300 | 41 | 12 | 8.0 | 8.5 | 60 | 466 | 353 | 243 | 166 | 174 | 43 |
| 18 | 300 | 39 | 12 | 8.0 | 8.5 | 50 | 457 | 326 | 238 | 170 | 118 | 32 |
| 19 | 300 | 42 | 11 | 7.0 | 8.5 | 40 | 440 | 321 | 232 | 189 | 69 | 32 |
| 20 | 300 | 38 | 11 | 7.0 | 8.5 | 35 | 437 | 309 | 229 | 177 | 52 | 32 |
| 21 | 300 | 30 | 11 | 6.0 | 8.0 | 32 | 431 | 329 | 221 | 167 | 55 | 25 |
| 22 | 300 | 30 | 11 | 6.0 | 8.0 | 35 | 419 | 318 | 221 | 179 | 63 | 37 |
| 23 | 290 | 29 | 11 | 6.0 | 8.5 | 60 | 412 | 290 | 238 | 159 | 64 | 30 |
| 24 | 280 | 29 | 11 | 6.0 | 9.0 | 350 | 413 | 293 | 260 | 161 | 64 | 34 |
| 25 | 270 | 28 | 11 | 6.0 | 10 | 600 | 406 | 286 | 258 | 164 | 73 | 30 |
| 26 | 270 | 27 | 11 | 6.0 | 60 | 800 | 400 | 279 | 254 | 167 | 73 | 29 |
| 27 | 230 | 27 | 11 | 6.0 | 170 | 1100 | 391 | 278 | 251 | 159 | 74 | 36 |
| 28 | 150 | 26 | 11 | 6.0 | 180 | 1000 | 380 | 294 | 243 | 161 | 77 | 32 |
| 29 | 120 | 25 | 12 | 5.0 | 170 | 900 | 375 | 289 | 243 | 151 | 76 | 29 |
| 30 | 100 | 24 | 12 | 6.0 | --- | 800 | 370 | 279 | 243 | 163 | 76 | 32 |
| 31 | 50 | --- | 12 | 6.0 | --- | 750 | --- | 273 | --- | 177 | 76 | --- |
| TOTAL | 6820 | 2596 | 406 | 291.0 | 798.0 | 8477 | 13163 | 10861 | 7826 | 5803 | 3959 | 1441 |
| MEAN | 220 | 86.5 | 13.1 | 9.39 | 27.5 | 273 | 439 | 350 | 261 | 187 | 128 | 48.0 |
| MAX | 300 | 180 | 24 | 14 | 180 | 1100 | 720 | 467 | 304 | 243 | 179 | 85 |
| MIN | 50 | 24 | 11 | 5.0 | 6.0 | 32 | 300 | 273 | 221 | 151 | 52 | 25 |
| AC-FT | 13530 | 5150 | 805 | 577 | 1580 | 16810 | 26110 | 21540 | 15520 | 11510 | 7850 | 2860 |
| CAL YR 1983 | TOTAL | 87728.7 | | MEAN | 240 | MAX | 1030 | MIN | 9.8 | AC-FT | 174000 | |
| WTR YR 1984 | TOTAL | 62441.0 | | MEAN | 171 | MAX | 1100 | MIN | 5.0 | AC-FT | 123900 | |

JAMES RIVER BASIN

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

PERIOD OF RECORD.--Water years 1957 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: June 1953 to September 1975, October 1976 to current year.

SPECIFIC CONDUCTANCE: October 1976 to current year.

INSTRUMENTATION.--Temperature records from June 1953 to September 1975, November 1976 to September 1978.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum, 33.0°C July 12, 13, 1957; July 23, 1977; minimum, 0.0°C on many days during winter months.

SPECIFIC CONDUCTANCE: Maximum daily, 1,880 micromhos Jan. 31, 1979; minimum daily, 200 micromhos Mar. 24, 25, and 26, 1978.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum 30.0°C Aug. 5, 6; minimum, 0.0°C on many days during the winter

SPECIFIC CONDUCTANCE: Maximum daily, 1,480 micromhos Feb. 11; minimum daily, 280 micromhos Mar. 11.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | COLOR (PLAT- INUM- COBALT UNITS) (00080) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-------|------|--|--|---|--|--|---|--|---|
| NOV | | | | | | | | | |
| 14... | 1545 | 41 | 740 | 8.7 | .0 | 2.5 | -- | 14.1 | -- |
| DEC | | | | | | | | | |
| 20... | 1130 | 5.0 | 1210 | 7.6 | -2 .9 | .0 | 10 | 10.6 | 70 |
| JAN | | | | | | | | | |
| 30... | 1530 | 8.0 | 1350 | 7.8 | .0 | .0 | 10 | 6.0 | -- |
| APR | | | | | | | | | |
| 26... | 1330 | 394 | 580 | 8.3 | 6.0 | 9.0 | 100 | 10.0 | 86 |
| JUN | | | | | | | | | |
| 06... | 1030 | 311 | 600 | 7.6 | 18.0 | 18.0 | 25 | 6.3 | 67 |
| 25... | 1400 | 278 | 630 | 8.2 | 26.0 | 23.5 | 120 | 6.8 | 79 |
| AUG | | | | | | | | | |
| 06... | 1400 | 178 | 710 | 8.1 | 30.0 | 26.0 | 140 | 5.5 | 67 |
| SEP | | | | | | | | | |
| 24... | 1430 | 30 | 835 | 8.6 | .0 | 8.5 | 70 | 10.1 | 85 |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LINITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) |
|-------|---|--|---|---|---|------------------------------|--|--|--|--|--|--|
| DEC | | | | | | | | | | | | |
| 20... | 460 | 44 | 110 | 45 | 97 | 31 | 2 | 14 | 417 | 20 | 200 | 43 |
| JAN | | | | | | | | | | | | |
| 30... | 520 | 61 | 130 | 48 | 120 | 33 | 2 | 11 | 462 | 14 | 220 | 57 |
| APR | | | | | | | | | | | | |
| 26... | 200 | 0 | 43 | 23 | 39 | 28 | 1 | 13 | 212 | 2.0 | 88 | 11 |
| JUN | | | | | | | | | | | | |
| 06... | 200 | 3 | 41 | 23 | 43 | 31 | 1 | 12 | 194 | 9.4 | 89 | 13 |
| AUG | | | | | | | | | | | | |
| 06... | 240 | 22 | 50 | 27 | 57 | 33 | 2 | 14 | 214 | 3.3 | 140 | 15 |

| DATE | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | PHOS- PHORUS, TOTAL (MG/L AS P) (00665) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | BORON, DIS- SOLVED (UG/L AS B) (01020) | ZINC, DIS- SOLVED (UG/L AS ZN) (01090) |
|-------|---|--|---|--|--|--|---|--|--|---|---|---|
| DEC | | | | | | | | | | | | |
| 20... | .30 | 7.3 | 708 | 770 | .96 | 9.6 | -- | .32 | -- | .060 | 280 | -- |
| JAN | | | | | | | | | | | | |
| 30... | .30 | 23 | 981 | 890 | 1.3 | 21 | -- | .49 | -- | .060 | 360 | 0 |
| APR | | | | | | | | | | | | |
| 26... | .20 | 4.1 | 366 | 350 | .50 | 389 | -- | <.10 | -- | .070 | 90 | -- |
| JUN | | | | | | | | | | | | |
| 06... | .10 | 5.0 | 347 | 340 | .47 | 291 | -- | .20 | -- | .090 | 90 | -- |
| AUG | | | | | | | | | | | | |
| 06... | .20 | 14 | 454 | 450 | .62 | 218 | -- | .39 | -- | .160 | 120 | -- |
| SEP | | | | | | | | | | | | |
| 24... | -- | -- | -- | -- | -- | -- | <.10 | <.10 | .230 | .110 | 200 | -- |

JAMES RIVER BASIN

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06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SEDI- MENT, SUS- PENDED (MG/L) (80154) | SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155) |
|--------------|------|--|---|---|
| NOV 14... | 1545 | 41 | 40 | 4.4 |
| JUN 06... | 1030 | 311 | 96 | 81 |
| 25... | 1400 | 278 | 110 | 83 |
| AUG 06... | 1400 | 178 | 70 | 34 |
| SEP 24... | 1430 | 30 | 39 | 3.2 |

JAMES RIVER BASIN

06470500 JAMES RIVER AT LAMOURS, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|---------|------|------|----------|-----|-----|----------|-----|-----|---------|-----|-----|------|
| OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | | |
| 1 | 12.5 | 11.5 | 12.0 | 9.0 | 8.0 | 8.5 | 1.0 | .5 | 1.0 | .0 | .0 | .0 |
| 2 | 12.0 | 11.5 | 11.5 | 8.5 | 8.0 | 8.5 | 1.0 | .5 | .5 | .5 | .0 | .0 |
| 3 | 12.0 | 11.0 | 11.5 | 8.5 | 7.5 | 8.0 | .5 | .5 | .5 | .5 | .0 | .0 |
| 4 | 12.0 | 11.0 | 11.5 | 7.0 | 7.0 | 7.0 | 1.0 | .5 | .5 | .5 | .5 | .5 |
| 5 | 12.0 | 10.5 | 11.0 | 8.0 | 7.0 | 7.5 | 1.0 | .5 | 1.0 | .5 | .5 | .5 |
| 6 | 13.0 | 12.0 | 12.5 | 7.5 | 6.5 | 7.0 | 1.0 | 1.0 | 1.0 | .5 | .5 | .5 |
| 7 | 12.5 | 11.5 | 12.0 | 8.0 | 6.5 | 7.5 | 1.0 | .5 | 1.0 | 1.0 | .5 | 1.0 |
| 8 | 12.0 | 10.0 | 11.0 | 7.0 | 6.5 | 7.0 | 1.0 | .5 | .5 | 1.0 | .5 | .5 |
| 9 | 12.5 | 10.5 | 11.5 | 6.5 | 5.0 | 6.0 | .5 | .5 | .5 | .5 | .5 | .5 |
| 10 | 14.0 | 12.5 | 13.0 | 5.0 | 4.0 | 4.5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 11 | 13.0 | 10.5 | 12.0 | 4.5 | 3.5 | 4.0 | .5 | .5 | .5 | .5 | .5 | .5 |
| 12 | 10.5 | 8.5 | 9.5 | 3.5 | 1.5 | 2.5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 13 | 9.5 | 7.5 | 8.0 | 2.5 | 1.5 | 2.0 | 1.0 | .5 | .5 | .5 | .5 | .5 |
| 14 | 9.0 | 7.5 | 8.0 | 2.5 | 1.5 | 2.0 | 1.0 | 1.0 | 1.0 | .5 | .0 | .5 |
| 15 | 9.0 | 8.0 | 8.5 | 3.0 | 2.0 | 2.5 | 1.0 | 1.0 | 1.0 | .0 | .0 | .0 |
| 16 | 8.0 | 7.0 | 7.5 | 3.0 | 2.5 | 2.5 | 1.0 | 1.0 | 1.0 | .0 | .0 | .0 |
| 17 | 7.5 | 6.5 | 7.0 | 3.0 | 2.0 | 2.5 | 1.0 | .5 | 1.0 | .0 | .0 | .0 |
| 18 | 7.5 | 6.5 | 7.0 | 4.0 | 2.5 | 3.0 | .5 | .5 | .5 | .0 | .0 | .0 |
| 19 | 7.5 | 6.5 | 7.0 | 3.0 | 2.5 | 2.5 | .5 | .5 | .5 | .0 | .0 | .0 |
| 20 | 8.5 | 7.5 | 8.0 | 2.5 | 2.0 | 2.0 | .5 | .5 | .5 | .5 | .0 | .5 |
| 21 | 8.5 | 8.0 | 8.5 | 2.0 | 1.5 | 1.5 | .5 | .5 | .5 | 1.0 | .5 | .5 |
| 22 | 9.5 | 8.5 | 8.5 | 1.5 | .5 | .5 | .5 | .5 | .5 | 1.0 | .5 | 1.0 |
| 23 | 9.5 | 8.0 | 8.5 | 1.0 | .5 | .5 | 1.0 | .5 | .5 | 1.0 | 1.0 | 1.0 |
| 24 | 10.0 | 9.0 | 9.0 | 1.5 | 1.0 | 1.0 | 1.0 | .5 | .5 | 1.0 | 1.0 | 1.0 |
| 25 | 9.5 | 8.0 | 8.5 | 1.5 | 1.0 | 1.5 | .5 | .5 | .5 | 1.0 | .5 | 1.0 |
| 26 | 9.5 | 8.0 | 8.5 | 1.5 | 1.5 | 1.5 | .5 | .5 | .5 | 1.0 | .5 | .5 |
| 27 | 10.5 | 8.5 | 9.5 | 1.5 | 1.0 | 1.5 | .5 | .5 | .5 | .5 | .5 | .5 |
| 28 | 10.0 | 8.5 | 9.0 | 1.0 | .5 | 1.0 | .5 | .5 | .5 | .5 | .0 | .5 |
| 29 | 8.5 | 7.5 | 8.0 | 1.0 | .5 | .5 | .5 | .0 | .5 | .5 | .0 | .0 |
| 30 | 8.5 | 7.0 | 7.5 | 1.0 | .5 | 1.0 | .0 | .0 | .0 | .0 | .0 | .0 |
| 31 | 8.5 | 7.5 | 8.0 | | | | .0 | .0 | .0 | .0 | .0 | .0 |
| MONTH | 14.0 | 6.5 | 9.5 | 9.0 | .5 | 3.5 | 1.0 | .0 | .5 | 1.0 | .0 | .5 |

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|----------|-----|-----|-------|-----|-----|-------|------|------|------|------|------|------|
| FEBRUARY | | | MARCH | | | APRIL | | | MAY | | | |
| 1 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 8.5 | 5.5 | 7.0 |
| 2 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 9.0 | 7.5 | 8.0 |
| 3 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 11.0 | 8.5 | 9.5 |
| 4 | .0 | .0 | .0 | .0 | .0 | .0 | .5 | .0 | .0 | 10.0 | 9.0 | 9.5 |
| 5 | .0 | .0 | .0 | .0 | .0 | .0 | 5.0 | .0 | 1.5 | 12.0 | 8.5 | 10.5 |
| 6 | .5 | .0 | .0 | .0 | .0 | .0 | 7.5 | 5.0 | 6.0 | 11.5 | 10.5 | 11.0 |
| 7 | .5 | .0 | .0 | .0 | .0 | .0 | 8.5 | 6.5 | 7.5 | 10.5 | 9.0 | 9.5 |
| 8 | .5 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.5 | 7.5 | 11.0 | 8.5 | 9.5 |
| 9 | .5 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.0 | 7.5 | 11.5 | 9.0 | 10.5 |
| 10 | .5 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.5 | 7.5 | 13.5 | 10.5 | 12.0 |
| 11 | .0 | .0 | .0 | .0 | .0 | .0 | 8.0 | 7.5 | 7.5 | 14.0 | 12.0 | 13.0 |
| 12 | .0 | .0 | .0 | .0 | .0 | .0 | 7.5 | 6.5 | 7.0 | 14.5 | 12.0 | 13.5 |
| 13 | .0 | .0 | .0 | .0 | .0 | .0 | 6.5 | 6.0 | 6.0 | 14.5 | 12.5 | 13.5 |
| 14 | .0 | .0 | .0 | .0 | .0 | .0 | 8.0 | 5.5 | 6.5 | 15.5 | 13.0 | 14.5 |
| 15 | .0 | .0 | .0 | .0 | .0 | .0 | 9.0 | 6.5 | 7.5 | 15.0 | 14.5 | 14.5 |
| 16 | .0 | .0 | .0 | .0 | .0 | .0 | 10.0 | 7.5 | 9.0 | 19.0 | 14.0 | 16.5 |
| 17 | .5 | .0 | .0 | .0 | .0 | .0 | 11.0 | 8.5 | 9.5 | 19.0 | 17.0 | 18.0 |
| 18 | .5 | .0 | .0 | .0 | .0 | .0 | 11.5 | 9.0 | 10.5 | 19.0 | 16.5 | 18.0 |
| 19 | .5 | .0 | .0 | .0 | .0 | .0 | 12.5 | 10.0 | 11.0 | 19.5 | 17.0 | 18.5 |
| 20 | .0 | .0 | .0 | .0 | .0 | .0 | 13.0 | 11.0 | 12.0 | 20.0 | 17.5 | 18.5 |
| 21 | .0 | .0 | .0 | .0 | .0 | .0 | 12.5 | 11.0 | 12.0 | 18.5 | 16.5 | 17.5 |
| 22 | .0 | .0 | .0 | .0 | .0 | .0 | 13.0 | 10.5 | 12.0 | 17.0 | 15.5 | 16.5 |
| 23 | .0 | .0 | .0 | .5 | .0 | .0 | 14.0 | 11.0 | 12.5 | 17.5 | 15.0 | 16.5 |
| 24 | .5 | .0 | .0 | .0 | .0 | .0 | 13.0 | 12.0 | 12.5 | 16.5 | 14.5 | 16.0 |
| 25 | .0 | .0 | .0 | .0 | .0 | .0 | 12.0 | 11.0 | 11.5 | 14.0 | 13.0 | 13.5 |
| 26 | .0 | .0 | .0 | .0 | .0 | .0 | 10.5 | 8.5 | 9.5 | 15.5 | 12.0 | 14.0 |
| 27 | .5 | .0 | .0 | .0 | .0 | .0 | 8.5 | 5.5 | 8.0 | 15.5 | 14.0 | 14.5 |
| 28 | .0 | .0 | .0 | .5 | .0 | .0 | 6.5 | 3.5 | 5.0 | 16.0 | 13.0 | 14.5 |
| 29 | .0 | .0 | .0 | .5 | .0 | .0 | 7.5 | 5.5 | 6.5 | 17.5 | 14.5 | 16.0 |
| 30 | | | | .5 | .0 | .0 | 7.0 | 5.0 | 6.0 | 18.5 | 15.0 | 16.5 |
| 31 | | | | .0 | .0 | .0 | | | | 21.0 | 17.0 | 18.5 |
| MONTH | .5 | .0 | .0 | .5 | .0 | .0 | 14.0 | .0 | 7.5 | 21.0 | 5.5 | 14.0 |

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|------|------|------|------|------|--------|------|------|-----------|------|------|------|
| JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | | | |
| 1 | 19.5 | 16.5 | 17.5 | 24.0 | 22.0 | 23.0 | 27.0 | 25.0 | 26.0 | 17.0 | 15.5 | 16.0 |
| 2 | 18.5 | 15.5 | 17.0 | 26.5 | 22.5 | 24.5 | 26.5 | 25.0 | 26.0 | 17.5 | 14.5 | 16.0 |
| 3 | 18.5 | 17.0 | 18.0 | 27.0 | 24.0 | 25.5 | 26.0 | 25.0 | 25.5 | 18.5 | 16.0 | 17.0 |
| 4 | 18.0 | 17.5 | 17.5 | 25.0 | 23.0 | 24.0 | 25.5 | 24.0 | 24.5 | 18.0 | 15.5 | 16.5 |
| 5 | 19.5 | 17.0 | 18.0 | 23.5 | 22.0 | 22.5 | 26.5 | 24.0 | 25.0 | 17.0 | 15.5 | 16.5 |
| 6 | 19.5 | 18.0 | 19.0 | 23.5 | 20.5 | 22.0 | 27.0 | 25.5 | 26.0 | 17.0 | 15.5 | 16.0 |
| 7 | 18.5 | 18.0 | 18.5 | 22.0 | 20.5 | 21.0 | 27.5 | 25.0 | 26.0 | 17.5 | 16.0 | 16.5 |
| 8 | 19.5 | 17.5 | 18.5 | 24.5 | 20.5 | 22.0 | 26.5 | 24.5 | 25.5 | 16.5 | 14.0 | 15.0 |
| 9 | 19.0 | 18.0 | 18.5 | 26.0 | 23.0 | 24.5 | 24.5 | 22.5 | 24.0 | 14.5 | 13.5 | 14.0 |
| 10 | 18.5 | 16.0 | 17.0 | 26.5 | 24.0 | 25.0 | 24.5 | 22.5 | 23.5 | 15.5 | 13.5 | 14.5 |
| 11 | 17.5 | 16.5 | 17.0 | 26.5 | 23.5 | 25.0 | 25.0 | 23.0 | 24.0 | 15.0 | 13.5 | 14.0 |
| 12 | 19.5 | 16.0 | 17.5 | 27.0 | 24.0 | 25.5 | 26.0 | 23.0 | 24.5 | 16.0 | 14.0 | 15.0 |
| 13 | 21.0 | 18.0 | 19.5 | 27.5 | 24.5 | 26.0 | 26.0 | 23.5 | 24.5 | 16.0 | 14.5 | 15.0 |
| 14 | 20.0 | 18.5 | 19.0 | 27.0 | 25.5 | 26.0 | 24.5 | 23.0 | 23.5 | 15.5 | 14.0 | 15.0 |
| 15 | 21.0 | 18.5 | 19.5 | 26.0 | 24.0 | 25.0 | 25.0 | 22.0 | 23.5 | 15.5 | 13.5 | 14.0 |
| 16 | 24.5 | 21.0 | 22.5 | 25.5 | 23.5 | 24.0 | 25.0 | 22.5 | 23.5 | 15.5 | 14.0 | 14.5 |
| 17 | 25.5 | 23.0 | 24.0 | 24.0 | 22.0 | 23.0 | 25.5 | 24.0 | 24.5 | 16.5 | 13.5 | 14.0 |
| 18 | 25.0 | 22.5 | 23.5 | 24.5 | 22.0 | 23.0 | 25.5 | 23.0 | 24.0 | 17.0 | 15.5 | 16.0 |
| 19 | 24.0 | 22.0 | 22.5 | 24.0 | 22.5 | 23.5 | 24.0 | 22.0 | 23.5 | 19.0 | 16.5 | 17.5 |
| 20 | 22.0 | 20.5 | 21.5 | 24.5 | 22.0 | 23.0 | 23.0 | 22.0 | 22.5 | 18.0 | 16.0 | 16.5 |
| 21 | 24.0 | 21.5 | 22.5 | 26.0 | 23.0 | 24.5 | 23.0 | 20.5 | 21.5 | 17.0 | 15.0 | 16.0 |
| 22 | 24.0 | 22.0 | 23.0 | 27.5 | 25.0 | 26.0 | 22.0 | 19.5 | 20.5 | 17.0 | 15.5 | 16.0 |
| 23 | 22.5 | 21.0 | 21.5 | 25.5 | 24.0 | 24.5 | 21.0 | 19.0 | 20.0 | 15.0 | 10.5 | 12.5 |
| 24 | 23.5 | 20.0 | 21.5 | 24.0 | 22.5 | 23.5 | 21.5 | 19.5 | 20.5 | 10.5 | 7.5 | 9.0 |
| 25 | 24.5 | 21.5 | 23.0 | 23.5 | 22.5 | 23.0 | 23.5 | 20.0 | 21.5 | 7.5 | 6.5 | 7.0 |
| 26 | 23.0 | 21.5 | 22.5 | 24.0 | 21.0 | 22.5 | 23.5 | 22.0 | 22.5 | 7.0 | 5.5 | 6.5 |
| 27 | 24.0 | 20.5 | 22.0 | 24.5 | 22.5 | 23.5 | 24.0 | 21.5 | 23.0 | 8.0 | 6.5 | 7.0 |
| 28 | 25.0 | 22.0 | 23.5 | 25.5 | 23.0 | 24.0 | 24.0 | 21.5 | 23.0 | 9.0 | 6.5 | 7.5 |
| 29 | 25.0 | 22.5 | 24.0 | 25.5 | 23.0 | 24.0 | 22.5 | 20.5 | 21.5 | 9.5 | 7.0 | 8.5 |
| 30 | 24.5 | 22.0 | 23.5 | 25.0 | 22.5 | 23.5 | 20.5 | 18.0 | 19.0 | 9.5 | 7.5 | 8.5 |
| 31 | | | | 27.0 | 23.5 | 25.0 | 18.5 | 17.0 | 17.5 | | | |
| MONTH | 25.5 | 15.5 | 20.5 | 27.5 | 20.5 | 24.0 | 27.5 | 17.0 | 23.0 | 19.0 | 5.5 | 13.5 |
| YEAR | 27.5 | .0 | 9.5 | | | | | | | | | |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|-----|------|----------|-----|------|----------|------|------|---------|------|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | 690 | 610 | 660 | 740 | 690 | 711 | 1030 | 1000 | 1010 | 1320 | 1290 | 1310 |
| 2 | 700 | 640 | 670 | 760 | 700 | 730 | 1050 | 1000 | 1030 | 1300 | 1270 | 1290 |
| 3 | 690 | 630 | 661 | 770 | 750 | 761 | 1070 | 1040 | 1050 | 1280 | 1260 | 1270 |
| 4 | 690 | 600 | 665 | 790 | 750 | 773 | 1080 | 1050 | 1070 | 1270 | 1260 | 1260 |
| 5 | 690 | 640 | 670 | 780 | 710 | 745 | 1090 | 1060 | 1080 | 1260 | 1240 | 1250 |
| 6 | 700 | 640 | 681 | 820 | 790 | 806 | 1120 | 1080 | 1100 | 1240 | 1220 | 1230 |
| 7 | 690 | 670 | 682 | 810 | 720 | 761 | 1140 | 1110 | 1120 | 1220 | 1190 | 1200 |
| 8 | 700 | 650 | 677 | 760 | 720 | 742 | 1150 | 1100 | 1130 | 1210 | 1190 | 1200 |
| 9 | 700 | 650 | 680 | 760 | 730 | 742 | 1170 | 1100 | 1150 | 1200 | 1180 | 1190 |
| 10 | 710 | 670 | 686 | 770 | 680 | 728 | 1160 | 1140 | 1150 | 1210 | 1190 | 1200 |
| 11 | 710 | 660 | 684 | 760 | 710 | 733 | 1150 | 1120 | 1130 | 1220 | 1200 | 1210 |
| 12 | 710 | 660 | 686 | 770 | 740 | 749 | 1150 | 1120 | 1130 | 1250 | 1220 | 1240 |
| 13 | 730 | 610 | 680 | 780 | 730 | 753 | 1130 | 1100 | 1120 | 1290 | 1260 | 1280 |
| 14 | 650 | 620 | 637 | 770 | 720 | 744 | 1140 | 1110 | 1120 | 1320 | 1290 | 1300 |
| 15 | 650 | 610 | 625 | 760 | 730 | 751 | 1130 | 1120 | 1130 | 1320 | 1310 | 1320 |
| 16 | 650 | 600 | 613 | 760 | 740 | 748 | 1140 | 1090 | 1130 | 1320 | 1310 | 1320 |
| 17 | 650 | 620 | 634 | 770 | 740 | 754 | 1170 | 1130 | 1150 | 1320 | 1300 | 1310 |
| 18 | 640 | 600 | 629 | 780 | 750 | 760 | 1180 | 1160 | 1170 | 1310 | 1300 | 1300 |
| 19 | 670 | 610 | 637 | 790 | 760 | 769 | 1190 | 1170 | 1190 | 1330 | 1310 | 1320 |
| 20 | 660 | 600 | 634 | 800 | 760 | 780 | 1220 | 1180 | 1210 | 1570 | 1320 | 1390 |
| 21 | 660 | 620 | 640 | 780 | 740 | 770 | 1230 | 1210 | 1220 | 1690 | 1370 | 1450 |
| 22 | 640 | 600 | 619 | 810 | 770 | 790 | 1260 | 1230 | 1240 | 1750 | 1580 | 1670 |
| 23 | 660 | 620 | 630 | 810 | 790 | 798 | 1270 | 1210 | 1250 | 1650 | 1630 | 1650 |
| 24 | 660 | 620 | 646 | 830 | 780 | 803 | 1290 | 1270 | 1280 | 1650 | 1560 | 1620 |
| 25 | 690 | 610 | 665 | 870 | 820 | 842 | 1320 | 1290 | 1310 | 1560 | 1450 | 1490 |
| 26 | 700 | 660 | 676 | 920 | 870 | 891 | 1330 | 1310 | 1320 | 1480 | 1450 | 1460 |
| 27 | 700 | 630 | 672 | 980 | 910 | 945 | 1340 | 1320 | 1330 | 1460 | 1410 | 1440 |
| 28 | 660 | 620 | 645 | 1010 | 960 | 989 | 1340 | 1320 | 1330 | 1420 | 1400 | 1410 |
| 29 | 700 | 640 | 672 | 1010 | 970 | 992 | 1350 | 1330 | 1340 | 1400 | 1370 | 1390 |
| 30 | 710 | 660 | 680 | 1020 | 980 | 995 | 1340 | 1320 | 1330 | 1370 | 1310 | 1360 |
| 31 | 720 | 660 | 681 | | | | 1320 | 1310 | 1320 | 1340 | 1300 | 1330 |
| MONTH | 730 | 600 | 659 | 1020 | 680 | 795 | 1350 | 1000 | 1180 | 1750 | 1180 | 1340 |

JAMES RIVER BASIN

313

06470800 BEAR CREEK NEAR OAKES, ND

LOCATION.--Lat 46°13'31", long 98°04'17", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.28, T.132 N., R.59 W., Dickey County, Hydrologic Unit 10160003, on right bank 80 ft downstream from bridge on ND Highway 13, 6 mi north, and 1 mi east of Oakes.

DRAINAGE AREA.--About 437 mi², contributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1976 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,291.30 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Record fair.

AVERAGE DISCHARGE.--8 years, 9.20 ft³/s, 6,670 acre-ft/yr; median of yearly mean discharges, 5.4 ft³/s, 3,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,170 ft³/s Apr. 15, 1979, gage height, 11.47 ft; no flow for long periods each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 1, 1975, reached a stage of 15.00 ft present datum, from flood-mark, discharge, 4,590 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|--------------------------------|------------------|---------|------|--------------------------------|------------------|
| Mar. 27 | 0430 | 350 | Ice jam | Mar. 31 | 0230 | *600 | b9.82 |

No flow for several weeks.

b - Backwater from ice

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-----|------|------|---------|------|--------|------|-------|-------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | .00 | 400 | 26 | .18 | .20 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | .00 | 300 | 25 | .16 | .18 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | .00 | 260 | 22 | .13 | .16 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | .00 | 234 | 20 | .12 | .14 | .00 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | .00 | 166 | 19 | .14 | .12 | .00 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | .00 | 129 | 18 | .16 | .10 | .00 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | .00 | 105 | 16 | .16 | .10 | .00 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | .00 | 90 | 14 | .20 | .08 | .00 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | .00 | 75 | 12 | .20 | .08 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | .00 | 57 | 11 | .20 | .06 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | .00 | 81 | 9.7 | .18 | .06 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | .00 | 64 | 8.3 | .18 | .04 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | .00 | 61 | 7.4 | .18 | .02 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | .00 | 56 | 6.2 | .18 | .01 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | .00 | 51 | 5.3 | .20 | .00 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | .00 | 45 | 4.5 | .22 | .00 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | .00 | 38 | 3.7 | .22 | .00 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | .00 | 34 | 2.8 | .20 | .00 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | .00 | 31 | 2.2 | .24 | .00 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .00 | .00 | 27 | 1.9 | .22 | .00 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | .00 | .00 | 22 | 1.7 | .20 | .00 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | .00 | .00 | 20 | 1.6 | .24 | .00 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | .00 | 10 | 18 | 1.3 | .24 | .00 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | .00 | 100 | 16 | 1.1 | .22 | .00 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | .00 | 200 | 14 | .87 | .22 | .00 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | .00 | 250 | 13 | .72 | .20 | .00 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .00 | 300 | 12 | .59 | .18 | .00 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | .00 | 240 | 11 | .47 | .18 | .00 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | .00 | 200 | 10 | .36 | .16 | .00 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | .00 | 500 | 20 | .23 | .16 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 550 | --- | .20 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | .00 | 2350.00 | 2460 | 244.14 | 5.67 | 1.35 | .00 | .00 |
| MEAN | .00 | .00 | .00 | .00 | .00 | 75.8 | 82.0 | 7.88 | .19 | .04 | .00 | .00 |
| MAX | .00 | .00 | .00 | .00 | .00 | 550 | 400 | 26 | .24 | .20 | .00 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | .00 | 10 | .20 | .12 | .00 | .00 | .00 |
| AC-FT | .00 | .00 | .00 | .00 | .00 | 4660 | 4880 | 484 | 11 | 2.7 | .00 | .00 |
| CAL YR 1983 | TOTAL | 238.13 | | MEAN | .65 | MAX | 28 | MIN | .00 | AC-FT | 472 | |
| WTR YR 1984 | TOTAL | 5061.16 | | MEAN | 13.8 | MAX | 550 | MIN | .00 | AC-FT | 10040 | |

JAMES RIVER BASIN

06470800 BEAR CREEK NEAR OAKES, ND--CONTINUED

PERIOD OF RECORD.--Water years 1976 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | HARD- NESS (MG/L AS CAC03) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CAC03) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | |
|--------------|---|--|--|---|--|--|--|--|---|---|--|---|
| MAR 28... | 1000 | 242 | -- | -- | 1.0 | .5 | -- | -- | -- | -- | -- | |
| APR 03... | 1400 | 258 | 230 | 7.2 | 9.0 | 2.5 | 71 | 8 | 17 | 7.0 | 13 | |
| 26... | 1210 | 13 | 690 | -- | 5.0 | 8.5 | -- | -- | -- | -- | -- | |
| DATE | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440) | CAR- BONATE, FET-LAB (MG/L AS CO3) (95445) | ALKA- LINITY LAB (MG/L AS CAC03) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300) |
| APR 03... | 26 | .7 | 8.2 | 77 | .000 | 63 | 7.7 | 33 | 9.5 | .10 | 7.0 | 156 |
| DATE | SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | ARSENIC DIS- SOLVED (UG/L AS AS) (01000) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | LEAD, DIS- SOLVED (UG/L AS PB) (01049) | LITHIUM DIS- SOLVED (UG/L AS LI) (01130) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) | MERCURY DIS- SOLVED (UG/L AS HG) (71890) | SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145) | STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080) |
| APR 03... | 130 | .21 | 109 | 2 | 80 | 140 | 0 | 10 | 80 | 1.3 | 0 | 69 |

JAMES RIVER BASIN

315

06470830 JAMES RIVER AT OAKES, ND

LOCATION.--Lat 46°08'14", long 98°08'09", in NW1/4NE1/4 sec.30, T.131 N., R.59 W., Dickey County, Hydrologic Unit 10160003, on left bank 300 ft downstream from bridge 1.0 mi west of Oakes.

DRAINAGE AREA.--5,480 mi², of which about 3,300 mi² is probably noncontributing.

PERIOD OF RECORD.--October 1982 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1982 to current year.

WATER TEMPERATURES: March 1982 to current year.

INSTRUMENTATION.--Water quality monitor since October 1982.

REMARKS.-- Water quality monitor records supplemented by periodic observer readings of water temperature and specific conductance. Unpublished records of dissolved oxygen are available in files of district office.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum 1,450 micromhos Feb. 13; minimum 400 micromhos Mar. 11.

WATER TEMPERATURES: Maximum daily 26.0°C July 19; minimum 0.0°C on many days during winter months.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | TIME | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) |
|-------|------|--|---|--|--|--|---|
| NOV | | | | | | | |
| 16... | 1400 | 700 | 8.7 | .5 | 2.5 | 13.9 | -- |
| DEC | | | | | | | |
| 20... | 1345 | 1680 | 8.1 | -1 .9 | .0 | 21.8 | 146 |
| FEB | | | | | | | |
| 01... | 0830 | 1560 | 7.8 | - .9 | .0 | 23.2 | -- |
| MAR | | | | | | | |
| 16... | 0900 | 810 | 7.6 | -1 .9 | .0 | 9.2 | -- |
| APR | | | | | | | |
| 27... | 0800 | 600 | 8.0 | 2.0 | 8.0 | 9.6 | 82 |
| JUN | | | | | | | |
| 07... | 0900 | 620 | 7.7 | 15.0 | 19.0 | 7.6 | -- |
| AUG | | | | | | | |
| 28... | 1130 | 800 | 8.5 | 28.0 | 22.0 | 5.6 | -- |

| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) |
|-------|---|--|---|---|---|------------------------------|--|--|
| DEC | | | | | | | | |
| 20... | 610 | 104 | 140 | 64 | 150 | 34 | 3 | 23 |
| FEB | | | | | | | | |
| 01... | 590 | 40 | 140 | 58 | 130 | 32 | 2 | 16 |
| MAR | | | | | | | | |
| 16... | 290 | 4 | 65 | 31 | 58 | 29 | 2 | 14 |
| APR | | | | | | | | |
| 27... | 200 | 6 | 44 | 22 | 41 | 29 | 1 | 12 |

| DATE | ALKA- LITY LAB (MG/L AS CACO3) (90410) | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618) |
|-------|--|--|--|--|---|--|--|--|--|
| DEC | | | | | | | | | |
| 20... | 510 | 7.8 | 310 | 70 | .50 | 990 | 2100 | 2.8 | -- |
| FEB | | | | | | | | | |
| 01... | 549 | 17 | 270 | 69 | .30 | 5.3 | 1000 | 1.4 | -- |
| MAR | | | | | | | | | |
| 16... | 286 | 14 | 130 | 21 | .20 | 9.3 | 500 | .68 | .53 |
| APR | | | | | | | | | |
| 27... | 195 | 3.8 | 98 | 15 | .20 | 5.2 | 350 | .48 | -- |

JAMES RIVER BASIN

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

WATER QUALITY DATA, -WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | OXYGEN, | | | | | | | |
|--------------|--|--|---|---|--|---|---|---|
| | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) |
| DEC 20... | <.10 | .08 | .100 | .030 | .09 | 450 | 12 | 150 |
| FEB 01... | <.10 | .04 | .010 | .010 | .03 | 390 | 9 | 130 |
| MAR 16... | .54 | .79 | .150 | .100 | .31 | 140 | 29 | 150 |
| APR 27... | <.10 | .09 | .090 | .060 | .18 | 90 | 46 | 240 |

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|------|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| 1 | --- | 8.0 | | | | --- | --- | 6.0 | 17.0 | 22.0 | 25.0 | 15.5 |
| 2 | --- | 8.0 | | | | --- | 3.5 | 13.0 | 16.0 | 23.5 | 25.0 | 16.0 |
| 3 | 11.0 | --- | | | | --- | 4.0 | 8.5 | 16.5 | 24.5 | 25.0 | 17.5 |
| 4 | 12.0 | 6.0 | | | | --- | 7.0 | 9.5 | 17.0 | 23.5 | 24.0 | 16.5 |
| 5 | 10.5 | --- | | | | --- | 9.0 | --- | 18.0 | 22.0 | 25.0 | 16.5 |
| 6 | 9.0 | --- | | | | --- | 6.0 | --- | 19.0 | 21.0 | 25.0 | 16.5 |
| 7 | 10.0 | 6.5 | | | | --- | --- | 8.0 | 19.0 | 21.0 | 25.5 | 16.0 |
| 8 | --- | 6.5 | | | | --- | --- | 8.5 | 18.5 | 21.5 | 24.5 | 14.0 |
| 9 | --- | 3.0 | | | | --- | 6.0 | 9.0 | 18.5 | 24.0 | 22.5 | 13.0 |
| 10 | --- | .5 | | | | --- | 7.0 | 10.0 | 16.5 | 24.5 | 23.5 | 14.0 |
| 11 | 10.5 | --- | | | | --- | 8.0 | 11.0 | 16.0 | 24.0 | 24.0 | 14.0 |
| 12 | 7.0 | --- | | | | --- | 7.0 | --- | 17.0 | 24.5 | 23.5 | 15.0 |
| 13 | 5.0 | --- | | | | --- | 6.0 | --- | 19.0 | 24.5 | 24.0 | 15.0 |
| 14 | 5.0 | 1.5 | | | | --- | --- | 13.0 | 19.5 | 25.0 | 23.0 | 15.0 |
| 15 | --- | 1.0 | | | | --- | --- | 14.0 | 19.5 | 23.5 | 22.5 | 15.0 |
| 16 | --- | 2.0 | | | | --- | 9.5 | 15.0 | 22.5 | 23.0 | 23.0 | 14.0 |
| 17 | --- | 2.0 | | | | --- | 9.0 | 17.0 | 23.5 | 22.0 | 24.5 | 14.0 |
| 18 | --- | 1.5 | | | | --- | 14.5 | 16.0 | 23.0 | 22.5 | 23.5 | 16.0 |
| 19 | 7.0 | --- | | | | --- | 11.0 | --- | 22.0 | 23.5 | 23.0 | 18.0 |
| 20 | 7.5 | --- | | | | --- | 11.5 | --- | 21.0 | 23.5 | 21.5 | 16.0 |
| 21 | 8.0 | 1.0 | | | | --- | --- | 17.5 | 22.0 | 24.0 | 21.0 | 15.5 |
| 22 | --- | .5 | | | | --- | --- | 15.0 | 22.5 | 25.0 | 19.5 | 15.5 |
| 23 | --- | --- | | | | --- | 12.0 | 14.5 | 21.5 | 23.0 | 19.5 | 10.0 |
| 24 | 9.0 | --- | | | | --- | 12.0 | 15.0 | 21.5 | 22.5 | 19.5 | 6.0 |
| 25 | 6.5 | --- | | | | --- | 11.5 | 13.0 | 22.5 | 22.0 | 20.5 | 5.0 |
| 26 | 6.0 | --- | | | | 1.0 | 10.0 | --- | 22.0 | 21.5 | 22.0 | 5.5 |
| 27 | 6.5 | --- | | | | 1.0 | 7.0 | --- | 21.5 | 23.5 | 22.5 | 6.5 |
| 28 | 7.0 | --- | | | | 1.0 | --- | --- | 22.5 | 24.0 | 22.5 | 7.0 |
| 29 | --- | --- | | | | 1.0 | --- | 15.0 | 23.5 | 23.5 | 20.5 | 8.0 |
| 30 | --- | --- | | | | --- | 4.5 | 15.5 | 22.5 | 22.5 | 18.0 | 8.5 |
| 31 | 7.0 | --- | | | | --- | --- | 18.0 | --- | 24.5 | 17.0 | --- |
| MEAN | --- | --- | | | | --- | --- | --- | 20.0 | 23.0 | 22.5 | 13.0 |
| MAX | --- | --- | | | | --- | --- | --- | 23.5 | 25.0 | 25.5 | 18.0 |
| MIN | --- | --- | | | | --- | --- | --- | 16.0 | 21.0 | 17.0 | 5.0 |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C). WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | --- | 770 | | | | --- | 290 | 670 | 649 | 648 | 720 | 821 |
| 2 | --- | 720 | | | | --- | 310 | 610 | 639 | 660 | 715 | 834 |
| 3 | 700 | --- | | | | --- | 330 | 670 | 649 | 666 | 712 | 857 |
| 4 | 670 | 720 | | | | --- | 340 | 670 | 651 | 655 | 708 | 859 |
| 5 | 700 | --- | | | | --- | 380 | --- | 658 | 645 | 725 | 858 |
| 6 | 720 | --- | | | | --- | --- | --- | 670 | 647 | 737 | 859 |
| 7 | 720 | 720 | | | | --- | --- | 750 | 664 | 643 | 744 | 859 |
| 8 | --- | 720 | | | | --- | --- | 750 | 659 | 653 | 742 | 855 |
| 9 | --- | 760 | | | | --- | 400 | 670 | 669 | 672 | 734 | 860 |
| 10 | --- | 720 | | | | --- | 410 | 730 | 651 | 675 | 742 | 873 |
| 11 | 730 | --- | | | | --- | 430 | 750 | 645 | 684 | 750 | 874 |
| 12 | 720 | --- | | | | --- | 450 | --- | 650 | 723 | 749 | 880 |
| 13 | 720 | --- | | | | --- | 490 | --- | 658 | 751 | 757 | 883 |
| 14 | 720 | 710 | | | | --- | --- | 690 | 662 | 775 | 760 | 884 |
| 15 | --- | 720 | | | | --- | --- | 720 | 658 | 773 | 754 | 894 |
| 16 | --- | 710 | | | | --- | 550 | 700 | 678 | 750 | 759 | 893 |
| 17 | --- | 700 | | | | --- | 550 | 720 | 673 | 732 | 769 | 906 |
| 18 | --- | 730 | | | | --- | 580 | 720 | 675 | 726 | 767 | 915 |
| 19 | 670 | --- | | | | --- | 630 | --- | 674 | 721 | 768 | 923 |
| 20 | 670 | --- | | | | --- | 630 | --- | 685 | 717 | 764 | 935 |
| 21 | 700 | 770 | | | | --- | --- | 720 | 690 | 720 | 765 | 941 |
| 22 | --- | 760 | | | | --- | --- | 670 | 684 | 723 | 764 | 945 |
| 23 | --- | --- | | | | --- | 610 | 680 | 656 | 690 | 768 | 942 |
| 24 | 700 | --- | | | | --- | 580 | 700 | 641 | 688 | 773 | 941 |
| 25 | 700 | --- | | | | --- | 570 | 670 | 647 | 695 | 784 | 943 |
| 26 | 710 | --- | | | | 340 | 630 | --- | 631 | 683 | 796 | 940 |
| 27 | 700 | --- | | | | 450 | 630 | --- | 633 | 680 | 798 | 936 |
| 28 | 700 | --- | | | | 410 | --- | --- | 668 | 688 | 803 | 933 |
| 29 | --- | --- | | | | 470 | --- | 650 | 677 | 691 | 801 | 930 |
| 30 | --- | --- | | | | 330 | 650 | 660 | 668 | 685 | 805 | 923 |
| 31 | 720 | --- | | | | --- | --- | 645 | --- | 708 | 808 | --- |
| MEAN | --- | --- | | | | --- | --- | --- | 660 | 696 | 759 | 897 |
| MAX | --- | --- | | | | --- | --- | --- | 690 | 775 | 808 | 945 |
| MIN | --- | --- | | | | --- | --- | --- | 631 | 643 | 708 | 821 |

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NR LUDDEN, ND

LOCATION.--Lat 45°56'52", long 98°10'29", in SE1/4NE1/4NE1/4 sec.34, T.129 N., R.60 W., Dickey County, Hydrologic Unit 10160003, on left bank, 10 ft upstream from dam, 4.5 mi southwest of Ludden and .8 mi upstream from North Dakota-South Dakota State line.

DRAINAGE AREA.--5,480 mi², of which about 3,300 mi² are noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1981 to current year.

GAGE.--Water-stage recorder and concrete dam control. Datum of gage is 1,280.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for winter months, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,060 ft³/fts, Apr. 4, 1984, gage height 13.02 ft, no flow part of several days during months when flow is affected by upstream winds.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 2,060 ft³/s, Apr. 4, gage height 13.02 ft; maximum gage height, 13.05 ft Apr. 2, backwater from ice; minimum daily discharge 4.0 ft³/s Sept.22.

EXTREMES FOR CURRENT PERIOD.--

Water year 1982: Maximum discharge, 1270 ft³/s, April 10, gage height 12.44 ft, no flow part of several days during fall months when flow is effected by upstream winds.

Water year 1983: Maximum discharge, 1170 ft³/s, Mar. 12, gage height 12.00 ft, no flow part of several days during fall months when flow is effected by upstream winds.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| 1 | 166 | 108 | 38 | 8.0 | 9.0 | 22 | 1500 | 419 | 321 | 291 | 199 | 102 |
| 2 | 150 | 116 | 36 | 7.0 | 9.0 | 31 | 1700 | 400 | 252 | 246 | 175 | 74 |
| 3 | 150 | 90 | 34 | 8.0 | 9.0 | 55 | 2000 | 389 | 248 | 305 | 151 | 60 |
| 4 | 123 | 28 | 32 | 7.0 | 9.0 | 97 | 2050 | 415 | 267 | 288 | 168 | 85 |
| 5 | 161 | 69 | 29 | 7.0 | 8.5 | 123 | 1850 | 429 | 302 | 296 | 173 | 33 |
| 6 | 123 | 120 | 26 | 7.5 | 8.5 | 144 | 1650 | 469 | 295 | 278 | 154 | 15 |
| 7 | 160 | 121 | 26 | 7.5 | 8.5 | 171 | 1440 | 519 | 298 | 211 | 175 | 33 |
| 8 | 112 | 153 | 26 | 8.0 | 8.5 | 177 | 1250 | 440 | 316 | 212 | 165 | 32 |
| 9 | 36 | 156 | 22 | 8.0 | 8.5 | 170 | 1040 | 358 | 342 | 253 | 170 | 60 |
| 10 | 62 | 110 | 21 | 8.5 | 8.5 | 160 | 915 | 356 | 340 | 220 | 147 | 75 |
| 11 | 203 | 97 | 18 | 9.0 | 8.5 | 155 | 891 | 364 | 281 | 211 | 98 | 60 |
| 12 | 223 | 58 | 17 | 9.0 | 8.5 | 150 | 950 | 290 | 290 | 173 | 80 | 54 |
| 13 | 188 | 81 | 17 | 9.0 | 8.5 | 145 | 960 | 334 | 311 | 156 | 73 | 95 |
| 14 | 170 | 101 | 17 | 9.0 | 9.1 | 140 | 922 | 277 | 298 | 206 | 99 | 88 |
| 15 | 183 | 101 | 14 | 8.5 | 12 | 145 | 845 | 168 | 275 | 199 | 186 | 61 |
| 16 | 177 | 60 | 12 | 8.5 | 18 | 145 | 767 | 39 | 316 | 186 | 156 | 23 |
| 17 | 171 | 58 | 10 | 8.5 | 19 | 141 | 707 | 283 | 349 | 186 | 164 | 4.4 |
| 18 | 215 | 91 | 8.5 | 8.5 | 19 | 123 | 659 | 356 | 351 | 127 | 150 | 56 |
| 19 | 166 | 135 | 8.5 | 8.5 | 17 | 106 | 608 | 341 | 353 | 174 | 80 | 85 |
| 20 | 148 | 118 | 8.5 | 8.0 | 17 | 90 | 579 | 225 | 322 | 135 | 44 | 73 |
| 21 | 171 | 77 | 7.5 | 8.0 | 17 | 79 | 555 | 297 | 300 | 121 | 120 | 18 |
| 22 | 179 | 60 | 7.0 | 8.0 | 17 | 72 | 523 | 305 | 328 | 186 | 100 | 4.0 |
| 23 | 156 | 40 | 6.5 | 7.8 | 17 | 80 | 485 | 212 | 341 | 179 | 30 | 88 |
| 24 | 227 | 40 | 6.0 | 7.8 | 18 | 150 | 478 | 263 | 322 | 167 | 6.4 | 131 |
| 25 | 154 | 41 | 7.0 | 8.3 | 21 | 200 | 460 | 304 | 250 | 168 | 30 | 42 |
| 26 | 168 | 43 | 7.0 | 8.5 | 21 | 300 | 509 | 248 | 330 | 169 | 56 | 7.8 |
| 27 | 183 | 43 | 7.0 | 8.5 | 21 | 400 | 478 | 240 | 294 | 170 | 85 | 46 |
| 28 | 210 | 43 | 8.0 | 8.5 | 21 | 600 | 507 | 248 | 284 | 151 | 101 | 27 |
| 29 | 80 | 43 | 7.0 | 8.5 | 21 | 800 | 517 | 214 | 258 | 77 | 83 | 16 |
| 30 | 71 | 40 | 8.0 | 8.5 | --- | 1100 | 486 | 137 | 199 | 87 | 93 | 22 |
| 31 | 64 | --- | 8.0 | 8.7 | --- | 1300 | --- | 190 | --- | 207 | 102 | --- |
| TOTAL | 4750 | 2441 | 499.5 | 254.1 | 397.6 | 7571 | 28281 | 9529 | 9033 | 6035 | 3613.4 | 1570.2 |
| MEAN | 153 | 81.4 | 16.1 | 8.20 | 13.7 | 244 | 943 | 307 | 301 | 195 | 117 | 52.3 |
| MAX | 227 | 156 | 38 | 9.0 | 21 | 1300 | 2050 | 519 | 353 | 305 | 199 | 131 |
| MIN | 36 | 28 | 6.0 | 7.0 | 8.5 | 22 | 460 | 39 | 199 | 77 | 6.4 | 4.0 |
| AC-FT | 9420 | 4840 | 991 | 504 | 789 | 15020 | 56100 | 18900 | 17920 | 11970 | 7170 | 3110 |
| CAL YR 1983 | TOTAL | 78374.6 | | MEAN | 215 | MAX | 1150 | MIN | 6.0 | AC-FT | 155500 | |
| WTR YR 1984 | TOTAL | 73974.8 | | MEAN | 202 | MAX | 2050 | MIN | 4.0 | AC-FT | 146700 | |

JAMES RIVER BASIN

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06470875 JAMES R. AT DAKOTA LAKE DAM NR LUDDEN, ND

WATER QUALITY RECORDS

PERIOD OF RECORD.--October 1982 to current year.

PERIOD OF DAILY RECORDS.--

WATER TEMPERATURES: October 1982 to current year.

SPECIFIC CONDUCTANCE: October 1982 to current year.

DISSOLVED OXYGEN: October 1982 to current year.

PH: June 1983 to current year.

INSTRUMENTATION: Water quality monitor since October 1982.

REMARKS.--Some records for dissolved oxygen are available in files at the District office.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum 29.0°C August 27, 1984; minimum 0.0°C several days during winter months each year.

SPECIFIC CONDUCTANCE: Maximum 2410 micromhos Feb. 3, 1984; minimum 217 micromhos July 13, 1983.

PH: Maximum recorded 9.9 units Sept. 15, 1983; minimum recorded 5.8 units Dec. 23, 1984.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 29.0°C August 27; minimum 0.0°C several days during winter months.

SPECIFIC CONDUCTANCE: Maximum, 2410 micromhos Feb. 3; minimum 227 micromhos April 4.

PH: Maximum recorded 9.9 units Nov. 8-14; minimum recorded 5.8 units Dec. 23.

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| | | STREAM- FLOW, INSTAN- TANEOUS (CFS) (00061) | SPE- CIFIC CON- DUCT- ANCE (UMHOS) (00095) | PH (STAND- ARD UNITS) (00400) | TEMPER- ATURE, AIR (DEG C) (00020) | TEMPER- ATURE (DEG C) (00010) | OXYGEN, DIS- SOLVED (MG/L) (00300) | OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301) | |
|-------|---|--|--|---|---|--|--|---|--|
| NOV | | | | | | | | | |
| 15... | 1400 | 93 | 660 | 9.7 | .0 | 1.5 | 15.0 | -- | |
| DEC | | | | | | | | | |
| 21... | 1440 | 7.9 | 1190 | 7.9 | -- | 2.0 | 10.8 | 77 | |
| JAN | | | | | | | | | |
| 31... | 0900 | 8.7 | 2300 | 7.8 | - .4 | 1.0 | 20.3 | -- | |
| MAR | | | | | | | | | |
| 15... | 0930 | 145 | 600 | 7.8 | - .9 | .0 | 1.0 | -- | |
| APR | | | | | | | | | |
| 25... | 1000 | 451 | 630 | 8.3 | 8.0 | 12.0 | 10.3 | 94 | |
| JUN | | | | | | | | | |
| 13... | 1430 | 311 | 620 | 8.2 | 22.0 | 21.0 | 11.0 | 120 | |
| JUL | | | | | | | | | |
| 16... | 1330 | 203 | 650 | 8.4 | 25.0 | 23.0 | 7.7 | -- | |
| AUG | | | | | | | | | |
| 27... | 1430 | 87 | 810 | 8.6 | 30.0 | 25.0 | 7.1 | 85 | |
| | | | | | | | | | |
| DATE | HARD- NESS (MG/L AS CACO3) (00900) | HARD- NESS NONCAR- BONATE (MG/L AS CACO3) (95902) | CALCIUM DIS- SOLVED (MG/L AS CA) (00915) | MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925) | SODIUM, DIS- SOLVED (MG/L AS NA) (00930) | PERCENT SODIUM (00932) | SODIUM AD- SORP- TION RATIO (00931) | POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935) | ALKA- LITY LAB (MG/L AS CACO3) (90410) |
| DEC | | | | | | | | | |
| 21... | 450 | 21 | 100 | 49 | 95 | 30 | 2 | 20 | 431 |
| JAN | | | | | | | | | |
| 31... | 890 | 65 | 190 | 100 | 210 | 33 | 3 | 32 | 822 |
| MAR | | | | | | | | | |
| 15... | 200 | 8 | 50 | 19 | 42 | 30 | 1 | 11 | 195 |
| APR | | | | | | | | | |
| 25... | 220 | 10 | 49 | 24 | 42 | 28 | 1 | 12 | 211 |
| JUN | | | | | | | | | |
| 13... | 200 | 0 | 44 | 23 | 46 | 31 | 1 | 13 | 205 |
| AUG | | | | | | | | | |
| 27... | 250 | 22 | 54 | 29 | 65 | 34 | 2 | 16 | 233 |

06470875 JAMES R. AT DAKOTA LAKE DAM NR LUDDEN, ND--CONTINUED

| DATE | CARBON DIOXIDE DIS- SOLVED (MG/L AS CO2) (00405) | SULFATE DIS- SOLVED (MG/L AS SO4) (00945) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950) | SILICA, DIS- SOLVED (MG/L AS SiO2) (00955) | SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) | SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) | SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) | NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618) |
|--------------|--|--|--|---|--|--|--|--|--|
| DEC 21... | 10 | 190 | 35 | .30 | 5.0 | 750 | 1.0 | 16 | -- |
| JAN 31... | 25 | 440 | 100 | .50 | 5.1 | 1600 | 2.1 | 37 | -- |
| MAR 15... | 6.0 | 90 | 24 | .20 | 11 | 370 | .50 | 143 | .47 |
| APR 25... | 2.0 | 100 | 16 | .20 | 6.0 | 380 | .51 | 458 | -- |
| JUN 13... | 2.5 | 98 | 14 | .20 | 3.0 | 360 | .50 | 306 | -- |
| AUG 27... | 1.1 | 160 | 17 | .20 | 1.0 | 480 | .66 | 114 | -- |

| DATE | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666) | PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671) | PHOS- PHATE, ORTHO, DIS- SOLVED (MG/L AS PO4) (00660) | BORON, DIS- SOLVED (UG/L AS B) (01020) | IRON, DIS- SOLVED (UG/L AS FE) (01046) | MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056) |
|--------------|--|--|---|---|--|---|---|---|
| DEC 21... | <.10 | .63 | .200 | .060 | .18 | 220 | 9 | 110 |
| JAN 31... | <.10 | .13 | .050 | .030 | .09 | 520 | 30 | 130 |
| MAR 15... | .50 | 1.0 | .180 | .100 | .31 | 120 | 84 | 240 |
| APR 25... | <.10 | .08 | .030 | .040 | .12 | 100 | 40 | 110 |
| JUN 13... | <.10 | .04 | .010 | <.010 | -- | 110 | 38 | 23 |
| AUG 27... | <.10 | .06 | .020 | .020 | .06 | 140 | 9 | 20 |

JAMES RIVER BASIN

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06470875 JAMES R. AT DAKOTA LAKE DAM NR LUDDEN, ND--CONTINUED

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|------|------|----------|-----|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | 8.0 | 6.0 | 7.5 | 3.0 | 2.5 | 3.0 | 1.0 | 1.0 | 1.0 |
| 2 | --- | --- | --- | 8.0 | 6.5 | 8.0 | 3.0 | 2.5 | 2.5 | 1.5 | 1.0 | --- |
| 3 | 12.5 | 10.5 | 11.5 | 8.0 | 6.0 | 7.5 | 3.0 | 2.5 | 2.5 | --- | --- | --- |
| 4 | 12.0 | 11.0 | 12.0 | 7.0 | 5.5 | 6.5 | 3.0 | 2.5 | 3.0 | --- | --- | --- |
| 5 | --- | --- | --- | 7.5 | 5.5 | 7.0 | 3.0 | 2.5 | 2.5 | --- | --- | --- |
| 6 | 11.0 | 10.0 | 10.5 | 7.0 | 6.0 | 6.5 | 2.5 | 2.0 | 2.5 | --- | --- | --- |
| 7 | --- | --- | --- | 8.0 | 5.0 | 7.0 | 2.5 | 2.0 | 2.5 | --- | --- | --- |
| 8 | 10.5 | 8.0 | 9.5 | 7.0 | 5.0 | 6.5 | 2.5 | 2.0 | 2.5 | 2.0 | 1.5 | 2.0 |
| 9 | 11.5 | 9.0 | 10.0 | 5.5 | 3.5 | 4.5 | 2.5 | 2.0 | 2.5 | 2.0 | 1.5 | 2.0 |
| 10 | 12.5 | 9.5 | 11.5 | 8.0 | 2.5 | 3.0 | 2.5 | 2.0 | 2.5 | 2.5 | 1.5 | 2.0 |
| 11 | --- | --- | --- | 3.0 | 2.0 | 2.5 | 2.5 | 2.0 | 2.5 | --- | --- | --- |
| 12 | --- | --- | --- | 2.0 | 1.0 | 1.5 | 2.5 | 2.0 | 2.0 | --- | --- | --- |
| 13 | --- | --- | --- | 1.5 | 1.0 | 1.5 | 2.5 | 1.5 | 2.0 | 2.5 | --- | 2.0 |
| 14 | 7.0 | 5.5 | 6.5 | 1.5 | 1.0 | 1.0 | 2.0 | 1.5 | 2.0 | --- | --- | --- |
| 15 | 7.0 | 6.5 | 6.5 | 2.0 | 1.0 | 1.5 | 2.0 | 1.5 | 2.0 | 2.0 | --- | --- |
| 16 | 7.0 | 5.5 | 6.5 | 2.5 | 1.5 | 2.0 | 2.0 | 1.5 | 1.5 | 2.0 | 1.5 | 1.5 |
| 17 | 6.0 | 5.0 | 6.0 | 1.5 | 1.5 | 1.5 | 2.0 | 1.5 | 1.5 | --- | --- | --- |
| 18 | 6.5 | 5.0 | 6.0 | 3.0 | 1.5 | 2.0 | 1.5 | 1.0 | 1.5 | --- | --- | --- |
| 19 | 6.5 | 6.0 | 6.5 | 2.5 | 2.0 | 2.0 | 1.5 | 1.0 | 1.5 | 1.5 | --- | 1.5 |
| 20 | 7.5 | 6.5 | 7.0 | 2.0 | 1.5 | 2.0 | 1.5 | 1.0 | 1.5 | --- | --- | --- |
| 21 | 8.0 | 7.0 | 7.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | --- | 1.5 |
| 22 | 8.5 | 7.5 | 8.0 | 1.0 | .5 | .5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 |
| 23 | 9.0 | 7.5 | 8.0 | 1.0 | .5 | .5 | 1.5 | 1.0 | 1.0 | --- | --- | --- |
| 24 | 9.5 | 8.0 | 8.5 | 1.5 | .5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5 | --- | --- |
| 25 | 8.5 | 7.0 | 7.5 | 2.0 | 1.5 | 2.0 | 1.0 | 1.0 | 1.0 | 1.5 | --- | 1.5 |
| 26 | .5 | 6.5 | 8.0 | 2.5 | 2.0 | 2.5 | 1.0 | 1.0 | 1.0 | 1.5 | --- | 1.5 |
| 27 | 8.0 | 7.0 | 8.0 | 2.5 | 2.0 | 2.5 | 1.0 | 1.0 | 1.0 | --- | --- | --- |
| 28 | 9.0 | 7.0 | 8.0 | 2.5 | 2.0 | 2.5 | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 | 1.5 |
| 29 | 7.5 | 6.5 | 7.0 | 3.0 | 2.0 | 2.5 | 1.0 | 1.0 | 1.0 | --- | --- | --- |
| 30 | 7.5 | 6.0 | 6.5 | 3.0 | 2.5 | 2.5 | 1.0 | 1.0 | 1.0 | --- | --- | --- |
| 31 | 7.5 | 6.5 | 7.5 | --- | --- | --- | 1.0 | 1.0 | 1.0 | --- | --- | --- |
| MONTH | 12.5 | 5.0 | 8.0 | 8.0 | .5 | 3.5 | 3.0 | 1.0 | 2.0 | 2.5 | 1.0 | 1.5 |

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|----------|-----|-----|-------|-----|-----|-------|------|------|------|------|------|------|
| FEBRUARY | | | MARCH | | | APRIL | | | MAY | | | |
| 1 | 2.0 | 1.5 | 1.5 | 1.0 | .5 | 1.0 | --- | --- | --- | 9.0 | 4.0 | 6.5 |
| 2 | 2.0 | 1.5 | 1.5 | 1.0 | .5 | 1.0 | --- | --- | --- | 8.0 | 6.5 | 7.5 |
| 3 | 2.0 | 1.5 | 1.5 | .5 | .5 | .5 | --- | --- | --- | 10.0 | 6.5 | 8.5 |
| 4 | 2.0 | 1.0 | 1.5 | .5 | .0 | .5 | --- | --- | --- | 9.5 | 7.5 | 9.0 |
| 5 | 2.0 | 1.0 | 1.5 | .5 | .0 | .0 | --- | --- | --- | 11.5 | 7.0 | 10.0 |
| 6 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 8.5 | --- | 4.0 | 11.5 | 9.0 | 11.0 |
| 7 | 2.0 | 1.5 | 2.0 | .5 | .0 | .5 | 8.5 | 6.0 | 8.0 | 11.0 | 7.5 | 9.5 |
| 8 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 8.5 | 6.5 | --- | 10.0 | 7.0 | 9.0 |
| 9 | 2.5 | 2.0 | 2.0 | .5 | .0 | .0 | --- | 6.5 | --- | 10.5 | 7.0 | 9.5 |
| 10 | 2.5 | 2.0 | 2.5 | .0 | .0 | .0 | 7.5 | 6.0 | 7.5 | 13.0 | 8.5 | 11.5 |
| 11 | 2.5 | 2.0 | 2.5 | .5 | .0 | .0 | 7.5 | 6.0 | 7.5 | 14.0 | 9.5 | 12.5 |
| 12 | 2.0 | 2.0 | 2.0 | .5 | .0 | .5 | 7.5 | 6.0 | 7.0 | 15.0 | 10.0 | 13.5 |
| 13 | 2.0 | 2.0 | 2.0 | .5 | .0 | .5 | 7.0 | 5.5 | 6.5 | 15.5 | 11.0 | 14.0 |
| 14 | 2.0 | 1.5 | 2.0 | .5 | .0 | .5 | 8.0 | 5.0 | --- | 16.5 | 11.5 | 15.0 |
| 15 | 2.0 | 2.0 | 2.0 | .5 | .0 | --- | 9.5 | 5.5 | 8.0 | 15.5 | 12.0 | 15.0 |
| 16 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 10.5 | 6.5 | 9.0 | 20.0 | 12.0 | 16.5 |
| 17 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 11.0 | 7.5 | 10.0 | 19.0 | 14.5 | 18.0 |
| 18 | 2.0 | 1.5 | 1.5 | .5 | .0 | .0 | 12.0 | 8.0 | 10.5 | 20.0 | 14.0 | 18.0 |
| 19 | 2.0 | 1.5 | 1.5 | .5 | .0 | .0 | 13.0 | 9.0 | 12.0 | 20.0 | 15.0 | 18.5 |
| 20 | 2.0 | 1.5 | 1.5 | .5 | .0 | .0 | 14.0 | 10.0 | 12.5 | 19.5 | 14.5 | 18.0 |
| 21 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 14.0 | 10.5 | 13.0 | 18.5 | 14.5 | 17.5 |
| 22 | 2.0 | 1.5 | 2.0 | .5 | .0 | .5 | 13.5 | 10.0 | 12.5 | 17.0 | 13.0 | 16.0 |
| 23 | 2.0 | 1.5 | 2.0 | .5 | .0 | .0 | 15.0 | 10.0 | 13.0 | 17.0 | 12.0 | 15.5 |
| 24 | 2.0 | 1.5 | 1.5 | .5 | .0 | .5 | 13.5 | 9.5 | 12.5 | 16.5 | 12.0 | 15.0 |
| 25 | 1.5 | 1.0 | 1.5 | .5 | .0 | .0 | 16.5 | 9.5 | 12.0 | 14.0 | 10.5 | 13.0 |
| 26 | 1.0 | 1.0 | 1.0 | .5 | .0 | .0 | 16.5 | 5.5 | 10.5 | 15.5 | 10.0 | 13.0 |
| 27 | 1.0 | 1.0 | 1.0 | .0 | .0 | .0 | 9.0 | 5.0 | 8.0 | 14.5 | 11.0 | 13.0 |
| 28 | 1.0 | 1.0 | 1.0 | .5 | .0 | .0 | 6.5 | 3.5 | 5.0 | 17.0 | 10.5 | 14.0 |
| 29 | 1.0 | 1.0 | 1.0 | .5 | .0 | .5 | 6.5 | 4.5 | 5.5 | 17.5 | 11.5 | 15.0 |
| 30 | --- | --- | --- | .5 | .0 | .5 | 7.0 | 3.5 | 5.5 | 18.0 | 12.0 | 16.5 |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 20.5 | 13.5 | 18.5 |
| MONTH | 2.5 | 1.0 | 1.5 | 1.0 | .0 | .5 | 16.5 | 3.5 | 9.0 | 20.5 | 4.0 | 13.5 |

06470875 JAMES R. AT DAKOTA LAKE DAM NR LUDDEN, ND--CONTINUED

TEMPERATURE, WATER (DEG. C.), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|------|------|------|------|------|------|--------|------|------|-----------|------|------|
| | JUNE | | | JULY | | | AUGUST | | | SEPTEMBER | | |
| 1 | 19.0 | 13.5 | 17.0 | 24.0 | 18.0 | 22.5 | 27.5 | 18.5 | 26.0 | 17.0 | 13.0 | 16.0 |
| 2 | 18.0 | 12.5 | 16.5 | 25.5 | 18.0 | 23.5 | 26.5 | 16.5 | 25.5 | 18.5 | 13.0 | 17.0 |
| 3 | 17.5 | 13.0 | 16.5 | 26.0 | 20.0 | 24.5 | 26.0 | 19.0 | 25.5 | 19.0 | 14.5 | 17.5 |
| 4 | 19.0 | 13.5 | 17.0 | 24.5 | 19.5 | 24.0 | 28.0 | 19.0 | 25.5 | 18.5 | 12.0 | 17.0 |
| 5 | 21.5 | 14.0 | 18.0 | 24.0 | 17.5 | 22.5 | 27.0 | 20.0 | 26.0 | 18.0 | 13.5 | 17.0 |
| 6 | 20.0 | 15.5 | 19.0 | 24.0 | 17.5 | 22.0 | 26.5 | 20.0 | 26.0 | 18.5 | 13.0 | 16.5 |
| 7 | 19.5 | 14.0 | 19.0 | 22.5 | 16.0 | 21.0 | 27.5 | 18.5 | 26.0 | 17.0 | 13.0 | 16.5 |
| 8 | 20.0 | 15.0 | 18.5 | 24.0 | 16.5 | 22.0 | 26.5 | 18.5 | 25.0 | 16.0 | 11.5 | 14.5 |
| 9 | 19.0 | 15.5 | 18.5 | 28.0 | 19.5 | 25.0 | 24.5 | 17.0 | 23.0 | 14.5 | 11.5 | 13.5 |
| 10 | 18.0 | 13.5 | 17.0 | 26.5 | 19.5 | 25.0 | 24.5 | 18.5 | 23.0 | 16.0 | 11.0 | 14.0 |
| 11 | 17.0 | 13.0 | 16.5 | 27.5 | 19.5 | 24.5 | 25.0 | 17.5 | 24.0 | 14.5 | 11.5 | 14.0 |
| 12 | 20.0 | 13.5 | 18.0 | 27.0 | 19.5 | 25.5 | 26.0 | 18.0 | 24.5 | 16.5 | 11.5 | 14.5 |
| 13 | 22.5 | 15.5 | 20.0 | 27.0 | 18.5 | 25.5 | 26.0 | 18.5 | 25.0 | 16.5 | 12.5 | 15.5 |
| 14 | 20.5 | 15.5 | 19.5 | 27.5 | 20.0 | 26.0 | 25.0 | 17.5 | 23.5 | 15.5 | 12.5 | 15.0 |
| 15 | 21.5 | 16.0 | 20.0 | 25.5 | 19.0 | 24.5 | 25.0 | 15.0 | 23.0 | 15.0 | 12.0 | 14.0 |
| 16 | 23.0 | 17.0 | 21.5 | 25.5 | 18.0 | 24.0 | 24.0 | 18.5 | 23.0 | 15.5 | 10.5 | 14.5 |
| 17 | 25.5 | 19.0 | 23.5 | 24.0 | 17.0 | 22.5 | 26.5 | 19.5 | 25.0 | 16.5 | 10.5 | 14.5 |
| 18 | 26.0 | 19.0 | 23.5 | 24.5 | 17.5 | 22.5 | 25.5 | 19.0 | 24.5 | 18.0 | 12.5 | 16.0 |
| 19 | 24.0 | 18.0 | 22.5 | 26.0 | 18.5 | 24.0 | 24.5 | 17.0 | 23.5 | 20.0 | 13.0 | 17.0 |
| 20 | 23.5 | 18.5 | 22.5 | 25.5 | 18.5 | 24.0 | 23.5 | 16.0 | 22.0 | 18.0 | 14.0 | 16.5 |
| 21 | 24.0 | 17.5 | 22.5 | 26.5 | 18.5 | 24.5 | 23.5 | 16.0 | 21.5 | 18.0 | 12.0 | 16.5 |
| 22 | 24.5 | 18.0 | 23.0 | 28.5 | 21.0 | 26.0 | 21.5 | 15.0 | 20.0 | 17.0 | 13.5 | 16.5 |
| 23 | 23.0 | 18.0 | 22.0 | 25.5 | 19.0 | 24.0 | 22.0 | 14.0 | 20.0 | 15.0 | 8.5 | 11.5 |
| 24 | 24.5 | 17.5 | 22.0 | 24.5 | 19.0 | 23.0 | 21.0 | 15.0 | 20.0 | 9.5 | 5.5 | 7.5 |
| 25 | 24.5 | 18.0 | 23.0 | 23.5 | 19.0 | 22.5 | 22.0 | 14.0 | 20.5 | 6.5 | 4.5 | 6.0 |
| 26 | 23.5 | 16.5 | 22.5 | 25.0 | 17.5 | 22.5 | 23.5 | 13.5 | 22.5 | 7.0 | 4.0 | 6.0 |
| 27 | 24.5 | 17.0 | 22.0 | 26.0 | 18.0 | 24.0 | 29.0 | 17.5 | 23.0 | 7.5 | 5.0 | 6.5 |
| 28 | 25.5 | 18.0 | 23.5 | 25.0 | 18.5 | 24.0 | 24.5 | 18.0 | 22.5 | 9.0 | 4.5 | 7.0 |
| 29 | 26.0 | 18.0 | 23.5 | 25.5 | 17.5 | 24.0 | 22.5 | 17.0 | 21.5 | 8.5 | 5.0 | 7.0 |
| 30 | 24.5 | 17.5 | 23.0 | 24.5 | 17.0 | 23.0 | 20.5 | 14.5 | 19.0 | 10.0 | 5.5 | 8.0 |
| 31 | --- | --- | --- | 27.0 | 18.0 | 25.0 | 18.5 | 14.0 | 17.5 | --- | --- | --- |
| MONTH | 26.0 | 12.5 | 20.5 | 28.5 | 16.0 | 24.0 | 29.0 | 13.5 | 23.0 | 20.0 | 4.0 | 13.5 |
| YEAR | 29.0 | .0 | 10.5 | | | | | | | | | |

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C.), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|-----|------|----------|-----|------|----------|------|------|---------|------|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | 647 | 525 | 639 | 794 | 621 | 757 | 1490 | --- | 1480 |
| 2 | --- | --- | --- | 652 | 541 | 634 | 795 | 631 | 739 | 1540 | 1240 | 1480 |
| 3 | 598 | 566 | 592 | 652 | 530 | 644 | 795 | 684 | 770 | --- | --- | --- |
| 4 | 598 | 561 | 590 | 657 | 540 | 651 | 827 | 673 | 780 | --- | --- | --- |
| 5 | --- | --- | --- | 662 | 551 | 652 | 916 | 784 | 885 | --- | --- | --- |
| 6 | 608 | 576 | 603 | 660 | 567 | 648 | 932 | 768 | 895 | --- | --- | --- |
| 7 | --- | --- | --- | 659 | 550 | 657 | 943 | 774 | 911 | --- | --- | --- |
| 8 | 608 | 576 | 602 | 667 | 556 | 660 | 948 | 768 | 919 | 1510 | 1260 | 1480 |
| 9 | 624 | 587 | 603 | 667 | 545 | 659 | 969 | 784 | 935 | 1490 | 1240 | 1470 |
| 10 | 671 | 438 | 606 | 664 | 566 | 660 | 980 | 800 | 949 | 1510 | 1100 | 1480 |
| 11 | --- | --- | --- | 661 | 550 | 651 | 975 | 800 | 959 | 1540 | 1480 | 1510 |
| 12 | --- | --- | --- | 661 | 555 | 653 | 996 | 827 | 966 | 1590 | 1510 | 1550 |
| 13 | --- | --- | --- | 667 | 545 | 658 | 986 | 817 | 970 | 1630 | 1500 | 1540 |
| 14 | 639 | 597 | 628 | 714 | 576 | 657 | 1010 | 843 | 984 | 1650 | 1600 | 1620 |
| 15 | 639 | 596 | 628 | 710 | 672 | 686 | 1020 | 875 | 1000 | | | |
| 16 | 649 | 596 | 640 | 725 | 598 | 720 | 1040 | 890 | 1020 | 1770 | 1710 | 1550 |
| 17 | 665 | 628 | 650 | 735 | 635 | 728 | 1080 | 890 | 1040 | --- | 1740 | --- |
| 18 | 723 | 644 | 669 | 746 | 635 | 738 | 1120 | 954 | 1100 | 1890 | 1800 | 1840 |
| 19 | 670 | 644 | 668 | 762 | 629 | 747 | 1160 | 991 | 1120 | 1930 | 1860 | 1890 |
| 20 | 675 | 649 | 669 | 778 | 640 | 771 | 1200 | 1020 | 1170 | 2020 | 1910 | 1940 |
| 21 | 685 | 665 | 670 | 762 | 651 | 769 | 1240 | 1030 | 1190 | | | |
| 22 | 685 | 669 | 678 | 762 | 646 | 755 | 1260 | 1080 | 1240 | 2140 | 2060 | 2100 |
| 23 | 675 | 654 | 665 | 768 | 672 | 757 | 1280 | 875 | 1210 | 2170 | 2080 | 2130 |
| 24 | 659 | 627 | 650 | 789 | 683 | 786 | 1340 | 1150 | 1300 | 2190 | 2130 | 2160 |
| 25 | 664 | 601 | 640 | 770 | 688 | 702 | 1360 | 1020 | 1330 | 2200 | 2140 | 2160 |
| 26 | 648 | 611 | --- | 770 | 699 | 703 | 1360 | 1340 | 1340 | --- | --- | --- |
| 27 | 639 | 621 | 637 | 789 | 694 | 781 | 1400 | 1190 | 1380 | 2230 | --- | --- |
| 28 | 648 | 600 | 639 | 821 | 672 | 778 | 1410 | 1190 | 1380 | 2230 | 2200 | 2220 |
| 29 | 652 | 616 | 640 | 757 | 641 | 743 | 1450 | 1220 | 1420 | 2210 | --- | --- |
| 30 | 652 | 631 | 648 | 752 | 630 | 743 | 1480 | 1430 | 1450 | 2290 | 2200 | 2240 |
| 31 | 647 | 531 | 642 | --- | --- | --- | 1500 | 1260 | 1480 | --- | --- | --- |
| MONTH | 723 | 438 | 637 | 821 | 525 | 701 | 1500 | 621 | 1080 | 2290 | 1100 | 1780 |

JAMES RIVER BASIN

06470875 JAMES R. AT DAKOTA LAKE DAM NR LUDDEN, ND--CONTINUED

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 THROUGH SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|---------|-----|------|----------|-----|------|----------|-----|------|---------|-----|------|
| | OCTOBER | | | NOVEMBER | | | DECEMBER | | | JANUARY | | |
| 1 | --- | --- | --- | 9.6 | 8.4 | --- | 8.6 | 7.8 | --- | --- | 6.8 | --- |
| 2 | --- | --- | --- | 9.6 | 8.6 | --- | 8.6 | 7.9 | --- | 7.7 | 6.8 | --- |
| 3 | 9.2 | 8.9 | --- | 9.5 | 8.2 | --- | 8.6 | 8.0 | --- | --- | --- | --- |
| 4 | 9.2 | 9.1 | --- | 9.3 | 8.1 | --- | 8.7 | 7.9 | --- | --- | --- | --- |
| 5 | --- | --- | --- | 9.5 | 8.1 | --- | 8.6 | 7.8 | --- | --- | --- | --- |
| 6 | 9.1 | 9.1 | --- | 9.6 | 9.4 | --- | 8.7 | 7.9 | --- | --- | --- | --- |
| 7 | --- | --- | --- | 9.6 | 9.5 | --- | 8.7 | 7.8 | --- | --- | 6.8 | --- |
| 8 | 9.2 | 9.1 | --- | 9.7 | 8.5 | --- | 8.6 | 7.7 | --- | 7.7 | 6.8 | --- |
| 9 | 9.2 | 9.0 | --- | 9.7 | 8.6 | --- | 8.6 | 7.7 | --- | 7.7 | 6.7 | --- |
| 10 | 9.7 | 7.5 | --- | 9.7 | 9.6 | --- | 8.6 | 7.7 | --- | 7.7 | --- | --- |
| 11 | --- | --- | --- | 9.7 | 8.6 | --- | 8.5 | 7.5 | --- | 7.7 | 7.6 | --- |
| 12 | --- | --- | --- | 9.7 | 8.6 | --- | 8.3 | 7.5 | --- | 7.7 | --- | --- |
| 13 | --- | --- | --- | 9.7 | 8.6 | --- | 8.3 | 7.3 | --- | 7.7 | 7.7 | --- |
| 14 | 9.4 | 9.2 | --- | 9.7 | 8.8 | --- | 8.2 | 7.3 | --- | 7.7 | 7.7 | --- |
| 15 | 9.3 | 9.3 | --- | 9.6 | 7.1 | --- | 8.2 | 7.3 | --- | --- | --- | --- |
| 16 | 9.3 | 9.3 | --- | 7.1 | 6.0 | --- | 8.1 | 7.3 | --- | 7.7 | --- | --- |
| 17 | 9.3 | 9.2 | --- | 7.1 | 6.0 | --- | 8.1 | 7.3 | --- | --- | --- | --- |
| 18 | 9.3 | 9.2 | --- | 7.1 | 6.2 | --- | 8.0 | 7.3 | --- | --- | --- | --- |
| 19 | 9.2 | 9.2 | --- | 7.1 | 6.1 | --- | 8.0 | 7.2 | --- | 7.8 | 7.7 | --- |
| 20 | 9.3 | 9.2 | --- | 7.1 | 6.0 | --- | 7.9 | 7.2 | --- | 7.8 | 7.7 | --- |
| 21 | 9.3 | 9.2 | --- | 7.1 | 6.1 | --- | 7.9 | 7.1 | --- | --- | --- | --- |
| 22 | 9.3 | 9.2 | --- | 7.1 | 6.2 | --- | 7.9 | 7.1 | --- | 7.8 | --- | --- |
| 23 | 9.3 | 9.2 | --- | 7.1 | 6.4 | --- | 7.8 | 5.8 | --- | 7.8 | 7.8 | --- |
| 24 | 9.4 | 9.1 | --- | 7.1 | 6.3 | --- | 7.8 | 7.1 | --- | 7.8 | --- | --- |
| 25 | 9.5 | 9.4 | --- | 7.1 | 6.2 | --- | 7.8 | 6.2 | --- | 7.9 | 7.8 | --- |
| 26 | 9.6 | 9.5 | --- | 7.1 | 6.4 | --- | 7.7 | 6.8 | --- | --- | --- | --- |
| 27 | 9.5 | 9.4 | --- | 7.0 | 6.2 | --- | 7.7 | 6.8 | --- | --- | --- | --- |
| 28 | 9.6 | 9.4 | --- | 7.3 | 6.3 | --- | 7.7 | 6.9 | --- | 7.9 | --- | --- |
| 29 | 9.6 | 9.3 | --- | 8.7 | 7.8 | --- | 7.7 | 6.9 | --- | --- | --- | --- |
| 30 | 9.6 | 9.1 | --- | 8.6 | 7.8 | --- | 7.7 | 6.9 | --- | 7.8 | --- | --- |
| 31 | 9.5 | 8.4 | --- | --- | --- | --- | 7.7 | 6.8 | --- | --- | --- | --- |
| MONTH | 9.7 | 7.5 | | 9.7 | 6.0 | | 8.7 | 5.8 | | 7.9 | 6.7 | |

PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 THROUGH SEPTEMBER 1984

| DAY | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN | MAX | MIN | MEAN |
|-------|----------|-----|------|-------|-----|------|-------|-----|------|-----|-----|------|
| | FEBRUARY | | | MARCH | | | APRIL | | | MAY | | |
| 1 | 7.8 | 7.0 | --- | 8.1 | 7.2 | --- | --- | --- | --- | 8.3 | 7.0 | --- |
| 2 | 7.8 | 6.9 | --- | 8.2 | 7.0 | --- | --- | 6.3 | --- | 8.2 | 7.3 | --- |
| 3 | 7.8 | 7.0 | --- | 8.2 | 7.3 | --- | 7.6 | 6.4 | --- | 8.1 | 7.0 | --- |
| 4 | 7.9 | 6.9 | --- | 8.3 | 7.1 | --- | --- | --- | --- | 8.0 | 6.8 | --- |
| 5 | 7.9 | 6.1 | --- | --- | 7.3 | --- | 7.7 | 6.4 | --- | 7.9 | 6.8 | --- |
| 6 | 8.0 | 6.3 | --- | --- | 6.8 | --- | 7.6 | 6.1 | --- | 7.9 | 6.8 | --- |
| 7 | 8.0 | 7.1 | --- | 7.8 | 6.5 | --- | 7.6 | 6.4 | --- | 8.0 | 6.7 | --- |
| 8 | 8.0 | 6.5 | --- | 7.7 | 6.2 | --- | 7.6 | 6.2 | --- | 7.8 | 6.5 | --- |
| 9 | 8.0 | 7.2 | --- | 7.6 | 6.7 | --- | 7.6 | --- | --- | 7.7 | 6.6 | --- |
| 10 | 8.0 | 6.5 | --- | 7.6 | 6.8 | --- | 7.6 | 6.2 | --- | 7.8 | 6.5 | --- |
| 11 | 8.0 | 7.2 | --- | 7.6 | 6.8 | --- | 7.4 | 6.1 | --- | 7.7 | 6.5 | --- |
| 12 | 8.0 | 7.1 | --- | 7.6 | 6.8 | --- | --- | 6.2 | --- | 7.6 | 6.4 | --- |
| 13 | 8.0 | 7.1 | --- | 7.6 | 6.7 | --- | 7.4 | 6.2 | --- | 7.7 | 6.5 | --- |
| 14 | 8.0 | 7.0 | --- | 7.6 | 6.7 | --- | 7.5 | 6.2 | --- | 7.6 | 6.5 | --- |
| 15 | 8.0 | 7.1 | --- | 7.7 | 5.9 | --- | 7.8 | 6.4 | --- | 7.5 | 6.4 | --- |
| 16 | 8.0 | 6.8 | --- | 7.7 | 6.5 | --- | 7.8 | 6.6 | --- | 7.5 | 6.3 | --- |
| 17 | 8.0 | 7.1 | --- | 7.7 | 6.8 | --- | 8.2 | 6.7 | --- | 7.7 | 6.3 | --- |
| 18 | 8.0 | 7.1 | --- | 7.7 | 6.8 | --- | 8.5 | 6.6 | --- | 8.1 | 6.7 | --- |
| 19 | 8.0 | 7.1 | --- | 7.7 | 6.8 | --- | 8.3 | 6.7 | --- | 8.2 | 6.8 | --- |
| 20 | 8.0 | 7.1 | --- | 7.7 | 6.7 | --- | 7.9 | 6.8 | --- | 8.2 | 6.8 | --- |
| 21 | 8.0 | 7.0 | --- | 7.7 | 6.8 | --- | 7.7 | 6.6 | --- | 8.1 | 6.9 | --- |
| 22 | 8.0 | 7.1 | --- | --- | --- | --- | 8.7 | 7.2 | --- | 8.2 | 6.9 | --- |
| 23 | 8.1 | 7.2 | --- | 8.0 | 7.0 | --- | 8.6 | 7.4 | --- | 8.2 | 6.9 | --- |
| 24 | 8.1 | 7.2 | --- | 8.2 | 6.6 | --- | 8.5 | 7.3 | --- | 8.2 | 7.0 | --- |
| 25 | 8.1 | 7.2 | --- | 8.5 | --- | --- | 8.4 | 6.8 | --- | 8.2 | 7.0 | --- |
| 26 | 8.1 | 7.2 | --- | 8.5 | --- | --- | 8.2 | 7.2 | --- | 8.3 | 7.1 | --- |
| 27 | 8.1 | 7.1 | --- | 8.0 | --- | --- | 8.0 | 7.0 | --- | 8.2 | 7.0 | --- |
| 28 | 8.1 | 7.1 | --- | 7.8 | 6.5 | --- | 8.1 | 7.0 | --- | 8.2 | 7.0 | --- |
| 29 | 8.1 | 7.1 | --- | 7.7 | 6.2 | --- | 8.1 | 7.0 | --- | 8.2 | 6.9 | --- |
| 30 | --- | --- | --- | --- | --- | --- | 8.1 | 7.0 | --- | 8.1 | 6.8 | --- |
| 31 | --- | --- | --- | --- | --- | --- | --- | --- | --- | 8.1 | 6.6 | --- |
| MONTH | 8.1 | 6.1 | | 8.5 | 6.2 | | 8.7 | 6.1 | | 8.3 | 6.3 | |

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PH (STANDARD UNITS), WATER YEAR OCTOBER 1983 THROUGH SEPTEMBER 1984

[illegible]

JAMES RIVER BASIN

06470878 JAMES RIVER AT NORTH DAKOTA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 45°56'10", long 98°10'26", in SE/SE/ sec. 34, T.129 N., R. 60 W., Dickey County, Hydrologic Unit 10160003, at bridge on North Dakota-South Dakota State line road 6.5 mi south, and 1 mi west from Ludden, ND.

DRAINAGE AREA.--5,480 mi², approximately, revised, of which about 3,300 mi² is probably noncontributing.

PERIOD OF RECORD.--October 1981 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is 1,200 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR CURRENT YEAR.--Maximum gage height 93.08 ft April 1, minimum, 88.26 ft Sept. 10.

GAGE HEIGHT (FEET ABOVE DATUM), WATER YEAR OCTOBER 1982 TO SEPTEMBER 1983

| MEAN VALUES | | | | | | | | | | | | |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
| 1 | 88.68 | 88.68 | 87.74 | --- | 88.33 | 88.60 | 93.08 | 90.29 | 89.43 | 89.48 | 88.98 | 88.42 |
| 2 | 88.68 | 88.63 | 87.77 | --- | 88.33 | 88.71 | 93.03 | 90.23 | 89.42 | 89.44 | 88.92 | 88.44 |
| 3 | 88.69 | 88.61 | 87.83 | --- | 88.35 | 88.80 | 92.85 | 90.19 | 89.38 | 89.70 | 88.88 | 88.47 |
| 4 | 88.69 | 88.72 | 87.85 | --- | 88.33 | 89.15 | 92.86 | 90.22 | 89.47 | 89.65 | 88.90 | 88.42 |
| 5 | 88.71 | 88.66 | 87.89 | --- | 88.33 | 89.42 | 92.84 | 90.28 | 89.58 | 89.60 | 88.91 | 88.49 |
| 6 | 88.71 | 88.59 | 87.85 | --- | 88.34 | 89.65 | 92.73 | 90.32 | 89.66 | 89.57 | 88.91 | 88.49 |
| 7 | 88.72 | 88.62 | 87.89 | --- | 88.35 | 89.70 | 92.56 | 90.49 | 89.64 | 89.50 | 88.93 | 88.42 |
| 8 | 88.70 | 88.59 | 87.90 | 88.19 | 88.37 | 89.76 | 92.43 | 90.29 | 89.70 | 89.35 | 88.91 | 88.41 |
| 9 | 88.90 | 88.57 | 87.95 | 88.17 | 88.38 | 89.77 | 92.23 | 90.11 | 89.76 | 89.33 | 88.88 | 88.31 |
| 10 | 88.84 | 88.49 | 87.96 | 88.20 | 88.39 | 89.80 | 92.05 | 90.02 | 89.84 | 89.28 | 88.83 | 88.26 |
| 11 | 88.76 | 88.47 | 87.98 | 88.21 | 88.39 | 89.77 | 91.88 | 90.01 | 89.67 | 89.26 | 88.83 | 88.28 |
| 12 | 88.87 | 88.52 | 87.99 | 88.21 | 88.40 | 89.74 | 91.90 | 89.86 | 89.66 | 89.18 | 88.79 | 88.32 |
| 13 | 88.83 | 88.45 | 88.00 | 88.23 | 88.41 | 89.73 | 91.88 | 89.82 | 89.67 | 89.07 | 88.75 | 88.31 |
| 14 | 88.80 | 88.41 | 88.05 | 88.25 | 88.42 | 89.70 | 91.74 | 89.70 | 89.67 | 89.04 | 88.77 | 88.34 |
| 15 | 88.82 | 88.37 | 88.05 | 88.25 | 88.42 | 89.66 | 91.51 | 89.56 | 89.65 | 89.09 | 88.84 | 88.41 |
| 16 | 88.86 | 88.36 | 88.06 | 88.25 | 88.53 | 89.61 | 91.31 | 89.50 | 89.80 | 89.05 | 88.84 | 88.58 |
| 17 | 88.87 | 88.30 | 88.06 | 88.25 | 88.54 | 89.58 | 91.16 | 89.58 | 89.90 | 89.04 | 88.83 | 88.53 |
| 18 | 88.93 | 88.24 | 88.07 | 88.25 | 88.54 | 89.53 | 91.06 | 89.84 | 89.86 | 88.96 | 88.81 | 88.38 |
| 19 | 88.91 | 88.20 | 88.09 | 88.25 | 88.53 | 89.51 | 90.94 | 89.86 | 89.89 | 88.94 | 88.78 | 88.41 |
| 20 | 88.94 | 88.20 | 88.11 | 88.24 | 88.53 | 89.47 | 90.78 | 89.65 | 89.80 | 88.94 | 88.81 | 88.38 |
| 21 | 88.96 | 88.12 | 88.14 | 88.22 | 88.55 | 89.36 | 90.71 | 89.58 | 89.74 | 88.90 | 88.73 | 88.71 |
| 22 | 89.00 | 88.05 | 88.15 | 88.24 | 88.53 | 89.33 | 90.61 | 89.62 | 89.85 | 88.92 | 88.66 | 88.51 |
| 23 | 89.03 | 88.03 | 88.15 | 88.26 | 88.55 | 89.35 | 90.50 | 89.53 | 89.79 | 88.96 | 88.67 | 88.30 |
| 24 | 89.07 | 87.97 | 88.16 | 88.27 | 88.56 | 89.73 | 90.46 | 89.39 | 89.74 | 88.92 | 88.74 | 88.31 |
| 25 | 89.06 | 87.92 | 88.26 | 88.27 | 88.58 | 90.27 | 90.39 | 89.51 | 89.60 | 88.93 | 88.59 | 88.38 |
| 26 | 89.05 | 87.87 | 88.32 | 88.26 | 88.59 | 90.77 | 90.50 | 89.39 | 89.55 | 88.96 | 88.57 | 88.49 |
| 27 | 89.03 | 87.84 | 88.31 | 88.25 | 88.60 | 91.17 | 90.47 | 89.31 | 89.59 | 88.95 | 88.58 | 88.36 |
| 28 | 89.03 | 87.82 | 88.30 | 88.24 | 88.60 | 91.48 | 90.50 | 89.27 | 89.53 | 88.92 | 88.57 | 88.42 |
| 29 | 88.94 | 87.81 | 88.29 | 88.28 | 88.59 | 91.89 | 90.49 | 89.21 | 89.46 | 88.94 | 88.55 | 88.49 |
| 30 | 88.86 | 87.75 | 88.28 | 88.33 | --- | 92.35 | 90.47 | 89.18 | 89.38 | 88.89 | 88.54 | 88.44 |
| 31 | 88.80 | --- | 88.27 | 88.33 | --- | 92.90 | --- | 89.19 | --- | 88.95 | 88.49 | --- |
| MEAN | 88.86 | 88.30 | 88.06 | --- | 88.46 | 89.94 | 91.53 | 89.77 | 89.66 | 89.15 | 88.77 | 88.42 |
| MAX | 89.07 | 88.72 | 88.32 | --- | 88.60 | 92.90 | 93.08 | 90.49 | 89.90 | 89.70 | 88.98 | 88.71 |
| MIN | 88.68 | 87.75 | 87.74 | --- | 88.33 | 88.60 | 90.39 | 89.18 | 89.38 | 88.89 | 88.49 | 88.26 |
| CAL YR 1983 | MEAN | 89.13 | MAX | 91.81 | MIN | 87.74 | | | | | | |

JAMES RIVER BASIN

327

06470878 JAMES RIVER AT ND-SD STATE LINE--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1974 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: October 1974 to current year.

SPECIFIC CONDUCTANCE: October 1979 to current year.

REMARKS.--Water temperatures and specific conductances are measured daily in field by local observer.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: Maximum daily, 28.5°C Aug. 5, 6, 1983; June 12, 1976; July 13, 1984; minimum daily, 0.0°C for several days during winter months each year.

SPECIFIC CONDUCTANCE: Maximum 4,000 micromhos March 15, 1979; minimum 240 microhms April 3, 1984.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum 28.5°C July 13, minimum 0.5°C Dec. 25 - Jan. 1; Jan. 12-16.

SPECIFIC CONDUCTANCE: Maximum 2,150 microhms Feb. 7, 8; minimum 240 microhms April 3.

TEMPERATURE, WATER (DEG C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|------|------|-----|------|-----|-----|------|------|------|------|------|------|
| 1 | 13.5 | 9.0 | 2.5 | .5 | 1.5 | 1.5 | 2.0 | 7.0 | 18.0 | 22.0 | 26.0 | 16.5 |
| 2 | 13.0 | 9.5 | 2.0 | 1.0 | 1.5 | 1.0 | 2.5 | 9.0 | 16.5 | 23.5 | 25.5 | 20.5 |
| 3 | 12.5 | 8.5 | 2.0 | 1.0 | 1.0 | 1.0 | 1.5 | 10.5 | 16.5 | 24.5 | 26.0 | 18.0 |
| 4 | 13.0 | 7.5 | 2.0 | 1.5 | 1.0 | 1.0 | 2.5 | 10.0 | 18.0 | 24.0 | 25.5 | 17.0 |
| 5 | 11.5 | 7.5 | 2.0 | 1.5 | 1.5 | 1.0 | 3.0 | 11.0 | 20.0 | 23.0 | 25.0 | 17.0 |
| 6 | 11.5 | 8.0 | 3.0 | 1.5 | 1.5 | 1.0 | 2.5 | 11.0 | 20.0 | 22.0 | 26.0 | 16.0 |
| 7 | 11.5 | 8.0 | 2.5 | 1.0 | 1.5 | 1.0 | 3.0 | 10.5 | 20.0 | 23.0 | 26.5 | 17.0 |
| 8 | 10.5 | 7.5 | 2.5 | 1.0 | 1.0 | 1.0 | 3.0 | 9.5 | 20.5 | 24.5 | 26.0 | 15.0 |
| 9 | 10.5 | 6.0 | 2.5 | 1.0 | 1.5 | 1.5 | 3.0 | 10.5 | 20.0 | 25.0 | 23.0 | 14.5 |
| 10 | 12.0 | 4.5 | 2.0 | 1.0 | 1.5 | 1.0 | 4.0 | 11.5 | 18.5 | 26.0 | 24.0 | 14.5 |
| 11 | 11.5 | 4.5 | 1.5 | 1.0 | 1.5 | 1.0 | 8.5 | 12.0 | 17.0 | 25.5 | 25.5 | 14.5 |
| 12 | 8.5 | 4.0 | 1.0 | .5 | 1.5 | 1.0 | 8.0 | 13.5 | 18.0 | 28.0 | 27.5 | 15.5 |
| 13 | 8.5 | 3.0 | 1.0 | .5 | 1.5 | 1.0 | 7.0 | 16.0 | 19.5 | 28.5 | 24.0 | 16.0 |
| 14 | 8.0 | 3.5 | 1.5 | .5 | 2.0 | 1.5 | 7.5 | 15.5 | 19.0 | 26.0 | 24.0 | 15.5 |
| 15 | 8.0 | 3.0 | 1.0 | .5 | 1.5 | 1.5 | 10.0 | 15.5 | 20.0 | 26.0 | 23.0 | 14.5 |
| 16 | 7.5 | 3.5 | 1.0 | .5 | 1.5 | 1.5 | 9.5 | 17.0 | 25.0 | 23.0 | 23.5 | 14.0 |
| 17 | 7.5 | 4.0 | 1.0 | 1.0 | 1.5 | 1.0 | 10.5 | 18.5 | 25.0 | 22.5 | 27.0 | 14.5 |
| 18 | 7.5 | 3.0 | 1.0 | 1.0 | 1.0 | 1.0 | 11.0 | 18.5 | 23.5 | 22.5 | 24.5 | 17.0 |
| 19 | 7.5 | 3.5 | 1.0 | 1.0 | 1.5 | 1.0 | 11.5 | 18.0 | 24.0 | 24.5 | 25.0 | 18.5 |
| 20 | 8.0 | 3.0 | 1.0 | 1.0 | 1.5 | 1.0 | 13.5 | 18.5 | 22.0 | 26.5 | 21.5 | 17.0 |
| 21 | 8.5 | 3.0 | 1.0 | 1.0 | 1.5 | 1.5 | 14.0 | 18.0 | 23.0 | 25.0 | 23.5 | 16.0 |
| 22 | 9.5 | 2.5 | 1.0 | 1.0 | 2.0 | 1.5 | 13.0 | 16.5 | 22.5 | 25.5 | 20.0 | 16.0 |
| 23 | 9.5 | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 | 13.5 | 16.0 | 23.0 | 25.0 | 19.0 | 11.5 |
| 24 | 9.5 | 1.5 | 1.0 | 1.0 | 1.5 | 2.5 | 13.0 | 16.0 | 23.5 | 24.5 | 20.5 | 9.0 |
| 25 | 8.5 | 2.0 | .5 | 1.0 | 1.5 | 1.5 | 13.0 | 13.5 | 23.0 | 24.0 | 21.5 | 7.0 |
| 26 | 9.0 | 2.5 | .5 | 1.0 | 1.0 | 2.0 | 11.0 | 13.0 | 23.5 | 22.5 | 24.5 | 6.5 |
| 27 | 9.5 | 2.0 | .5 | 1.0 | 1.5 | 1.5 | 8.0 | 14.0 | 22.0 | 24.5 | 23.5 | 5.5 |
| 28 | 8.5 | 2.0 | .5 | 1.0 | 1.5 | 1.0 | 6.0 | 14.0 | 24.0 | 25.0 | 23.0 | 7.5 |
| 29 | 8.0 | 2.0 | .5 | 1.5 | 1.5 | 1.5 | 6.5 | 15.5 | 24.5 | 23.5 | 22.0 | 8.5 |
| 30 | 8.5 | 2.0 | .5 | 1.5 | --- | 1.5 | 6.5 | 15.5 | 23.0 | 23.0 | 20.0 | 8.5 |
| 31 | 8.5 | --- | .5 | 1.5 | --- | 2.0 | --- | 19.0 | --- | 25.0 | 18.0 | --- |
| MEAN | 9.5 | 4.5 | 1.5 | 1.0 | 1.5 | 1.5 | 7.5 | 14.0 | 21.0 | 24.5 | 23.5 | 14.0 |
| MAX | 13.5 | 9.5 | 3.0 | 1.5 | 2.0 | 2.5 | 14.0 | 19.0 | 25.0 | 28.5 | 27.5 | 20.5 |
| MIN | 7.5 | 1.0 | .5 | .5 | 1.0 | 1.0 | 1.5 | 7.0 | 16.5 | 22.0 | 18.0 | 5.5 |
| CAL YR 1983 | MEAN | 11.0 | MAX | 28.5 | MIN | .5 | | | | | | |
| WTR YR 1984 | MEAN | 10.5 | MAX | 28.5 | MIN | .5 | | | | | | |

JAMES RIVER BASIN

06470878 JAMES RIVER AT ND-SD STATE LINE--CONTINUED

SPECIFIC CONDUCTANCE (MICROMHOS/CM AT 25 DEG. C), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
ONCE-DAILY

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|------|-----|------|------|------|------|-----|-----|-----|-----|-----|-----|
| 1 | 590 | 600 | 730 | 1410 | 2050 | 1350 | 280 | 580 | 660 | 650 | 700 | 760 |
| 2 | 590 | 600 | 730 | 1420 | 2140 | 1340 | 250 | 600 | 650 | 660 | 710 | 760 |
| 3 | 600 | 600 | 740 | 1440 | 2130 | 1330 | 240 | 620 | 650 | 670 | 710 | 760 |
| 4 | 600 | 590 | 740 | 1300 | 2140 | 1320 | 260 | 620 | 640 | 670 | 700 | 750 |
| 5 | 600 | 580 | 740 | 1350 | 2140 | 1200 | 260 | 600 | 640 | 660 | 700 | 760 |
| 6 | 600 | 580 | 750 | 1390 | 2140 | 1200 | 260 | 610 | 630 | 650 | 700 | 770 |
| 7 | 590 | 590 | 760 | 1400 | 2150 | 1110 | 290 | 610 | 630 | 640 | 700 | 780 |
| 8 | 590 | 580 | 790 | 1350 | 2150 | 1000 | 300 | 620 | 630 | 640 | 710 | 780 |
| 9 | 600 | 590 | 780 | 1380 | 2130 | 880 | 320 | 640 | 620 | 640 | 730 | 770 |
| 10 | 610 | 590 | 790 | 1400 | 2100 | 690 | 350 | 690 | 620 | 650 | 740 | 770 |
| 11 | 610 | 570 | 790 | 1390 | 2090 | 680 | 350 | 710 | 620 | 640 | 750 | 770 |
| 12 | 580 | 580 | 820 | 1300 | 1950 | 670 | 350 | 730 | 610 | 640 | 740 | 770 |
| 13 | 620 | 580 | 850 | 1350 | 1850 | 660 | 370 | 730 | 600 | 640 | 750 | 780 |
| 14 | 650 | 580 | 860 | 1370 | 1810 | 650 | 400 | 730 | 610 | 640 | 750 | 780 |
| 15 | 600 | 580 | 870 | 1400 | 1500 | 670 | 440 | 720 | 600 | 650 | 750 | 780 |
| 16 | 620 | 580 | 880 | 1450 | 1350 | 680 | 450 | 700 | 600 | 650 | 750 | 780 |
| 17 | 630 | 580 | 900 | 1500 | 1400 | 680 | 480 | 700 | 600 | 650 | 740 | 780 |
| 18 | 630 | 580 | 910 | 1550 | 1150 | 700 | 490 | 700 | 630 | 640 | 740 | 800 |
| 19 | 630 | 580 | 950 | 1590 | 1200 | 740 | 500 | 700 | 620 | 640 | 740 | 800 |
| 20 | 630 | 600 | 1000 | 1700 | 1300 | 770 | 530 | 700 | 630 | 650 | 740 | 810 |
| 21 | 630 | 620 | 1050 | 1860 | 1150 | 790 | 530 | 700 | 630 | 650 | 750 | 820 |
| 22 | 610 | 610 | 1020 | 1880 | 1300 | 800 | 540 | 700 | 640 | 660 | 750 | 820 |
| 23 | 620 | 600 | 1020 | 1900 | 1220 | 800 | 570 | 700 | 650 | 670 | 740 | 830 |
| 24 | 620 | 600 | 1000 | 1960 | 1050 | 720 | 590 | 690 | 650 | 680 | 750 | 830 |
| 25 | 600 | 600 | 990 | 2000 | 960 | 570 | 610 | 680 | 660 | 690 | 750 | 710 |
| 26 | 590 | 650 | 1090 | 2010 | 970 | 500 | 600 | 670 | 670 | 690 | 750 | 750 |
| 27 | 590 | 650 | 1120 | 2090 | 1000 | 400 | 610 | 680 | 660 | 700 | 730 | 760 |
| 28 | 600 | 660 | 1200 | 2130 | 1140 | 320 | 620 | 690 | 670 | 700 | 740 | 810 |
| 29 | 590 | 680 | 1280 | 2110 | 1280 | 360 | 620 | 670 | 670 | 700 | 750 | 810 |
| 30 | 590 | 650 | 1360 | 2100 | --- | 350 | 620 | 670 | 660 | 720 | 750 | 820 |
| 31 | 585 | --- | 1400 | 2090 | --- | 300 | --- | 670 | --- | 720 | 760 | --- |
| MEAN | 606 | 601 | 933 | 1630 | 1620 | 782 | 436 | 672 | 635 | 663 | 735 | 782 |
| MAX | 650 | 680 | 1400 | 2130 | 2150 | 1350 | 620 | 730 | 670 | 720 | 760 | 830 |
| MIN | 580 | 570 | 730 | 1300 | 960 | 300 | 240 | 580 | 600 | 640 | 700 | 710 |
| CAL YR 1983 | MEAN | 705 | MAX | 1400 | MIN | 340 | | | | | | |
| WTR YR 1984 | MEAN | 839 | MAX | 2150 | MIN | 240 | | | | | | |

06471200 MAPLE RIVER AT NORTH DAKOTA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 45°56'20", long 98°27'08", in SW¼SE¼ sec.33, T.129 N., R.62 W., Dickey County, ND, Hydrologic Unit 10160004, on left bank 0.4 mi upstream from State line, 7.8 mi northeast of Frederick, SD, and 15.7 mi upstream from mouth.

DRAINAGE AREA.--750 mi², approximately, of which about 270 mi² is probably noncontributing.

PERIOD OF RECORD.--June 1956 to current year.

GAGE.--Water-stage recorder. Altitude of gage is 1,365 ft, from topographic map. Prior to June 14, 1962, nonrecording gage at site 0.4 mi downstream at datum 0.94 ft lower.

REMARKS.--Records good except those for winter period, Feb. 16 to Mar. 30, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--28 years, 20.5 ft³/s (14,850 acre-ft/yr); median of yearly mean discharges, 12 ft³/s (8,690 acre-ft/yr).

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,930 ft³/s Apr. 11, 1969; maximum gage height, 16.05 ft Apr. 11, 1969 (backwater from ice); no flow for long periods in each year.

EXTREMES FOR CURRENT YEAR.--Peak discharge above base of 50 ft³/s and maximum (*):

| Date | Time | Discharge (ft ³ /s) | Gage height (ft) | Date | Time | Discharge (ft ³ /s) | Gage height (ft) |
|---------|------|-----------------------------------|---------------------|---------|------|-----------------------------------|---------------------|
| Feb. 29 | -- | 150 | ice jam | Mar. 27 | 2230 | *1600 | *a10.57 |

a Ice jam.
No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MEAN VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|-------|----------|-----|------|--------|--------|------|-------|-------|-------|-------|-----|
| 1 | .00 | .00 | .00 | .00 | .00 | 90 | 541 | 24 | 3.4 | 3.8 | .00 | .00 |
| 2 | .00 | .00 | .00 | .00 | .00 | 50 | 506 | 23 | 2.8 | 2.8 | .00 | .00 |
| 3 | .00 | .00 | .00 | .00 | .00 | 40 | 403 | 26 | 2.0 | 2.0 | .00 | .00 |
| 4 | .00 | .00 | .00 | .00 | .00 | 30 | 304 | 34 | 2.8 | 1.5 | .01 | .00 |
| 5 | .00 | .00 | .00 | .00 | .00 | 25 | 240 | 38 | 3.2 | 1.6 | .07 | .00 |
| 6 | .00 | .00 | .00 | .00 | .00 | 20 | 170 | 37 | 3.8 | 1.6 | .06 | .00 |
| 7 | .00 | .00 | .00 | .00 | .00 | 17 | 126 | 33 | 4.0 | 1.2 | .05 | .00 |
| 8 | .00 | .00 | .00 | .00 | .00 | 15 | 104 | 29 | 4.4 | .91 | .01 | .00 |
| 9 | .00 | .00 | .00 | .00 | .00 | 13 | 88 | 25 | 4.1 | .74 | .00 | .00 |
| 10 | .00 | .00 | .00 | .00 | .00 | 10 | 77 | 24 | 4.7 | .74 | .00 | .00 |
| 11 | .00 | .00 | .00 | .00 | .00 | 7.0 | 72 | 23 | 4.9 | .71 | .00 | .00 |
| 12 | .00 | .00 | .00 | .00 | .00 | 6.0 | 73 | 21 | 6.4 | .61 | .00 | .00 |
| 13 | .00 | .00 | .00 | .00 | .00 | 4.5 | 73 | 21 | 6.1 | .52 | .00 | .00 |
| 14 | .00 | .00 | .00 | .00 | .00 | 4.0 | 67 | 19 | 5.5 | .50 | .00 | .00 |
| 15 | .00 | .00 | .00 | .00 | .00 | 3.5 | 65 | 17 | 5.6 | .47 | .00 | .00 |
| 16 | .00 | .00 | .00 | .00 | .00 | 3.5 | 72 | 15 | 5.6 | .43 | .00 | .00 |
| 17 | .00 | .00 | .00 | .00 | .00 | 3.5 | 80 | 15 | 5.3 | .36 | .00 | .00 |
| 18 | .00 | .00 | .00 | .00 | .00 | 3.6 | 75 | 14 | 4.6 | .29 | .00 | .00 |
| 19 | .00 | .00 | .00 | .00 | .00 | 3.6 | 64 | 13 | 4.9 | .26 | .00 | .00 |
| 20 | .00 | .00 | .00 | .00 | .05 | 3.7 | 52 | 11 | 5.4 | .21 | .00 | .00 |
| 21 | .00 | .00 | .00 | .00 | 1.0 | 3.7 | 45 | 11 | 6.1 | .15 | .00 | .00 |
| 22 | .00 | .00 | .00 | .00 | 5.1 | 4.0 | 40 | 9.7 | 8.6 | .13 | .00 | .00 |
| 23 | .00 | .00 | .00 | .00 | 6.0 | 10 | 34 | 7.8 | 9.0 | .10 | .00 | .00 |
| 24 | .00 | .00 | .00 | .00 | 3.5 | 40 | 31 | 7.9 | 8.4 | .09 | .00 | .00 |
| 25 | .00 | .00 | .00 | .00 | 2.0 | 100 | 28 | 7.3 | 8.1 | .10 | .00 | .00 |
| 26 | .00 | .00 | .00 | .00 | 1.2 | 500 | 28 | 6.4 | 7.7 | .12 | .00 | .00 |
| 27 | .00 | .00 | .00 | .00 | .90 | 1350 | 30 | 5.8 | 6.9 | .11 | .00 | .00 |
| 28 | .00 | .00 | .00 | .00 | 10 | 1420 | 29 | 5.3 | 6.2 | .08 | .00 | .00 |
| 29 | .00 | .00 | .00 | .00 | 100 | 910 | 27 | 4.7 | 4.6 | .04 | .00 | .00 |
| 30 | .00 | .00 | .00 | .00 | --- | 570 | 25 | 3.9 | 3.0 | .00 | .00 | .00 |
| 31 | .00 | --- | .00 | .00 | --- | 523 | --- | 3.4 | --- | .00 | .00 | --- |
| TOTAL | .00 | .00 | .00 | .00 | 129.75 | 5783.6 | 3569 | 535.2 | 158.1 | 22.17 | .20 | .00 |
| MEAN | .00 | .00 | .00 | .00 | 4.47 | 187 | 119 | 17.3 | 5.27 | .72 | .01 | .00 |
| MAX | .00 | .00 | .00 | .00 | 100 | 1420 | 541 | 38 | 9.0 | 3.8 | .07 | .00 |
| MIN | .00 | .00 | .00 | .00 | .00 | 3.5 | 25 | 3.4 | 2.0 | .00 | .00 | .00 |
| AC-FT | .0 | .00 | .00 | .00 | 257 | 11470 | 7080 | 1060 | 314 | 44 | .4 | .00 |
| CAL YR 1983 | TOTAL | 8156.77 | | MEAN | 22.3 | MAX | 700 | MIN | .00 | AC-FT | 16180 | |
| WTR YR 1984 | TOTAL | 10198.02 | | MEAN | 27.9 | MAX | 1420 | MIN | .00 | AC-FT | 20230 | |

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

| Stream | Tributary to | Location | Drainage area (mi ²) | Measured previously (water years) | Measurements | |
|------------------------------|-------------------|---|--|--|---|---|
| | | | | | Date | Discharge (ft ³ /s) |
| Red River of the North basin | | | | | | |
| South Branch Turtle River | Turtle River | Lat 47°55'49", long 97°37'30", in SE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ sec.1, T.151 N., R.55 W., Grand Forks County, 1.5 mi north of Larimore. | -- | 1981-82 | 3-28-84 | b108 |
| Turtle River at Manvel | Red River | Lat 48°04'43", long 97°11'03", in SE ¹ / ₄ sec.10, T 153 N., R.51 W., Grand Forks County, 0.3 mi west of Manvel, and 10 mi. upstream from mouth. | 613 | 1946-70, 1972-73, 1980-83 | 3-28-84 | b448 |
| Red River of the North | Hudson Bay | Lat 48°11'40", long 97°08'30", in SW ¹ / ₄ SW ¹ / ₄ sec.31, T.155 N., R.50 W., in Marshall County, at bridge on Minn. Highway 1 at Oslo, MN, and at mile 271.2. | 31,200 | 1936-37, 1941-43, 1945-49, 1965-68, 1979 | 4-04-84 | 30,900 |
| Marais River | Red River | Lat 48°11'48", long 97°09'54", in NW ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ sec.35, T.155 N., R.51 W., Walsh County, 1.7 mi west of Oslo, MN on ND Highway 54. | -- | -- | 4-05-84 | 3,470 |
| Red River of the North | Hudson Bay | Lat 48°24'48", long 97°08'16", in SE ¹ / ₄ sec.18, T.157 N., R.50 W., Walsh County, 1 mi south and 7.2 mi east of Oakwood, ND on highway 317. | -- | -- | 4-04-84 | 32,300 |
| Knife River basin | | | | | | |
| Elm Creek | Knife River | Lat 47°06'25", long 102°3'05", in SE ¹ / ₄ NW ¹ / ₄ sec.23, T.142 N., R.90 W., Mercer County, 13.5 mi south of Golden Valley. | 82.0 | 1967-83+ | 1-31-84 2-22-84 3-21-84 6-07-84 | 15.0 7.5 b200 a.05 |
| West Branch Otter Creek | Knife River | Lat 47°08'05", long 101°39'35", in NW ¹ / ₄ NW ¹ / ₄ SW ¹ / ₄ sec.12, T.142 N., R.87 W., Oliver County, 10 mi southeast of Beulah. | 26.5 | 1965-83+ | 2-02-84 2-29-84 3-14-84 3-21-84 3-22-84 3-28-84 4-03-84 4-23-84 6-05-84 | 4.64 a1.2 0.15 b200 12.2 2.92 1.87 0.46 0.13 |
| Missouri River Basin | | | | | | |
| East Branch Apple Creek | Missouri River | Lat 46°53'41", long 100°26'05", in NW ¹ / ₄ NW ¹ / ₄ NW ¹ / ₄ sec.5, T.139 N., R.77 W., 5 mi north of McKenzie. | -- | 1983 | 2-23-83 3-11-83 3-14-83 7-07-83 2-02-84 2-28-84 3-13-84 3-20-84 3-21-84 3-23-84 3-29-84 | c14.2 c76.7 c187 c0 0 45.0 0 7.68 84.3 310 50.1 |
| Apple Creek | Missouri River | Lat 46°52'50", long 100°28'55", in NW ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ Sec.11 T.139 N., R.78 W., .5 mi below West Branch Apple Creek 5 mi northeast of Menoken. | -- | 1983 | 2-23-83 3-18-83 3-18-83 2-28-84 3-18-84 3-22-84 3-24-84 3-29-84 | c38.1 c50.1 c83.0 59.4 0 404 813 96.7 |

a - Estimated

b - Crest-stage station, maximum discharge

c - Not previously published

† - Operated as continuous-record gaging station

DISCHARGE MEASUREMENTS MADE AT MISCELLANEOUS SITES DURING WATER YEAR 1984

331

| Stream | Tributary to | Location | Drainage area (mi ²) | Measured previously (water years) | Measurements | |
|---------------------------|---------------------------|--|--|--|-------------------|-----------------------------------|
| | | | | | Date | Discharge (ft ³ /s) |
| Missouri River basin | | | | | | |
| Random Creek | Missouri River | Lat 46°50'36", long 100°29'16", in NW ¹ / ₄ NW ¹ / ₄ SE ¹ / ₄ sec.13, T.139 N., R.78 W., at bridge 2 mi northeast of Menoken. | -- | 1983 | 2-18-83 | c0 |
| | | | | | 4-05-83 | c53.5 |
| | | | | | 5-20-83 | c14.5 |
| | | | | | 7-07-83 | 0.83 |
| | | | | | 2-02-84 | 0 |
| | | | | | 3-20-84 | 0 |
| | | | | | 3-21-84 | 49.8 |
| | | | | | 3-22-84 | 36.0 |
| | | | | | 3-29-84 | 15.8 |
| | | | | | 4-20-84 | 20.1 |
| | | | | | 6-18-84 | 10.0 |
| Long Lake Creek | Long Lake | Lat 46°37'13", long 100°15'15", in NE ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ sec.8, T.136 N., R.76 W., 4 mi south and 1½ mi east of Moffit. | -- | -- | 7-20-84 | 0.82 |
| | | | | | James River basin | |
| Cottonwood Creek | James River | Lat 46°17'45", long 98°16'05", in NW ¹ / ₄ NW ¹ / ₄ NW ¹ / ₄ sec.32, T.133 N., R.60 W., 1 mi east and 4 mi south of LaMoure. | -- | -- | 4-10-84 | 58.5 |
| | | | | | James River basin | |
| Pipestem Creek | James River | Lat 46°57'00", long 98°45'26", on south line sec.9, T.140 N., R.64 W., Stutsman Co., below Pipestem Reservoir embankment on county Highway 3 mi northwest of Jamestown. | 1,010 | 1974-76, 1978-79, 1983 | 10-23-84 | a3 |
| | | | | | 3-29-84 | 135 |
| | | | | | 4-24-84 | 108 |
| | | | | | 7-18-84 | 158 |
| James River | Missouri River | Lat 46°11'40", long 98°10'20", on sec.35, T.132 N., R.60 W., county road 3½ mi north and 4 mi west of Oakes, ND. | | 1983 | 4-04-84 | 1080 |
| | | | | | 4-10-84 | 514 |
| Grand River basin | | | | | | |
| North Fork Grand River | Grand River | Lat 45°57'09", long 103°18'23", on west line of sec.34, T.129 N., R.101 W., Bowman County, at bridge on county highway, 9.0 mi west of Haley. | -- | 1977-83 | 5-09-84 | 30.4 |
| | | | | | 6-08-84 | 1.72 |
| | | | | | 7-12-84 | 0.52 |
| | | | | | 8-02-84 | 0.36 |
| Alkali Creek | North Fork Grand River | Lat 46°00'00", long 103°22'05", on west line of sec.18, T.129 N., R.101 W., Bowman County, at right bank on downstream side of county highway bridge, 12 mi south of Bowman. | 58.1 | 1965-73, 1977-83 | 5-09-84 | 9.59 |
| | | | | | 6-07-84 | 0.18 |
| | | | | | 7-12-84 | 0.20 |
| | | | | | 8-02-84 | 0.07 |
| Spring Creek | North Fork Grand River | Lat 46°01'04", long 103°17'29", on south line of sec.3, T.129 N., R.101 W., Bowman County at bridge on county highway, 9.0 mi northwest of Haley. | -- | 1977-83 | 5-09-84 | 31.5 |
| | | | | | 6-08-84 | 3.30 |
| | | | | | 7-12-84 | 1.04 |
| | | | | | 8-02-84 | 0.46 |

a - Estimated

b - Crest-stage station, maximum discharge

c - Not previously published

† - Operated as continuous-record gaging station

BENSON COUNTY

480228098482501. Local number, 153-063-30CBC.

LOCATION.--Lat 48°02'28", long 098°48'25", Hydrologic Unit 09020201.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 200 ft, cased to 137 ft, plastic pipe, No. 18 slot screen set 137 to 143 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,445 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.75 ft below land-surface datum, May 25, 1983; lowest measured, 25.05 ft below land-surface datum, Mar. 4, 1971.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|-------|----------------|---------|----------------|---------|----------------|
| NOV 30 | 14.47 | APR 6 | 14.59 | JUNE 21 | 14.11 | SEPT 21 | 15.47 |

BENSON COUNTY

480958099154801. Local number, 154-067-15BBB.

LOCATION.--Lat 48°09'58", long 099°15'48", Hydrologic Unit 09020201.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 180 ft, cased to 147 ft, plastic pipe, No. 18 slot screen set 147 to 153 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,475 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 29.04 ft below land-surface datum, July 2, 1978; lowest measured, 33.80 ft below land-surface datum, Mar. 15, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|-------|----------------|---------|----------------|---------|----------------|
| NOV 29 | 30.84 | MAR 7 | 31.19 | JUNE 19 | 30.69 | SEPT 20 | 31.16 |

BENSON COUNTY

481041099442701. Local number, 154-071-11AAD1.

LOCATION.--Lat 48°10'41", long 099°44'27", Hydrologic Unit 09020202.

Owner: North Dakota State Water Commission.

AQUIFER.--Fox Hills Sandstone.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 100 ft, cased to 42 ft, plastic pipe, No. 12 slot screen set 42 to 45 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,590 ft. Measuring point: Top of casing 2.0 ft (0.61 m) above land-surface datum.

PERIOD OF RECORD.--August 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.14 ft below land-surface datum, July 12, 1982; lowest measured, 9.67 ft below land-surface datum, Nov. 28, 1983.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|-------|----------------|---------|----------------|---------|----------------|
| OCT 5 | 7.53 | MAR 7 | 7.94 | JUNE 20 | 6.52 | SEPT 21 | 7.89 |
| NOV 28 | 9.67 | | | | | | |

BOWMAN COUNTY

461534103491701. Local number, 132-105-16BDB.

LOCATION.--Lat 46°15'34", long 103°49'17", Hydrologic Unit 10110203.

Owner: North Dakota State Water Commission.

AQUIFER.--Hell Creek-Fox Hills Sandstone.

CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 475 ft, cased to 441 ft steel pipe, No. 12 slot screen set 441 to 459 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 3,010 ft. Measuring point: Top of casing 3.40 ft above land-surface datum.

PERIOD OF RECORD.--September 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 270.15 ft below land-surface datum, Feb. 25, 1973; lowest measured, 271.73 ft below land-surface datum, Jan. 11, 1972.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|------|----------------|------|----------------|------|----------------|
| NOV 30 | 271.73 | | | | | | |

BURLEIGH COUNTY

464943100305801. Local number, 139-078-27CBB.

LOCATION.--Lat 46°49'43", long 100°30'58", Hydrologic Unit 10130103.

Owner: North Dakota State Water Commission.

AQUIFER.--McKenzie.

CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 255 ft, cased to 200 ft, plastic pipe, slotted 200 to 220 ft below land-surface datum, gravel packed.

DATUM.--Altitude of land-surface datum is 1,713. Measuring point: Top of casing 1.90 ft above land-surface datum.

PERIOD OF RECORD.--August 1962 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.30 ft below land-surface datum, June 17, 1970; lowest measured, 32.44 ft below land-surface datum, Aug. 26, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|---------|----------------|
| OCT 26 | 24.82 | MAR 14 | 24.14 | MAY 25 | 23.56 | JULY 27 | 28.45 |
| NOV 30 | 24.61 | APR 23 | 23.70 | JUNE 28 | 23.60 | SEPT 26 | 25.62 |

CASS COUNTY

464359096541301. Local number, 138-049-29CCC.

LOCATION.--Lat 46°43'59", long 096°54'13", Hydrologic Unit 09020105.

Owner: North Dakota State Water Commission.

AQUIFER.--West Fargo.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 317 ft, cased to 278 ft plastic pipe, screens set at 278 to 280 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 912 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.

PERIOD OF RECORD.--August 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 32.17 ft below land-surface datum, Aug. 1, lowest measured, 55.02 ft below land-surface datum, Sept. 12, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|---------|----------------|---------|----------------|---------|----------------|
| OCT 12 | 48.79 | APR 11 | 51.00 | JULY 12 | 53.49 | SEPT 12 | 55.02 |
| NOV 9 | 49.28 | MAY 16 | 51.93 | AUG 9 | 54.92 | | |
| DEC 15 | 49.56 | JUNE 22 | 52.55 | | | | |

DIVIDE COUNTY

485649103155701. Local number, 163-97-15BCC.

LOCATION.--Lat 48°56'49", long 103°15'57", Hydrologic Unit 09010001.

Owner: North Dakota State Water Commission.

AQUIFER.--Yellowstone.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 575 ft, cased to 546 ft, steel pipe, No. 12 slot screen set 546 to 558 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,915 ft. Measuring point: Top of casing 1.50 ft above land-surface datum.

PERIOD OF RECORD.--August 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.31 ft below land-surface datum, June 5, 1979; lowest measured, 14.48 ft below land-surface datum, Aug. 9, 1972.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|-------|----------------|--------|----------------|
| NOV 30 | 12.23 | FEB 14 | 12.19 | MAY 8 | 12.52 | AUG 29 | 13.08 |

DUNN COUNTY

471323102290101. Local number, 143-093-09BCB.

LOCATION.--Lat 47°13'23", long 102°29'01", Hydrologic Unit 10130201.

Owner: North Dakota State Water Commission.

AQUIFER.--Sentinel Butte.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 965 ft, cased to 378 ft, steel pipe, No. 12 slot screen set 378 to 396 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 2,133 ft. Measuring point: Top of casing 2.10 ft above land-surface datum.

PERIOD OF RECORD.--February 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 92.12 ft below land-surface datum, June 7, 1984; lowest measured, 93.79 ft below land-surface datum, June 22, 1981.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|-------|----------------|
| OCT 17 | 92.95 | MAR 15 | 93.01 | JUNE 7 | 92.12 | AUG 1 | 93.01 |
| NOV 28 | 93.08 | | | | | | |

EDDY COUNTY

473720098592401. Local number, 148-065-19DAA.

LOCATION.--Lat 47°37'20", long 098°59'24", Hydrologic Unit 10160001.

Owner: North Dakota State Water Commission.

AQUIFER.--New Rockford.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 242 ft, cased to 220 ft, plastic pipe, slotted from 210 to 220 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,526 ft. Measuring point: Top of casing 1.90 ft above land-surface datum.

PERIOD OF RECORD.--September 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.40 ft below land-surface datum, Sept. 6, 1983; lowest measured, 50.49 ft below land-surface datum, Sept. 6, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|--------|----------------|
| OCT 17 | 45.36 | NOV 30 | 45.07 | JULY 19 | 45.27 | AUG 30 | 46.77 |

EMMONS COUNTY

463632100171901. Local number, 136-076-07CBC.

LOCATION.--Lat 46°36'32", long 100°17'19", Hydrologic Unit 10130103.

Owner: North Dakota State Water Commission.

AQUIFER.--Long Lake.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 150 ft, cased to 117 ft, plastic pipe, No. 12 slot screen set at 117 to 123 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,735 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--November 1972 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.73 ft below land-surface datum, July 13, 1984; lowest measured, 8.32 ft below land-surface datum, Sept. 1, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|---------|----------------|
| NOV 28 | 4.22 | MAR 15 | 4.07 | JULY 13 | 0.73 | SEPT 24 | 3.15 |
| DEC 3 | 4.36 | | | | | | |

GRAND FORKS COUNTY

474957097343501. Local number, 150-054-04CCD.

LOCATION.--Lat 47°49'57", long 097°34'35", Hydrologic Unit 09020307.

Owner: North Dakota State Water Commission.

AQUIFER.--Elk Valley.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 126 ft, cased to 40 ft, plastic pipe, No. 12 slot screen set 40 to 43 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,127 ft. Measuring point: Top of casing 1.80 ft, above land-surface datum.

PERIOD OF RECORD.--September 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.48 ft below land-surface datum, May 6, 1966; lowest measured, 7.96 ft below land-surface datum, Mar. 7, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 3 | 4.67 | NOV 29 | 5.07 | APR 12 | 5.34 | MAY 30 | 4.49 |

GRIGGS COUNTY

471612098113101. Local number, 144-059-20CCC.

LOCATION.--Lat 47°16'12", long 098°11'31", Hydrologic Unit 09020203.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 240 ft, cased to 158 ft, plastic pipe, No. 25 slot screen set 158 to 161 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,430 ft. Measuring point: Top of casing 2.0 ft above land-surface datum.

PERIOD OF RECORD.--September 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 45.84 ft below land-surface datum, Apr. 5, 1977; lowest measured, 86.99 ft below land-surface datum, Aug. 10, 1976.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|--------|----------------|
| DEC 6 | 54.76 | MAY 15 | 50.48 | JUNE 12 | 54.53 | JULY 9 | 55.23 |
| APR 18 | 50.59 | | | | | | |

GRIGGS COUNTY

473425098232901. Local number, 147-061-01CCC.

LOCATION.--Lat 47°34'25", long 098°23'29", Hydrologic Unit 09020203.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 340 ft, cased to 237 ft, plastic pipe, No. 25 slot screen set 237 to 240 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,525 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--September 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.72 ft below land-surface datum, May 16, 1984; lowest measured, 96.10 ft below land-surface datum, Aug. 12, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|---------|----------------|---------|----------------|---------|----------------|
| DEC 6 | 28.79 | MAY 16 | 26.72 | JULY 10 | 27.76 | SEPT 11 | 35.54 |
| APR 19 | 27.14 | JUNE 13 | 29.33 | AUG 8 | 52.65 | | |

GRIGGS COUNTY

473600098065901. Local number, 148-059-36AAB.

LOCATION.--Lat 47°36'00", long 098°06'59", Hydrologic Unit 09020203.

Owner: North Dakota State Water Commission.

AQUIFER.--McVillie.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 180 ft, cased to 137 ft, plastic pipe, No. 12 slot screen set 137 to 143 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,320 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--October 1971 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 6.40 ft below land-surface datum, May 3, 1979; lowest 12.09 ft below land-surface datum, Aug. 9, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|------|----------------|------|----------------|------|----------------|
| DEC 14 | 10.34 | | | | | | |

HETTINGER COUNTY

463153102521001. Local number, 135-097-04DCA.

LOCATION.--Lat 46°31'53", long 102°52'10", Hydrologic Unit 10130204.

Owner: North Dakota State Water Commission.

AQUIFER.--Fox Hills Sandstone.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 1,790 ft, cased to 1,320 ft, steel pipe, open hole.

DATUM.--Altitude of land-surface datum is 2,567 ft. Measuring point: Top of casing 0.70 ft above land-surface datum.

PERIOD OF RECORD.--September 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 141.87 ft below land-surface datum, Dec. 31, 1968; lowest measured, 144.20 ft below land-surface datum, Nov. 26, 1969.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|-------|----------------|---------|----------------|--------|----------------|
| DEC 1 | 142.75 | MAR 9 | 142.78 | JUNE 14 | 142.67 | SEPT 7 | 142.79 |

KIDDER COUNTY

470638099324301. Local number, 142-070-16DDD.

LOCATION.--Lat 47°06'38", long 099°32'43", Hydrologic Unit 10130103.

Owner: North Dakota State Water Commission.

AQUIFER.--Long Lake.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 84 ft, cased to 70 ft, plastic pipe, No. 18 slot screen set 70 to 73 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,810 ft. Measuring point: Top of casing 1.90 ft above land-surface datum.

PERIOD OF RECORD.--November 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.94 ft below land-surface datum, Dec. 4, 1976; lowest measured, 26.03 ft below land-surface datum, Aug. 27, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|---------|-------------|---------|-------------|
| NOV 18 | 22.07 | APR 25 | 21.28 | JUNE 18 | 21.19 | AUG 15 | 22.37 |
| DEC 8 | 22.08 | MAY 16 | 21.16 | JULY 17 | 23.38 | SEPT 13 | 22.19 |

MC LEAN COUNTY

473752101055301. Local number, 148-082-23BBB.

LOCATION.--Lat 47°37'52", long 101°05'53", Hydrologic Unit 10130101.

Owner: North Dakota State Water Commission.

AQUIFER.--Lake Nettie.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 300 ft, cased to 198 ft, plastic pipe, No. 24 slot screen set 198 to 204 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,880 ft. Measuring point: Top of casing 2.30 ft above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.50 ft below land-surface datum, Mar. 31, 1983, and June 27, 1984; lowest measured, 42.30 ft below land-surface datum, Dec. 2, 1970.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|-------------|--------|-------------|---------|-------------|---------|-------------|
| DEC 7 | 36.80 | APR 17 | 36.60 | JUNE 27 | 36.50 | SEPT 20 | 36.83 |

OLIVER COUNTY

470642101162701. Local number, 142-084-24BBA.

LOCATION.--Lat 47°06'42", long 101°16'27", Hydrologic Unit 10130101.

Owner: North Dakota State Water Commission.

AQUIFER.--Fox Hills Sandstone.

CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 1,295 ft, cased to 966 ft, steel pipe, open ended.

DATUM.--Altitude of land-surface datum is 2,006 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--January 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 197.04 ft below land-surface datum, Dec. 8, 1972; lowest measured, 208.70 ft below land-surface datum, Nov. 24, 1971.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|-------------|--------|-------------|--------|-------------|--------|-------------|
| OCT 6 | 199.41 | NOV 29 | 199.40 | JUNE 5 | 199.48 | AUG 27 | 199.42 |
| NOV 7 | 199.24 | MAR 16 | 199.47 | | | | |

GROUND-WATER LEVELS

PEMBINA COUNTY

485239097501702. Local number, 162-056-01CCC2.

LOCATION.--Lat 48°52'39", long 097°50'17", Hydrologic Unit 09020313.

Owner: North Dakota State Water Commission.

AQUIFER.--Icelandic.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 40 ft, cased to 37 ft, plastic pipe, No. 12 slot screen set 37 to 40 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 988 ft. Measuring point: Top of casing 1.8 ft above land-surface datum.

PERIOD OF RECORD.--October 1969 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.65 ft below land-surface datum, May 8, 1970; lowest measured, 8.06 ft below land-surface datum, Dec. 4, 1972.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|-------------|-------|-------------|--------|-------------|--------|-------------|
| OCT 5 | 7.74 | DEC 1 | 7.49 | APR 12 | 6.98 | JUNE 4 | 6.71 |

PIERCE COUNTY

475323100092101. Local number, 151-074-20AAA.

LOCATION.--Lat 47°53'23", long 100°09'21", Hydrologic Unit 09020202.

Owner: North Dakota State Water Commission.

AQUIFER.--New Rockford.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 320 ft, cased to 256 ft, plastic pipe, No. 18 slot screen set 256 to 259 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,605 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--November 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 22.50 ft below land-surface datum, Mar. 5, 1981; lowest measured, 31.73 ft below land-surface datum, Dec. 10, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|-------------|--------|-------------|---------|-------------|------|-------------|
| NOV 30 | 30.50 | MAR 12 | 30.44 | JULY 19 | 30.49 | | |

RICHLAND COUNTY

462633097163402. Local number, 134-052-06CCD2.

LOCATION.--Lat 46°26'33", long 097°16'34", Hydrologic Unit 09020204.

Owner: North Dakota State Water Commission.

AQUIFER.--Sheyenne Delta.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 40 ft, cased to 30 ft, plastic pipe, slotted 30 to 40 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,067 ft. Measuring point: Top of casing 0.65 ft above land-surface datum.

PERIOD OF RECORD.--September 1963 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level, 0.78 ft below land-surface datum, May 13, 1972; lowest recorded, 8.73 ft below land-surface datum, Feb. 8, 1977. May have been lower during period of missing record, Jan. 17 - Feb. 7, 1977.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984
MINIMUM VALUES

| DAY | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|-------------|------|------|------|------|--------|------|------|--------|------|------|------|------|
| 5 | 6.71 | 6.59 | 6.68 | 7.28 | --- | 6.35 | 3.16 | 2.92 | 4.62 | 5.26 | 6.82 | 7.62 |
| 10 | 6.79 | 6.67 | 6.82 | 7.10 | --- | 6.33 | 3.12 | 3.04 | 3.96 | 5.78 | 7.03 | 7.69 |
| 15 | 6.83 | 6.66 | 6.90 | 7.29 | --- | 6.52 | 2.69 | 3.40 | 4.36 | 6.19 | 7.21 | 7.72 |
| 20 | 6.54 | 6.51 | 7.10 | 7.40 | --- | 6.55 | 3.00 | 3.94 | 4.76 | 6.32 | 7.35 | 7.82 |
| 25 | 6.47 | 6.45 | 7.23 | 7.49 | 6.60 | 5.56 | 2.96 | 4.29 | 4.92 | 6.56 | 7.43 | 7.78 |
| EOM | 6.57 | 6.59 | 7.31 | 7.47 | 6.42 | 3.48 | 2.70 | 4.79 | 5.22 | 6.70 | 7.57 | 7.77 |
| MIN | 6.46 | 6.43 | 6.59 | 7.10 | 6.42 | 3.48 | 2.36 | 2.63 | 3.55 | 5.20 | 6.75 | 7.55 |
| WTR YR 1984 | MEAN | 5.98 | HIGH | 2.36 | APR 27 | LOW | 7.84 | SEP 22 | | | | |

GROUND-WATER LEVELS

STARK COUNTY

465755102410701. Local number, 140-095-08AAA.

LOCATION.--Lat 46°57'55", long 102°41'07", Hydrologic Unit 10130204.

Owner: North Dakota State Water Commission.

AQUIFER.--Sentinel Butte.

CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 160 ft, cased to 80 ft, plastic pipe, open ended.

DATUM.--Altitude of land-surface datum is 2,419 ft. Measuring point: Top of casing 1.70 ft above land-surface datum.

PERIOD OF RECORD.--December 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.61 ft below land-surface datum, June 19, 1970; lowest measured, 27.23 ft below land-surface datum, Dec. 10, 1968.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|---------|----------------|
| OCT 19 | 17.79 | JAN 20 | 17.78 | APR 20 | 17.27 | JULY 23 | 17.25 |
| NOV 28 | 17.75 | FEB 22 | 17.33 | MAY 21 | 16.85 | AUG 20 | 17.67 |
| DEC 22 | 17.87 | MAR 24 | 17.29 | JUNE 20 | 16.66 | SEPT 21 | 17.99 |

STEELE COUNTY

471601097371001. Local number, 144-055-26BBB.

LOCATION.--Lat 47°16'01", long 097°37'10", Hydrologic Unit 09020109.

Owner: North Dakota State Water Commission.

AQUIFER.--Galesburg.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 300 ft, cased to 53 ft, plastic pipe, slotted 53 to 68 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,160 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 16.20 ft below land-surface datum, Apr. 23, 1984; lowest measured, 23.35 ft below land-surface datum, Aug. 25, 1980.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|---------|----------------|
| DEC 6 | 20.57 | MAY 16 | 19.38 | JUNE 29 | 19.42 | AUG 28 | 22.24 |
| APR 23 | 16.20 | MAY 28 | 19.55 | JULY 31 | 21.81 | SEPT 23 | 21.40 |

STUTSMAN COUNTY

463846098274101. Local number, 137-062-26DDD.

LOCATION.--Lat 46°38'46", long 098°27'41", Hydrologic Unit 10160003.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 240 ft, cased to 157 ft, plastic pipe, No. 12 slot screen set 157-163 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,455 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.

PERIOD OF RECORD.--September 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.20 ft below land-surface datum, Sept. 6, 1979; lowest measured, 20.67 ft below land-surface datum, May 28, 1973.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|--------|----------------|--------|----------------|
| OCT 13 | 17.95 | APR 10 | 18.20 | JUNE 6 | 17.43 | AUG 1 | 17.61 |
| NOV 9 | 18.05 | MAY 8 | 17.86 | JULY 5 | 17.51 | SEPT 6 | 17.66 |
| DEC 7 | 17.99 | | | | | | |

GROUND-WATER LEVELS

TRAILL COUNTY

473228097051501. Local number, 147-051-22BBB.

LOCATION.--Lat 47°32'28", long 097°05'15", Hydrologic Unit 09020301.

Owner: North Dakota State Water Commission.

AQUIFER.--Hillsboro.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 103 ft, cased to 97 ft, plastic pipe, No. 18 slot screen set 97 to 100 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 925 ft. Measuring point: Top of casing 2.40 ft above land-surface datum.

PERIOD OF RECORD.--August 1965 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +1.90 ft above land-surface datum, July 4, 1979; lowest measured, 7.27 ft below land-surface datum, Aug. 17, 1965.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|-------|----------------|---------|----------------|---------|----------------|
| DEC 1 | 2.11 | MAY 8 | 1.19 | JUNE 25 | 0.03 | SEPT 25 | 1.91 |

WALSH COUNTY

481657097473601. Local number, 156-056-36CCC1.

LOCATION.--Lat 48°16'57", long 097°47'36", Hydrologic Unit 09020308.

Owner: North Dakota State Water Commission.

AQUIFER.--Fordville.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 280 ft, cased to 27 ft, plastic pipe, No. 18 slot screen set 27 to 30 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,145 ft. Measuring point: Top of casing 1.85 ft above land-surface datum.

PERIOD OF RECORD.--May 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.03 ft below land-surface datum, June 29, 1981; lowest measured, 6.95 ft below land-surface datum, June 13, 1973.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|-------|----------------|--------|----------------|--------|----------------|
| OCT 3 | 6.14 | DEC 1 | 6.15 | APR 18 | 5.90 | JUNE 1 | 6.22 |

WALSH COUNTY

482408097443201. Local number, 157-055-21DBC.

LOCATION.--Lat 48°24'08", long 097°44'32", Hydrologic Unit 09020301.

Owner: North Dakota State Water Commission.

AQUIFER.--Dakota Formation.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 496 ft, cased to 491 ft, steel pipe, screen set 491 to 496 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 975 ft. Measuring point: Top of casing at land-surface datum.

PERIOD OF RECORD.--May 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 88.84 ft below land-surface datum, Mar. 9, 1982; lowest measured, 92.75 ft below land-surface datum, Sept. 17, 1974.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|-------|----------------|--------|----------------|---------|----------------|
| OCT 3 | 90.80 | DEC 2 | 90.92 | APR 12 | 90.74 | JUNE 21 | 90.85 |

GROUND-WATER LEVELS

WALSH COUNTY

482449098095801. Local number, 157-058-18DDD.

LOCATION.--Lat 48°24'49", long 098°09'58", Hydrologic Unit 09020308.

Owner: North Dakota State Water Commission.

AQUIFER.--Pierre Shale.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 140 ft, cased to 80 ft, plastic pipe, slotted screen set 80 to 100 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,580 ft. Measuring point: Top of casing 1.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.89 ft above land-surface datum, Dec. 5, 1972; lowest measured, 9.15 ft below land-surface datum, Mar. 14, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|-------|----------------|-------|----------------|--------|----------------|---------|----------------|
| OCT 3 | 2.57 | DEC 1 | 2.34 | APR 12 | 1.11 | JUNE 21 | 2.97 |

WARD COUNTY

480912101090301. Local number, 154-082-24ABA.

LOCATION.--Lat 48°09'12", long 101°09'03", Hydrologic Unit 09010001.

Owner: North Dakota State Water Commission.

AQUIFER.--Lower Souris.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 115 ft, cased to 10 ft, plastic pipe, slotted screen set 10 to 40 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,850 ft. Measuring point: Top of casing 1.70 ft above land-surface datum.

PERIOD OF RECORD.--January 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.84 ft below land-surface datum (corrected), June 17, 1965; lowest measured, 13.69 ft below land-surface datum, Mar. 4, 1964.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|---------|----------------|------|----------------|
| NOV 30 | 13.09 | MAR 24 | 11.95 | JUNE 16 | 11.53 | | |

WELLS COUNTY

474419099371201. Local number, 149-070-09DAA1.

LOCATION.--Lat 47°44'19", long 099°37'12", Hydrologic Unit 10160001.

Owner: North Dakota State Water Commission.

AQUIFER.--New Rockford.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 283 ft, cased to 177 ft, plastic pipe, slotted 177 to 197 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,610 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.

PERIOD OF RECORD.--May 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 64.56 ft below land-surface datum, Dec. 1, 1982; lowest measured, 66.65 ft below land-surface datum, Mar. 15, 1967.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|---------|----------------|------|----------------|------|----------------|
| NOV 29 | 64.72 | JULY 19 | 65.11 | | | | |

WILLIAMS COUNTY

483048103373101. Local number, 158-100-17ADA.

LOCATION.--Lat 48°30'48", long 103°37'31", Hydrologic Unit 10110102.

Owner: North Dakota State Water Commission.

AQUIFER.--Little Muddy.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 52 ft, cased to 35 ft, plastic pipe, slotted 35 to 43 ft below land-surface datum.

DATUM.--Altitude of land-surface datum is 1,987 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--August 1966 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.02 ft below land-surface datum, June 5, 1979; lowest measured, 20.44 ft below land-surface datum, Aug. 29, 1984.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL | DATE | WATER LEVEL |
|--------|----------------|--------|----------------|-------|----------------|--------|----------------|
| NOV 29 | 19.34 | FEB 15 | 19.26 | MAY 9 | 19.02 | AUG 29 | 20.44 |

QUALITY OF GROUND WATER

343

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| STATION NUMBER | LOCAL IDENTIFIER | COUNTY | GEOLOGIC UNIT | DEPTH OF WELL, TOTAL (FEET) | DATE OF SAMPLE | TIME | SPECIFIC CONDUCTANCE (UMHOS) | PH (STANDARD UNITS) | TEMPERATURE (DEG C) |
|-----------------|------------------|--------|---------------|-----------------------------|----------------|------|------------------------------|---------------------|---------------------|
| BOWMAN | | | | | | | | | |
| 461202103005001 | 130-099-01BBB | 011 | 125TRVL | 60.00 | 84-06-15 | 1145 | 3050 | 8.3 | 7.5 |
| 460645103021801 | 130-099-03ADD | 011 | 125TRVL | 60.00 | 84-09-10 | 1615 | 2850 | 8.2 | 7.5 |
| | | 011 | 125TRVL | 64.00 | 84-02-15 | 1700 | 7100 | 8.2 | 8.0 |
| | | 011 | 125TRVL | 67.00 | 84-06-21 | 1350 | 7000 | 8.2 | 6.0 |
| | | 011 | 125TRVL | 67.00 | 84-09-24 | 1600 | 7150 | 8.4 | 12.0 |
| 460705103025601 | 130-099-03BAA | 011 | 125TRVL | -- | 84-07-10 | 1645 | 6250 | 9.2 | 7.0 |
| 460645103033302 | 130-099-04ADD2 | 011 | 125TRVL | -- | 84-09-14 | 1045 | 6250 | 9.0 | 8.5 |
| | | 011 | 125TRVL | -- | 84-07-13 | 1035 | 6800 | 6.9 | 6.5 |
| | | 011 | 125TRVL | -- | 84-09-25 | 1100 | 6700 | 7.0 | 7.5 |
| 460705103041101 | 130-099-04BAA | 011 | 125TRVL | 47.00 | 84-07-13 | 1430 | 4150 | 7.0 | 7.0 |
| 461355103055701 | 131-099-19DDD | 011 | 125TRVL | 47.00 | 84-09-26 | 1115 | 4320 | 7.1 | 10.0 |
| | | 011 | 125TRVL | 74.00 | 84-06-15 | 1500 | 7350 | 7.5 | 7.5 |
| | | 011 | 125TRVL | 74.00 | 84-09-17 | 1530 | 4750 | 7.6 | 8.5 |
| 460902103043601 | 131-099-21CCB | 011 | 125HRMN | 80.00 | 84-02-17 | 0950 | 775 | 6.9 | 8.0 |
| | | 011 | 125HRMN | -- | 84-07-10 | 1130 | 1620 | 7.1 | 7.5 |
| 461355103043303 | 131-099-21CCC3 | 011 | 125HRMN | -- | 84-09-20 | 1130 | 1620 | 7.1 | 8.5 |
| | | 011 | 125TRVL | 152 | 84-06-27 | 1440 | 1710 | 8.6 | 8.0 |
| | | 011 | 125TRVL | 152 | 84-09-20 | 1415 | 1740 | 8.7 | 8.5 |
| 460856103024401 | 131-099-22DCC1 | 011 | 125HRMN | 76.00 | 84-07-09 | 1610 | 4350 | 7.2 | 8.0 |
| | | 011 | 125HRMN | 76.00 | 84-09-18 | 1630 | 4280 | 7.2 | 8.0 |
| 460856103020701 | 131-099-23CCC1 | 011 | 125TRVL | -- | 84-06-29 | 1330 | 1390 | 8.7 | 8.5 |
| 460856103020702 | 131-099-23CCC2 | 011 | 125TRVL | -- | 84-09-18 | 1400 | 1380 | 8.7 | 8.5 |
| | | 011 | 125TRVL | 100 | 84-06-29 | 1140 | 2350 | 8.3 | 8.0 |
| 460804103010101 | 131-099-26DDD | 011 | 125TRVL | 100 | 84-09-18 | 1245 | 2510 | 8.2 | 8.0 |
| | | 011 | 125HRMN | 76.00 | 84-02-17 | 1225 | 1360 | 8.4 | 8.5 |
| 460804103010103 | 131-099-26DDD3 | 011 | 125HRMN | 76.00 | 84-06-25 | 1530 | 1420 | 8.4 | 7.5 |
| | | 011 | 125HRMN | 76.00 | 84-09-11 | 1300 | 1380 | 8.4 | 7.5 |
| | | 011 | 125TRVL | 20.00 | 84-06-25 | 1645 | 2710 | 8.4 | 11.0 |
| 460830103021601 | 131-099-27ADD | 011 | 125TRVL | 120 | 84-07-10 | 1355 | 1560 | 8.6 | 7.5 |
| | | 011 | 125TRVL | 120 | 84-09-11 | 1530 | 1480 | 8.7 | 7.5 |
| 460843103032001 | 131-099-27BBC1 | 011 | 120TRTR | 86.00 | 84-02-16 | 1040 | 5820 | 7.7 | 6.5 |
| | | 011 | 120TRTR | 86.00 | 84-06-26 | 1305 | 5650 | 7.5 | 6.0 |
| | | 011 | 120TRTR | 86.00 | 84-09-12 | 1315 | 5650 | 7.5 | 6.0 |
| 460843103032003 | 131-099-27BBC3 | 011 | 125TRVL | 160 | 84-02-16 | 1100 | 1610 | 9.0 | 6.5 |
| | | 011 | 125TRVL | 160 | 84-06-26 | 1730 | 1790 | 8.8 | 6.5 |
| 460825103032601 | 131-099-27CBB | 011 | 125TRVL | 160 | 84-09-12 | 1430 | 1600 | 8.9 | 6.5 |
| | | 011 | 125HRMN | 80.00 | 84-06-27 | 1150 | 1150 | 7.7 | 7.5 |
| | | 011 | 125HRMN | 80.00 | 84-09-13 | 1615 | 1190 | 7.7 | 7.5 |
| 460816103032701 | 131-099-27CBC1 | 011 | 125HRMN | 80.00 | 84-06-28 | 1110 | 2790 | 7.6 | 10.0 |
| | | 011 | 125HRMN | 80.00 | 84-09-13 | 1200 | 2730 | 7.7 | 9.5 |
| 460816103032702 | 131-099-27CBC2 | 011 | 125TRVL | 60.00 | 84-06-28 | 1150 | 2650 | 7.4 | 10.0 |
| 460834103055501 | 131-099-29BCC | 011 | 125TRVL | 60.00 | 84-09-13 | 1245 | 2670 | 7.5 | 9.5 |
| | | 011 | 125TGRVL | 53.00 | 84-06-28 | 1625 | 1810 | 9.2 | 7.0 |
| 460804103052301 | 131-099-29CDD | 011 | 125TGRVL | 53.00 | 84-09-19 | 1510 | 1760 | 9.2 | 8.0 |
| | | 011 | 125HRMN | 32.00 | 84-06-28 | 1415 | 1500 | 6.6 | 7.5 |
| 460725103051301 | 131-099-32DBC | 011 | 125HRMN | 32.00 | 84-09-19 | 1215 | 3000 | 6.6 | 7.5 |
| | | 011 | 125TRVL | -- | 84-07-13 | 1230 | 2950 | 7.6 | 7.5 |
| | | 011 | 125TRVL | -- | 84-09-25 | 1430 | 2900 | 7.8 | 10.0 |
| 460747103032902 | 131-099-33ADA2 | 011 | 120TRTR | 38.00 | 84-02-16 | 1625 | 2710 | 8.0 | 7.5 |
| | | 011 | 120TRTR | 38.00 | 84-06-20 | 1315 | 2680 | 8.3 | 9.0 |
| 460747103032903 | 131-099-33ADA3 | 011 | 125TRVL | 76.00 | 84-02-16 | 1705 | 2430 | 8.3 | 7.0 |
| 460709103032804 | 131-099-33DDD4 | 011 | 125TRVL | 76.00 | 84-06-20 | 1345 | 2440 | 8.7 | 9.5 |
| | | 011 | 125TGRVL | 52.00 | 84-02-17 | 1420 | 4480 | 10.2 | 8.5 |
| 460709103032806 | 131-099-33DDD6 | 011 | 125TGRVL | 52.00 | 84-06-19 | 1500 | 4350 | 11.2 | 8.0 |
| | | 011 | 125TRVL | 65.00 | 84-02-17 | 1400 | 6500 | 7.4 | 9.0 |
| 460743103024201 | 131-099-34ACB | 011 | 125TRVL | 65.00 | 84-06-19 | 1230 | 6500 | 7.0 | 8.0 |
| | | 011 | 125TRVL | 14 | 84-02-16 | 1310 | 2430 | 9.9 | 8.5 |
| | | 011 | 125TRVL | 14 | 84-06-21 | 1115 | 2440 | 9.7 | 7.5 |
| 460744103014801 | 131-099-35BDB | 011 | 125TRVL | 78.00 | 84-02-15 | 1730 | 1380 | 8.3 | 9.0 |
| | | 011 | 125TRVL | -- | 84-06-20 | 1630 | 1390 | 8.6 | 8.0 |
| | | 011 | 125TRVL | -- | 84-09-12 | 1640 | 1310 | 8.8 | 8.0 |

Geologic unit (aquifer):

125TRVL - Tongue River - Ludlow Member of Fort Union Formation.

125HRMN - Harmon Lignite aquifer, Paleocene age.

120TRTR - Tertiary system.

125TGRVL - Tongue River Member of the Fort Union Formation, Lower, Paleocene.

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE OF SAMPLE | HARD- NESS (MG/L AS CaCO ₃) | HARD- NESS, NONCAR- BONATE (MG/L AS CaCO ₃) | CALCIUM DIS- SOLVED (MG/L AS Ca) | MAGNE- SIUM, DIS- SOLVED (MG/L AS Mg) | SODIUM, DIS- SOLVED (MG/L AS Na) | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CaCO ₃) | SULFATE DIS- SOLVED (MG/L AS SO ₄) | CHLO- RIDE, DIS- SOLVED (MG/L AS Cl) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) |
|----------------------|---|--|--|--|--|-------------------|---|---|--|--|---|--|
| BOWMAN | | | | | | | | | | | | |
| 84-06-15 | 170 | 0 | 29 | 23 | 690 | 90 | 24 | 6.7 | 501 | 1200 | 8.7 | 1.2 |
| 84-09-10 | 110 | 0 | 18 | 16 | 610 | 92 | 26 | 5.1 | 517 | 990 | 8.8 | 1.5 |
| 84-02-15 | 240 | 0 | 30 | 39 | 1700 | 94 | 49 | 13 | 442 | 3400 | 16 | 1.1 |
| 84-06-21 | 300 | 0 | 41 | 48 | 1700 | 92 | 43 | 14 | 430 | 3700 | 15 | 1.0 |
| 84-09-24 | 260 | 0 | 27 | 45 | 1800 | 94 | 50 | 10 | 444 | 3600 | 14 | 1.1 |
| 84-07-10 | 150 | 0 | 24 | 21 | 1500 | 95 | 55 | 9.0 | 290 | 3200 | 12 | .80 |
| 84-09-14 | 140 | 0 | 19 | 22 | 1600 | 96 | 60 | 8.7 | 613 | 3200 | 11 | .70 |
| 84-07-13 | 1700 | 1400 | 200 | 280 | 1200 | 61 | 13 | 9.7 | 293 | 4100 | 12 | .60 |
| 84-09-25 | 1600 | 1300 | 180 | 270 | 1200 | 62 | 13 | 13 | 295 | 3900 | 12 | .60 |
| 84-07-13 | 710 | 300 | 120 | 98 | 810 | 71 | 14 | 16 | 403 | 2100 | 7.8 | .20 |
| 84-09-26 | 730 | 330 | 130 | 98 | 810 | 70 | 13 | 16 | 410 | 2100 | 7.6 | .10 |
| 84-06-15 | 2300 | 1900 | 310 | 380 | 1200 | 52 | 11 | 25 | 401 | 4700 | 51 | .30 |
| 84-09-17 | 940 | 530 | 110 | 160 | 720 | 62 | 10 | 15 | 407 | 2200 | 28 | .60 |
| 84-02-17 | 390 | 34 | 85 | 42 | 21 | 10 | .5 | 7.9 | 352 | 100 | 1.5 | .50 |
| 84-07-10 | 880 | 570 | 190 | 97 | 61 | 13 | .9 | 9.7 | 307 | 670 | 11 | .30 |
| 84-09-20 | 840 | 540 | 180 | 94 | 60 | 13 | .9 | 8.6 | 304 | 660 | 10 | .30 |
| 84-06-27 | 21 | 0 | 5.2 | 1.8 | 410 | 97 | 41 | 2.6 | 616 | 450 | 25 | 2.9 |
| 84-09-20 | 19 | 0 | 4.8 | 1.7 | 420 | 98 | 43 | 2.4 | 636 | 480 | 25 | 2.9 |
| 84-07-09 | 1800 | 1300 | 320 | 230 | 500 | 38 | 5 | 15 | 477 | 2100 | 41 | .40 |
| 84-09-18 | 1800 | 1400 | 340 | 240 | 490 | 36 | 5 | 15 | 480 | 2200 | 43 | .50 |
| 84-06-29 | 19 | 0 | 3.6 | 2.3 | 330 | 97 | 34 | 3.1 | 636 | 300 | 28 | 4.9 |
| 84-09-18 | 30 | 0 | 6.3 | 3.5 | 340 | 96 | 28 | 2.1 | 649 | 260 | 24 | 3.0 |
| 84-06-29 | 47 | 0 | 9.7 | 5.4 | 540 | 96 | 35 | 4.5 | 445 | 800 | 5.9 | 2.1 |
| 84-09-18 | 50 | 0 | 10 | 6.0 | 620 | 96 | 39 | 4.3 | 455 | 790 | 6.1 | 2.0 |
| 84-02-17 | 14 | 0 | 3.2 | 1.5 | 320 | 98 | 38 | 2.5 | 449 | 290 | 5.3 | 2.3 |
| 84-06-25 | 16 | 0 | 3.7 | 1.7 | 320 | 97 | 36 | 2.6 | 430 | 290 | 5.9 | 2.2 |
| 84-09-11 | 15 | 0 | 3.5 | 1.6 | 330 | 98 | 38 | 2.4 | 439 | 290 | 6.1 | 2.2 |
| 84-06-25 | 520 | 31 | 63 | 88 | 510 | 67 | 10 | 13 | 489 | 1100 | 23 | 1.1 |
| 84-07-10 | 20 | 0 | 4.2 | 2.3 | 370 | 97 | 37 | 2.3 | 571 | 280 | 17 | 1.4 |
| 84-09-11 | 22 | 0 | 4.6 | 2.4 | 360 | 97 | 35 | 2.4 | 582 | 280 | 19 | 3.0 |
| 84-02-16 | 700 | 33 | 130 | 90 | 1200 | 77 | 20 | 51 | 663 | 2600 | 35 | .80 |
| 84-06-26 | 730 | 220 | 140 | 90 | 1100 | 75 | 18 | 47 | 506 | 2600 | 16 | .90 |
| 84-09-12 | 660 | 0 | 110 | 91 | 1300 | 80 | 23 | 45 | 852 | 2600 | 14 | .90 |
| 84-02-16 | 14 | 0 | 3.6 | 1.2 | 390 | 98 | 47 | 2.3 | 746 | 230 | 18 | 4.6 |
| 84-06-26 | 29 | 0 | 7.7 | 2.3 | 410 | 97 | 34 | 2.6 | 718 | 420 | 30 | 4.2 |
| 84-09-12 | 22 | 0 | 6.5 | 1.4 | 370 | 97 | 36 | 2.1 | 732 | 360 | 28 | 3.0 |
| 84-06-27 | 320 | 72 | 79 | 29 | 130 | 47 | 3 | 3.8 | 245 | 330 | 2.5 | .80 |
| 84-09-13 | 370 | 140 | 92 | 35 | 130 | 43 | 3 | 3.3 | 234 | 410 | 3.3 | .80 |
| 84-06-28 | 350 | 0 | 66 | 44 | 520 | 76 | 12 | 8.8 | 457 | 1100 | 8.1 | .70 |
| 84-09-13 | 330 | 0 | 61 | 43 | 570 | 79 | 14 | 7.5 | 462 | 1100 | 8.1 | .70 |
| 84-06-28 | 400 | 0 | 76 | 50 | 490 | 72 | 11 | 8.4 | 469 | 1000 | 7.8 | .80 |
| 84-09-13 | 370 | 0 | 69 | 47 | 540 | 76 | 13 | 7.0 | 474 | 990 | 7.8 | .80 |
| 84-06-28 | 22 | 0 | 6.1 | 1.6 | 410 | 97 | 40 | 3.6 | 613 | 330 | 7.2 | 1.3 |
| 84-09-19 | 20 | 0 | 5.8 | 1.4 | 420 | 97 | 42 | 3.0 | 624 | 320 | 7.5 | 1.3 |
| 84-06-28 | 3600 | 2700 | 410 | 610 | 3100 | 66 | 23 | 14 | 846 | 9600 | 16 | .30 |
| 84-09-19 | 3400 | 2600 | 380 | 590 | 2700 | 63 | 21 | 13 | 749 | 8400 | 17 | .30 |
| 84-07-13 | 600 | 190 | 100 | 85 | 510 | 64 | 9 | 18 | 417 | 1300 | 3.5 | .30 |
| 84-09-25 | 620 | 180 | 100 | 88 | 550 | 66 | 10 | 14 | 433 | 1300 | 3.5 | .30 |
| 84-02-16 | 130 | 0 | 25 | 16 | 580 | 90 | 23 | 6.0 | 602 | 830 | 7.1 | 1.3 |
| 84-06-20 | 120 | 0 | 24 | 14 | 610 | 91 | 25 | 6.3 | 571 | 870 | 6.7 | 1.3 |
| 84-02-16 | 26 | 0 | 5.3 | 3.0 | 570 | 98 | 50 | 2.9 | 596 | 610 | 7.6 | 2.3 |
| 84-06-20 | 26 | 0 | 5.9 | 2.7 | 540 | 98 | 48 | 2.8 | 571 | 690 | 8.1 | 2.1 |
| 84-02-17 | 1200 | 1100 | 370 | 70 | 740 | 56 | 10 | 24 | 133 | 2600 | 14 | .30 |
| 84-06-19 | 1000 | 890 | 370 | 25 | 660 | 58 | 9 | 27 | 140 | 2400 | 16 | .20 |
| 84-02-17 | 1300 | 860 | 240 | 160 | 1300 | 69 | 16 | 18 | 399 | 3400 | 13 | .20 |
| 84-06-19 | 1300 | 930 | 260 | 160 | 1200 | 66 | 15 | 20 | 382 | 3900 | 14 | .20 |
| 84-02-16 | 19 | 0 | 4.9 | 1.6 | 550 | 98 | 57 | 2.7 | 427 | 790 | 15 | 2.9 |
| 84-06-21 | 22 | 0 | 5.9 | 1.8 | 560 | 98 | 54 | 2.3 | 400 | 900 | 20 | 3.0 |
| 84-02-15 | 24 | 0 | 6.0 | 2.1 | 330 | 96 | 31 | 2.3 | 603 | 400 | 30 | 4.2 |
| 84-06-20 | 25 | 0 | 6.4 | 2.1 | 340 | 96 | 31 | 2.0 | 569 | 400 | 32 | 4.2 |
| 84-09-12 | 26 | 0 | 6.8 | 2.1 | 340 | 96 | 30 | 2.0 | 581 | 480 | 33 | 3.0 |

| STATION | NUMBER | DATE | OF | SAMPLE | SILICA, SOLIDS, RESIDUE, SUM OF CONSTITUENTS, DEG. C AT 180 SOLVED (MG/L) SOLVED (MG/L) | AC-FT) (MG/L) SOLVED (MG/L) | AS NO3) (MG/L) SOLVED (MG/L) | AS B) (UG/L) SOLVED (UG/L) | AS FE) (UG/L) SOLVED (UG/L) | IRON, DIS- SOLVED (UG/L) | MANGA- NESE, DIS- SOLVED (UG/L) | MOLYB- DENUM, DIS- SOLVED (UG/L) | STRON- TIUM, DIS- SOLVED (UG/L) | AS SR) |
|-----------------|----------|------|-------|----------|---|--------------------------------------|---------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------|---|--|---|--------|
| 461202103005001 | 84-06-15 | 9.0 | 7.9 | 84-09-10 | 2300 | 2300 | 2.9 | 1500 | 30 | 100 | 12 | 830 | 550 | 2500 |
| 460645103021801 | 84-02-15 | 13 | 7.8 | 84-06-21 | 5700 | 5800 | 7.8 | 1100 | 50 | 200 | 1 | 2500 | 550 | 2500 |
| 460705103025601 | 84-07-10 | 8.3 | 6.6 | 84-07-10 | 4840 | 5000 | 6.6 | 760 | 40 | 40 | 2 | 1500 | 1700 | 4600 |
| 460645103033302 | 84-07-13 | 9.2 | 8.5 | 84-09-25 | 6260 | 5800 | 8.4 | 4800 | 9400 | 2500 | <1 | 4600 | 4700 | 3900 |
| 460705103041101 | 84-07-13 | 13 | 4.7 | 84-07-13 | 3450 | 3400 | 4.7 | 3500 | 1700 | 650 | <1 | 3900 | 3500 | 4800 |
| 461355103055701 | 84-06-15 | 7.2 | 9.9 | 84-09-17 | 7250 | 3500 | 4.9 | 860 | 80 | 12 | <0 | 3500 | 2800 | 4600 |
| 460902103043601 | 84-02-17 | 12 | 4.6 | 84-02-17 | 464 | 1200 | 4.6 | 150 | 37 | 94 | -- | 2600 | 2800 | 2600 |
| 460804103010103 | 84-06-25 | 7.5 | 905 | 84-06-25 | 905 | 890 | 1.2 | 910 | 62 | 17 | <1 | 100 | 110 | 100 |
| 460804103010103 | 84-06-25 | 6.6 | 2060 | 84-06-25 | 2060 | 2100 | 2.8 | 1400 | 80 | 180 | -- | 130 | 130 | 150 |
| 460830103021601 | 84-07-10 | 8.4 | 1020 | 84-07-10 | 1020 | 1000 | 1.4 | 1100 | 310 | 100 | <1 | 130 | 130 | 150 |
| 460843103032001 | 84-02-16 | 21 | 4680 | 84-02-16 | 4680 | 4500 | 6.4 | 1600 | 50 | 550 | -- | 4800 | 5000 | 230 |
| 460825103032601 | 84-09-12 | 7.6 | 1170 | 84-09-12 | 1170 | 1200 | 1.6 | 1300 | 440 | 44 | <20 | 150 | 170 | 150 |
| 460816103032702 | 84-06-28 | 7.7 | 1940 | 84-06-28 | 1940 | 1900 | 2.6 | 1600 | 90 | 70 | <1 | 2900 | 2800 | 2900 |
| 460834103055501 | 84-06-28 | 9.6 | 1150 | 84-06-28 | 1150 | 1100 | 1.6 | 820 | 34 | 5 | <1 | 160 | 160 | 170 |
| 460804103052301 | 84-06-28 | 8.8 | 13800 | 84-06-28 | 13800 | 14000 | 18.8 | 12000 | 450 | 790 | 1 | 14000 | 13000 | 14000 |
| 460725103051301 | 84-09-19 | 8.3 | 13400 | 84-09-19 | 13400 | 13000 | 18.2 | 13000 | 330 | 560 | 3 | 13000 | 3400 | 3400 |
| 460747103032902 | 84-02-16 | 8.4 | 1800 | 84-02-16 | 1800 | 1800 | 2.5 | 1100 | 40 | 40 | <1 | 3400 | 3400 | 3400 |
| 460709103032804 | 84-02-17 | 8.2 | 1620 | 84-02-17 | 1620 | 1600 | 2.2 | 1100 | 50 | 20 | <10 | 850 | 850 | 850 |
| 460743103024201 | 84-02-16 | 12 | 1690 | 84-02-16 | 1690 | 1600 | 2.3 | 1300 | 80 | 820 | <10 | 880 | 880 | 880 |
| 460744103014801 | 84-06-21 | 21 | 1720 | 84-06-21 | 1720 | 1800 | 2.3 | 1200 | 220 | 30 | <10 | 180 | 180 | 190 |
| 460709103032806 | 84-06-19 | 1.1 | 3640 | 84-06-19 | 3640 | 3600 | 5.0 | 13000 | 60 | 60 | <10 | 850 | 850 | 850 |
| 460709103032806 | 84-02-17 | 3.9 | 3900 | 84-02-17 | 3900 | 3900 | 5.3 | 13000 | 60 | 60 | <10 | 850 | 850 | 850 |
| 460709103032806 | 84-02-17 | 1.1 | 3640 | 84- | | | | | | | | | | |

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| STATION NUMBER | LOCAL IDENT- I- FIER | COUNTY | GEO- LOGIC UNIT | DEPTH OF WELL, TOTAL (FEET) | DATE OF SAMPLE | TIME | SPE- CIFIC CON- DUCT- ANCE (UMHOS) | PH (STAND- ARD UNITS) | TEMPER- ATURE (DEG C) |
|-----------------|----------------------------|--------|-----------------------|---|----------------------|------|---|--------------------------------|-----------------------------|
| CAVALIER | | | | | | | | | |
| 484444098504301 | 161N063W29BBB | 019 | 112BGFV | 133 | 84-06-05 | 1045 | 2100 | 8.3 | 7.5 |
| 485057098480601 | 162N063W15CCC | 019 | 112BGFV | 110 | 84-06-05 | 0845 | 800 | 8.0 | 10.5 |
| GRAND FORKS | | | | | | | | | |
| 474957097343501 | 150-054-04CCD | 035 | -- | -- | 84-05-30 | 1320 | 740 | 8.0 | 12.5 |
| 480539097433101 | 153-055-04CCD | 035 | 112ELKV | 30.01 | 84-05-31 | 1500 | 640 | 8.4 | 11.0 |
| NELSON | | | | | | | | | |
| 474532098105501 | 149-059-02BBB | 063 | 112BGFV | 240 | 84-06-19 | 1440 | 1010 | 8.2 | 14.0 |
| 474747098132401 | 150-059-21BCC1 | 063 | -- | -- | 84-06-20 | 1300 | 420 | 8.3 | 10.5 |
| 474835098184201 | 150N060W15DAA | 063 | 112BGFV | 163 | 84-06-19 | 1015 | 780 | 8.1 | 10.0 |
| WALSH | | | | | | | | | |
| 481939097513201 | 156-056-16CCB | 099 | 112DELT | 40.01 | 84-06-01 | 1430 | 1060 | 7.9 | 7.5 |

Geological unit (aquifer):

112BGFV - Buried glaciofluvial deposits.
 112ELKV - Elk Valley aquifer.
 112DELT - Delta deposits.

QUALITY OF GROUND WATER

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WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| DATE OF SAMPLE | HARD- NESS (MG/L AS CaCO ₃) | HARD- NESS, NONCAR- BONATE (MG/L CaCO ₃) | CALCIUM DIS- SOLVED (MG/L AS Ca) | MAGNE- SIUM, DIS- SOLVED (MG/L AS Mg) | SODIUM, DIS- SOLVED (MG/L AS Na) | PERCENT SODIUM | SODIUM AD- SORP- TION RATIO | POTAS- SIUM, DIS- SOLVED (MG/L AS K) | ALKA- LINITY LAB (MG/L AS CaCO ₃) | SULFATE DIS- SOLVED (MG/L AS SO ₄) | CHLO- RIDE, DIS- SOLVED (MG/L AS Cl) | FLUO- RIDE, DIS- SOLVED (MG/L AS F) |
|----------------------|---|---|--|--|--|-------------------|---|---|--|--|---|--|
| CAVALIER | | | | | | | | | | | | |
| 84-06-05 | 540 | 95 | 140 | 46 | 280 | 52 | 5 | 14 | 450 | 570 | 23 | .20 |
| 84-06-05 | 400 | 130 | 110 | 30 | 57 | 23 | 1 | 9.0 | 270 | 130 | 8.0 | .20 |
| GRAND FORKS | | | | | | | | | | | | |
| 84-05-30 | 360 | 130 | 98 | 28 | 13 | 7 | .3 | 5.4 | 230 | 99 | 16 | .20 |
| 84-05-31 | 310 | 10 | 92 | 20 | 8.5 | 5 | .2 | 5.7 | 300 | 25 | 2.7 | .20 |
| NELSON | | | | | | | | | | | | |
| 84-06-19 | 300 | 120 | 87 | 21 | 100 | 41 | 3 | 8.0 | 190 | 170 | 23 | .20 |
| 84-06-20 | 190 | 0 | 54 | 14 | 95 | 51 | 3 | 3.0 | 190 | 23 | .60 | .20 |
| 84-06-19 | 330 | 98 | 98 | 21 | 34 | 18 | .8 | 5.4 | 230 | 91 | 4.4 | .20 |
| WALSH | | | | | | | | | | | | |
| 84-06-01 | 460 | 250 | 120 | 38 | 45 | 17 | .9 | 5.0 | 210 | 280 | 12 | .20 |

QUALITY OF GROUND WATER

WATER QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| STATION NUMBER | DATE OF SAMPLE | SILICA, DIS-SOLVED (MG/L AS SI02) | SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) | SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) | SOLIDS, DIS-SOLVED (TONS PER AC-FT) | NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS NO3) | BORON, DIS-SOLVED (UG/L AS B) | IRON, DIS-SOLVED (UG/L AS FE) | MANGANESE, DIS-SOLVED (UG/L AS MN) | MOLYBDENUM, DIS-SOLVED (UG/L AS MO) | STRONTIUM, DIS-SOLVED (UG/L AS SR) |
|-----------------|----------------|-----------------------------------|---|--|-------------------------------------|---|-------------------------------|-------------------------------|------------------------------------|-------------------------------------|------------------------------------|
| CAVALIER | | | | | | | | | | | |
| 484444098504301 | 84-06-05 | 31 | 1320 | 1400 | 1.8 | 6.3 | 460 | 1700 | 390 | 5 | 900 |
| 485057098480601 | 84-06-05 | 28 | 509 | 530 | .69 | 1.0 | 250 | 280 | 1400 | 5 | 530 |
| GRAND FORKS | | | | | | | | | | | |
| 474957097343501 | 84-05-30 | 27 | 472 | 420 | .64 | 1.0 | 90 | 30 | 830 | 8 | 420 |
| 480539097433101 | 84-05-31 | 27 | 354 | 360 | .48 | 1.0 | 50 | 50 | 1000 | 1 | 340 |
| NELSON | | | | | | | | | | | |
| 474532098105501 | 84-06-19 | 30 | 583 | 550 | .79 | .20 | 200 | 430 | 810 | 4 | 610 |
| 474747098132401 | 84-06-20 | 29 | 254 | 340 | .35 | 1.0 | 40 | 410 | 530 | 2 | 150 |
| 474835098184201 | 84-06-19 | 29 | 390 | 430 | .53 | 1.0 | 80 | 170 | 1100 | 4 | 550 |
| WALSH | | | | | | | | | | | |
| 481939097513201 | 84-06-01 | 25 | 679 | 650 | .92 | 1.0 | 60 | 220 | 560 | 0 | 450 |

CHEMICAL QUALITY OF PRECIPITATION

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RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND
(National trends network precipitation-quality station)

LOCATION.--Lat 48°47'14", long 97°44'23", in SW1/4NW1/4SW1/4 sec. 10, T.161 N., R.55 W., Pembina County, Hydrologic Unit 09020313, at Icelandic State Park 5.6 mi west of Cavalier.

PERIOD OF RECORD.--October 1983 to September 1984 (weekly composite).

INSTRUMENTATION.--The composite sample collector is an Aerochem Metrics¹/ model 301 wet/dry precipitation collector mounted on ground surface. Precipitation quantity is determined by a Belfort¹/ model 5-780 recording rain gage equipped with an event recorder and an Alter-type wind screen. The recording rain gage is installed 20 ft east of the sample collector with gage mouth and collector bucket elevations of 50.75 in above land surface. A nonrecording National Weather Service rain gage is installed 28 ft south of the composite sample collector as a quality check on weekly composite precipitation volume.

REMARKS.--Data presented are provisional analyses by the Central Analytical Laboratory of the Illinois State Water Survey and have not completed quality-assurance review by the National Atmospheric Deposition Program. Unless noted starting and ending time for composite period is 9:00 a.m.

COOPERATION.--Onsite observers are provided by the North Dakota State Parks and Recreation Department.

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | PRECIP- ITATION TOTAL INCHES, WEEK | COL- ECTOR EFFI- CIENCY WET DEPOS. PERCENT | PH (STAND- ARD UNITS) | SPEC- CIFIC CON- DUCT- ANCE (UMHOS) | CALCIUM DIS- SOLVED (MG/L) AS CA |
|-------------------------|--|--|--------------------------------|--|--|
| 10/25 to 11/01 | <.01 | >100 | -- | -- | -- |
| 11/01 to 11/08 | <.01 | >100 | 6.99* | 86.8* | -- |
| 11/08 to 11/15 | <.01 | >100 | 6.49* | 52.8 | -- |
| 11/15 to 11/22 | .55 | 36 | 5.05 | 8.1 | -- |
| 11/22 to 11/29 | .05 | 130 | 6.16* | 17.7* | .83 |
| 11/29 to 12/06 | <.01 | >100 | 6.10* | 2.4 | .04 |
| 12/06 to 12/13 | .02 | 141 | 5.98* | 15.3* | <.25 |
| 12/13 to 12/20 | <.01 | >100 | 6.05* | 2.8* | .05 |
| 12/20 to 12/27 | <.01 | >100 | 5.9* | 3 | .05 |
| 12/27 to 01/03 | .01 | 100 | -- | -- | -- |
| 01/03 to 01/10 | <.01 | >100 | -- | -- | -- |
| 01/10 to 01/17 | <.01 | >100 | -- | -- | -- |
| 01/17 to 01/24 | <.01 | >100 | 5.82* | 2.3* | .03 |
| 01/24 to 01/31 | <.01 | >100 | 6.45* | 17.2* | .70 |
| 01/31 to 02/07 | <.01 | >100 | -- | -- | -- |
| 02/07 to 02/14 | .13 | 46 | 7.42 | 7.5 | .61 |
| 02/14 to 02/21 | .17 | 53 | 6.71 | 12.6 | .60 |
| 02/21 to 02/28 | .03 | 18 | 6.81* | 24.0 | 1.1 |
| 02/28 to 03/06 | <.01 | >100 | 5.81* | 1.9* | .05 |
| 03/06 to 03/13 | .13 | <8 | 7.23* | 26.8* | 4.29 |
| 03/13 to 03/20 | .03 | <33 | 6.01* | 3.8* | .10 |
| 03/20 to 03/27 | .15 | 40 | 6.54* | 23.3 | .42 |
| 03/27 to 04/03 | <.01 | >100 | -- | -- | -- |
| 04/03 to 04/10 | <.01 | >100 | -- | -- | -- |
| 04/10 to 04/17 | 1.00 | 75 | 5.28* | 24.9 | .15 |
| 04/17 to 04/24 | <.01 | >100 | -- | -- | -- |
| 04/24 to 05/01 | .95 | 155 | 6.42 | 20.3 | 1.09 |
| 05/01 to 05/08 | <.01 | >100 | 6.13* | 2.8* | .31 |
| 05/08 to 05/15 | .14 | 107 | 7.03* | 23.8* | 1.91 |
| 05/15 to 05/22 | .37 | 100 | 6.39* | 4.5* | .21 |
| 05/22 to 05/29 | <.01 | >100 | 7.03* | -- | -- |

¹/ The use of brand names in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

* Data are laboratory determinations by the Central Analytical Laboratory of the Illinois State Water Survey. Nondesignated data are field determinations.

CHEMICAL QUALITY OF PRECIPITATION

RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND--CONTINUED
(National trends network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | PRECIP- ITATION TOTAL INCHES, WEEK | COL- ECTOR EFFI- CIENCY WET DEPOS. PERCENT | PH (STAND- ARD UNITS) | SPEC- CIFIC CON- DUCT- ANCE (UMHOS) | CALCIUM DIS- SOLVED (MG/L) AS CA |
|-------------------------|--|--|--------------------------------|--|--|
| 05/29 to 06/05 | .27 | 88 | 6.28* | 16.4 | .83 |
| 06/05 to 06/12 | 1.50 | 99 | 6.09 | 4.9 | .06 |
| 06/12 to 06/19 | .43 | 98 | 4.99* | 7.6* | .18 |
| 06/19 to 06/26 | .25 | 125 | 5.79* | 12.9* | .81 |
| 06/26 to 07/03 | 1.77 | 100 | 7.02 | 5.3 | .113 |
| 07/03 to 07/10 | .37 | 100 | 6.21* | 6.2 | .308 |
| 07/10 to 07/17 | .70 | >100 | 7.03 | 11.6 | .506 |
| 07/17 to 07/24 | <.01 | 100 | 6.45* | -- | -- |
| 07/24 to 07/31 | .47 | 102 | 5.01* | 12.8 | .374 |
| 07/31 to 08/07 | .13 | 108 | 6.49* | 15.0 | .673 |
| 08/07 to 08/14 | .65 | 105 | 5.94* | 7.5* | .349 |
| 08/14 to 08/21 | .17 | 100 | 6.18* | 6.3* | .224 |
| 08/21 to 08/28 | <.01 | 100 | 6.95* | 58.1* | -- |
| 08/28 to 09/04 | .05 | 60 | 6.91* | 25.8* | 1.882 |
| 09/04 to 09/11 | .18 | 72 | 6.59* | 9.9* | .334 |
| 09/11 to 09/18 | .07 | 100 | 6.49* | 11.7* | .439 |
| 09/18 to 09/25 | .01 | 200 | -- | -- | -- |
| 09/25 to 10/02 | <.01 | 100 | 6.76* | 40.0* | -- |

* Data are laboratory determinations by the Central Analytical Laboratory of the Illinois State Water Survey. Nondesignated data are field determinations.

CHEMICAL QUALITY OF PRECIPITATION

351

RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND
(National trends network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | MAGNE- SIUM, DIS- SOLVED (MG/L) | POTAS- SIUM, DIS- SOLVED (MG/L) | SODIUM DIS- SOLVED (MG/L AS NA) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) |
|-------------------------|---|---|---|---|---|---|---|--|
| 10/25 to 11/01 | -- | -- | -- | -- | -- | -- | -- | -- |
| 11/01 to 11/08 | -- | -- | -- | -- | -- | -- | -- | -- |
| 11/08 to 11/15 | -- | -- | -- | -- | -- | -- | -- | -- |
| 11/15 to 11/22 | -- | -- | -- | -- | -- | -- | -- | -- |
| 11/22 to 11/29 | .234 | .100 | .518 | <.84 | .67 | .39 | .36 | <.008 |
| 11/29 to 12/06 | .019 | .041 | .049 | <.10 | .09 | .05 | .01 | <.001 |
| 12/06 to 12/13 | .137 | <.082 | .519 | 16.12 | 1.64 | 1.07 | .56 | <.027 |
| 12/13 to 12/20 | .015 | .029 | .075 | <.10 | .10 | <.02 | .01 | <.001 |
| 12/20 to 12/27 | .014 | .042 | .130 | <.10 | .24 | <.016 | <.005 | <.001 |
| 12/27 to 01/03 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01/03 to 01/10 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01/10 to 01/17 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01/17 to 01/24 | .015 | .012 | .071 | <.10 | .11 | <.016 | <.005 | .001 |
| 01/24 to 01/31 | .287 | .144 | .369 | <1.03 | .72 | .48 | .44 | <.010 |
| 01/31 to 02/07 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02/07 to 02/14 | .181 | .029 | .259 | 1.05 | .18 | .17 | .22 | <.001 |
| 02/14 to 02/21 | .116 | .045 | .306 | 1.41 | .22 | .56 | .53 | <.001 |
| 02/21 to 02/28 | .524 | .170 | 1.128 | 3.93 | .66 | .761 | .28 | <.007 |
| 02/28 to 03/06 | .010 | .008 | .074 | <.10 | .09 | <.016 | <.005 | <.001 |
| 03/06 to 03/13 | .483 | .157 | .130 | .82 | .09 | <.016 | .052 | <.001 |
| 03/13 to 03/20 | .015 | .006 | .068 | .44 | .05 | .093 | .075 | <.001 |
| 03/20 to 03/27 | .143 | .050 | .242 | 2.62 | .27 | 1.41 | .969 | <.001 |
| 03/27 to 04/03 | -- | -- | -- | -- | -- | -- | -- | -- |
| 04/03 to 04/10 | -- | -- | -- | -- | -- | -- | -- | -- |
| 04/10 to 04/17 | .039 | .016 | .038 | 3.59 | .09 | 1.08 | 1.014 | <.001 |
| 04/17 to 04/24 | -- | -- | -- | -- | -- | -- | -- | -- |
| 04/24 to 05/01 | .111 | .071 | .117 | 1.39 | .14 | .140 | .14 | <.001 |
| 05/01 to 05/08 | .034 | .033 | .080 | .34 | .10 | .0300 | <.005 | <.001 |
| 05/08 to 05/15 | .424 | .113 | .217 | 2.09 | .17 | .750 | .488 | .001 |
| 05/15 to 05/22 | .039 | .008 | .020 | .52 | .10 | .260 | .108 | <.001 |
| 05/22 to 05/29 | -- | -- | -- | -- | -- | -- | -- | -- |
| 05/29 to 06/05 | .159 | .105 | .112 | 2.21 | .15 | .823 | 1.525 | <.001 |
| 06/05 to 06/12 | .015 | .014 | .027 | .42 | <.02 | .194 | .426 | <.001 |
| 06/12 to 06/19 | .042 | .025 | .063 | .59 | .11 | .132 | .751 | .003 |
| 06/19 to 06/26 | .189 | .133 | .209 | 1.88 | .28 | .443 | 1.533 | .002 |
| 06/26 to 07/03 | .024 | .022 | .023 | .72 | .08 | .170 | .13 | <.001 |
| 07/03 to 07/10 | .082 | .043 | .057 | .52 | .08 | .320 | .19 | .004 |
| 07/10 to 07/17 | .100 | .070 | .043 | 1.52 | .13 | .480 | .36 | <.001 |
| 07/17 to 07/24 | -- | -- | -- | -- | -- | -- | -- | -- |
| 07/24 to 07/31 | .081 | .081 | .039 | 1.57 | .10 | .470 | .44 | <.001 |
| 07/31 to 08/07 | .190 | .161 | .162 | 1.31 | .21 | .220 | .42 | <.001 |
| 08/07 to 08/14 | .093 | .068 | .050 | 1.08 | .07 | <.02 | .11 | <.001 |
| 08/14 to 08/21 | .069 | .082 | .085 | .53 | .12 | .330 | .16 | <.001 |
| 08/21 to 08/28 | -- | -- | -- | -- | -- | -- | -- | -- |
| 08/28 to 09/04 | .302 | .167 | .479 | 1.89 | .47 | .839 | .547 | .003 |
| 09/04 to 09/11 | .101 | .082 | .126 | .54 | .17 | <.016 | <.005 | <.001 |
| 09/11 to 09/18 | .176 | .067 | .231 | 1.15 | .29 | .311 | .280 | <.001 |
| 09/18 to 09/25 | -- | -- | -- | -- | -- | -- | -- | -- |
| 09/25 to 10/02 | -- | -- | -- | -- | -- | -- | -- | -- |

CHEMICAL QUALITY OF PRECIPITATION

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND
(National trends network precipitation-quality station)

LOCATION.--Lat 47°14'32", long 99°14'02", in SE1/4SW1/4SW1/4 sec.12, T.142 N., R.68 W., Stutsman County, Hydrologic Unit 10160002, at U.S. Fish and Wildlife Service Northern Prairie Wildlife Research Center, Woodworth Experiment Station, 2.8 mi east and 1 mi south of Woodworth.

PERIOD OF RECORD.--November 1983 to September 1984 (weekly composite).

INSTRUMENTATION.--The composite sample collector is an Aerochem Metrical¹/ model 301 wet/dry precipitation collector mounted on ground surface. Precipitation quantity is determined by a Belfort ¹/ model 5-780 recording rain gage equipped with an event recorder and an Alter-type wind screen. The recording rain gage is installed 17 ft east of the sample collector with gage mouth and collector bucket elevations of 50.75 in above land surface. A nonrecording Weather Service rain gage is installed 17 ft east of the recording rain gage as a quality check on weekly composite precipitation volume.

REMARKS.--The station is located 295 ft west of an event sample-collection station operated by the North Dakota State Health Department. Continuously recording meteorological instrumentation for air temperature, wind speed, and wind direction are installed 9.8 ft above land surface at the event station. Data presented are provisional analyses by the Central Analytical Laboratory of the Illinois State Water Survey and have not completed quality-assurance review by the National Atmospheric Deposition Program. Unless noted starting and ending time for composite periods is 9:00 a.m.

COOPERATION.--Onsite observers are provided by the U.S. Fish and Wildlife Service.

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | PRECIP- ITATION TOTAL INCHES, WEEK | COL- ECTOR EFFI- CIENCY WET DEPOS. PERCENT | PH (STAND- ARD UNITS) | SPEC- IFIC CON- DUCT- ANCE (UMHOS) | CALCIUM DIS- SOLVED (MG/L) AS CA |
|-------------------------|--|--|--------------------------------|---|--|
| 11/29 to 12/06 | <.01 | >100 | 6.45* | 13.7* | .02 |
| 12/06 to 12/13 | .27 | 4.0 | 6.26* | 8.8* | .27 |
| 12/13 to 12/20 | <.01 | >100 | 6.11* | 4.0* | .05 |
| 12/20 to 12/27 | .03 | 29 | 7.29* | 66.1* | -- |
| 12/27 to 01/03 | .00 | -- | -- | -- | .05 |
| 01/03 to 01/10 | .07 | <1.0 | 5.88* | 4.9* | .03 |
| 01/10 to 01/17 | .07 | 7.0 | -- | -- | -- |
| 01/17 to 01/24 | .01 | <1.0 | 5.78* | 1.9* | .02 |
| 01/24 to 01/31 | .48 | 50 | 5.29* | 6.9 | .14 |
| 01/31 to 02/07 | .02 | 200 | 5.84 | 58.0 | 11.40 |
| 02/07 to 02/14 | .02 | 95 | 6.40* | 21.9 | .66 |
| 02/14 to 02/21 | <.01 | >100 | 6.64* | -- | -- |
| 02/21 to 02/28 | .02 | 150 | 6.31* | 16.5 | .26 |
| 02/28 to 03/06 | .16 | 50 | 6.09 | 6.7 | .08 |
| 03/06 to 03/13 | .09 | 9.0 | 7.09* | 30.6 | -- |
| 03/13 to 03/20 | <.01 | >100 | -- | -- | -- |
| 03/20 to 03/27 | .33 | 76 | 6.64 | 6.6 | .13 |
| 03/27 to 04/03 | .32 | 34 | 4.74 | 15.6 | -- |
| 04/03 to 04/10 | <.01 | >100 | -- | -- | -- |
| 04/10 to 04/17 | 1.26 | 90 | 4.81 | 21.5 | .09 |
| 04/17 to 04/24 | .29 | 90 | 5.62 | 3.7 | .22 |
| 04/24 to 05/01 | 1.12 | 73 | 5.06 | 9.1 | .48 |
| 05/01 to 05/08 | .27 | 81 | 5.55 | 5.1 | .16 |
| 05/08 to 05/15 | <.01 | >100 | 5.94* | 1.7 | .06 |
| 05/15 to 05/22 | .17 | 32 | 5.14 | 38.8 | 2.29 |
| 05/22 to 05/29 | <.01 | >100 | -- | -- | -- |

¹/ The use of brand names in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

* Data are laboratory determinations by the Central Analytical Laboratory of the Illinois State Water Survey. Nondesignated data are field determinations.

CHEMICAL QUALITY OF PRECIPITATION

353

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND--CONTINUED
 (National trends network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | PRECIP- ITATION TOTAL INCHES, WEEK | COL- ECTOR EFFI- CIENCY WET DEPOS. PERCENT | PH (STAND- ARD UNITS) | SPEC- IFIC CON- DUCT- ANCE (UMHOS) | CALCIUM DIS- SOLVED (MG/L) AS CA |
|-------------------------|--|--|--------------------------------|---|--|
| 05/29 to 06/05 | 1.68 | 100 | 5.32 | 7.7 | .13 |
| 06/05 to 06/12 | .88 | 91 | 5.30* | 6.1 | .12 |
| 06/12 to 06/19 | .96 | 99 | 5.46 | 4.8 | .14 |
| 06/19 to 06/26 | .75 | 93 | 5.29* | 5.7 | .20 |
| 06/26 to 07/03 | 1.04 | 90 | 5.44* | 6.4 | .266 |
| 07/03 to 07/10 | .23 | 96 | 5.35 | 10.9 | .516 |
| 07/10 to 07/17 | .48 | 100 | 5.27 | 11.2 | .439 |
| 07/17 to 07/24 | .01 | >100 | -- | -- | -- |
| 07/24 to 07/31 | .06 | 117 | 7.31* | 16.9 | -- |
| 07/31 to 08/07 | .72 | 93 | 5.75 | 8.6 | .156 |
| 08/07 to 08/14 | <.01 | >100 | -- | -- | -- |
| 08/14 to 08/21 | .17 | 77 | 6.27 | 8.5 | .304 |
| 08/21 to 08/28 | .02 | 100 | 6.02* | 31.3* | 1.575 |
| 08/28 to 09/04 | .23 | 91 | 6.31 | 7.1 | .611 |
| 09/04 to 09/11 | .23 | 70 | 5.89 | 8.0* | .440 |
| 09/11 to 09/18 | .39 | 85 | 6.07 | 8.7* | .184 |
| 09/18 to 09/25 | .20 | 90 | 6.84 | 13.4 | .723 |
| 09/25 to 10/02 | .08 | 38 | 5.56* | 13.3* | -- |

* Data are laboratory determinations by the Central Analytical Laboratory of the Illinois State Water Survey. Nondesignated data are field determinations.

CHEMICAL QUALITY OF PRECIPITATION

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND--CONTINUED
(National trends network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984

| PERIOD OF COLLECTION | MAGNE- SIUM, DIS- SOLVED (MG/L) | POTAS- SIUM, DIS- SOLVED (MG/L) | SODIUM DIS- SOLVED (MG/L AS NA) | SULFATE DIS- SOLVED (MG/L AS SO4) | CHLO- RIDE, DIS- SOLVED (MG/L AS CL) | NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) | NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) | PHOS- PHORUS, DIS- SOLVED (MG/L AS P) |
|-------------------------|---|---|---|---|---|---|---|--|
| 11/29 to 12/06 | .006 | .008 | .02 | .53 | 1.87 | 1.03 | .30 | <.001 |
| 12/06 to 12/13 | .142 | .088 | .17 | <.49 | .44 | <.08 | .23 | <.005 |
| 12/13 to 12/20 | .018 | .076 | .06 | <.10 | .12 | .11 | .01 | <.001 |
| 12/20 to 12/27 | -- | -- | -- | -- | -- | -- | -- | -- |
| 12/27 to 01/03 | .013 | .015 | -- | <.10 | <.02 | -- | .01 | -- |
| 01/03 to 01/10 | .012 | .014 | .04 | <.10 | .05 | <.016 | .02 | <.001 |
| 01/10 to 01/17 | -- | -- | -- | -- | -- | -- | -- | -- |
| 01/17 to 01/24 | .007 | .013 | .04 | <.10 | .06 | .047 | .02 | <.001 |
| 01/24 to 01/31 | .030 | .055 | .07 | .45 | .08 | .06 | .17 | <.001 |
| 01/31 to 02/07 | 2.290 | 2.090 | .96 | 9.31 | .87 | <.02 | .01 | <.001 |
| 02/07 to 02/14 | .430 | .102 | 1.6 | 3.28 | .56 | .20 | .40 | <.003 |
| 02/14 to 02/21 | -- | -- | -- | -- | -- | -- | -- | -- |
| 02/21 to 02/28 | .139 | .047 | .24 | 2.12 | .24 | 1.06 | .51 | <.001 |
| 02/28 to 03/06 | .023 | .006 | .05 | 1.02 | .08 | .233 | .29 | <.001 |
| 03/06 to 03/13 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03/13 to 03/20 | -- | -- | -- | -- | -- | -- | -- | -- |
| 03/20 to 03/27 | .051 | .016 | .16 | .73 | .05 | .342 | .32 | <.001 |
| 03/27 to 04/03 | .077 | .174 | -- | 1.92 | -- | .48 | -- | -- |
| 04/03 to 04/10 | -- | -- | -- | -- | -- | -- | -- | -- |
| 04/10 to 04/17 | .024 | .017 | .03 | 2.02 | .09 | .51 | -- | <.001 |
| 04/17 to 04/24 | .089 | .020 | .16 | .48 | .09 | .11 | -- | <.001 |
| 04/24 to 05/01 | .052 | .031 | .06 | 1.21 | .11 | .327 | .16 | <.001 |
| 05/01 to 05/08 | .044 | .018 | .07 | .67 | .11 | .218 | .12 | <.001 |
| 05/08 to 05/15 | .019 | .004 | .01 | .19 | <.02 | <.016 | .00 | <.001 |
| 05/15 to 05/22 | .494 | .319 | .71 | 7.45 | .38 | 1.11 | .99 | <.001 |
| 05/22 to 05/29 | -- | -- | -- | -- | -- | -- | -- | -- |
| 05/29 to 06/05 | .023 | .024 | .03 | .75 | <.02 | .373 | .68 | <.042 |
| 06/05 to 06/12 | .022 | .019 | .04 | .56 | .08 | .412 | .852 | <.020 |
| 06/12 to 06/19 | .038 | .022 | .04 | .89 | .09 | .124 | .511 | <.020 |
| 06/19 to 06/26 | .046 | .035 | .08 | -- | .13 | .248 | .751 | <.036 |
| 06/26 to 07/03 | .050 | .033 | .03 | .78 | .10 | .280 | .22 | <.001 |
| 07/03 to 07/10 | .159 | .083 | .25 | 1.56 | .21 | .460 | .39 | <.001 |
| 07/10 to 07/17 | .092 | .043 | .19 | 1.79 | .11 | .370 | .30 | <.001 |
| 07/17 to 07/24 | -- | -- | -- | -- | -- | -- | -- | -- |
| 07/24 to 07/31 | -- | -- | -- | -- | -- | -- | -- | -- |
| 07/31 to 08/07 | .042 | .022 | .050 | 1.29 | <.02 | .40 | .21 | <.001 |
| 08/07 to 08/14 | -- | -- | -- | -- | -- | -- | -- | -- |
| 08/14 to 08/21 | .090 | .115 | .106 | .99 | .14 | .37 | .33 | <.001 |
| 08/21 to 08/28 | .417 | .207 | .608 | 4.21 | .64 | .80 | 1.01 | <.004 |
| 08/28 to 09/04 | .116 | .100 | .162 | 1.91 | .19 | .56 | .357 | <.001 |
| 09/04 to 09/11 | .110 | .078 | .177 | 1.03 | .16 | .21 | .19 | <.001 |
| 09/11 to 09/18 | .073 | .027 | .127 | 1.12 | .12 | .50 | .34 | <.001 |
| 09/18 to 09/25 | .144 | .068 | .181 | 1.68 | .17 | .15 | .27 | <.001 |
| 09/25 to 10/02 | -- | -- | -- | -- | -- | -- | -- | -- |

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FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI). This report contains both the inch-pound and SI unit equivalents in the station manuscript descriptions.

| Multiply inch-pound units | By | To obtain SI units |
|--|------------------------|--|
| <i>Length</i> | | |
| inches (in) | 2.54×10^1 | millimeters (mm) |
| | 2.54×10^{-2} | meters (m) |
| feet (ft) | 3.048×10^{-1} | meters (m) |
| miles (mi) | 1.609×10^0 | kilometers (km) |
| <i>Area</i> | | |
| acres | 4.047×10^3 | square meters (m ²) |
| | 4.047×10^{-1} | square hectometers (hm ²) |
| | 4.047×10^{-3} | square kilometers (km ²) |
| square miles (mi ²) | 2.590×10^0 | square kilometers (km ²) |
| <i>Volume</i> | | |
| gallons (gal) | 3.785×10^0 | liters (L) |
| | 3.785×10^0 | cubic decimeters (dm ³) |
| | 3.785×10^{-3} | cubic meters (m ³) |
| million gallons | 3.785×10^3 | cubic meters (m ³) |
| | 3.785×10^{-3} | cubic hectometers (hm ³) |
| cubic feet (ft ³) | 2.832×10^1 | cubic decimeters (dm ³) |
| | 2.832×10^{-2} | cubic meters (m ³) |
| cfs-days | 2.447×10^3 | cubic meters (m ³) |
| | 2.447×10^{-3} | cubic hectometers (hm ³) |
| acre-feet (acre-ft) | 1.233×10^3 | cubic meters (m ³) |
| | 1.233×10^{-3} | cubic hectometers (hm ³) |
| | 1.233×10^{-6} | cubic kilometers (km ³) |
| <i>Flow</i> | | |
| cubic feet per second (ft ³ /s) | 2.832×10^1 | liters per second (L/s) |
| | 2.832×10^1 | cubic decimeters per second (dm ³ /s) |
| | 2.832×10^{-2} | cubic meters per second (m ³ /s) |
| gallons per minute (gal/min) | 6.309×10^{-2} | liters per second (L/s) |
| | 6.309×10^{-2} | cubic decimeters per second (dm ³ /s) |
| | 6.309×10^{-5} | cubic meters per second (m ³ /s) |
| million gallons per day | 4.381×10^1 | cubic decimeters per second (dm ³ /s) |
| | 4.381×10^{-2} | cubic meters per second (m ³ /s) |
| <i>Mass</i> | | |
| tons (short) | 9.072×10^{-1} | megagrams (Mg) or metric tons |

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