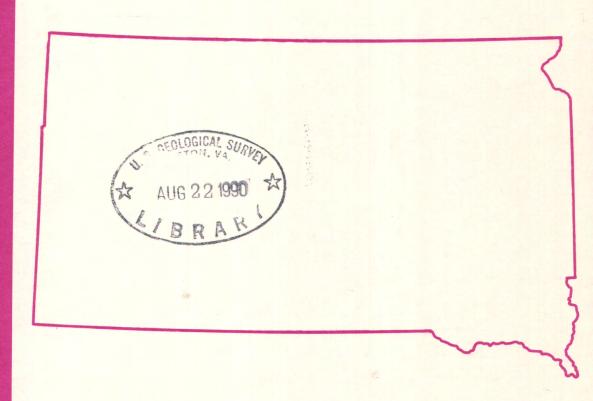


# Water Resources Data South Dakota Water Year 1989



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT SD-89-1
Prepared in cooperation with the State of South Dakota
and with other agencies

# CALENDAR FOR WATER YEAR 1989

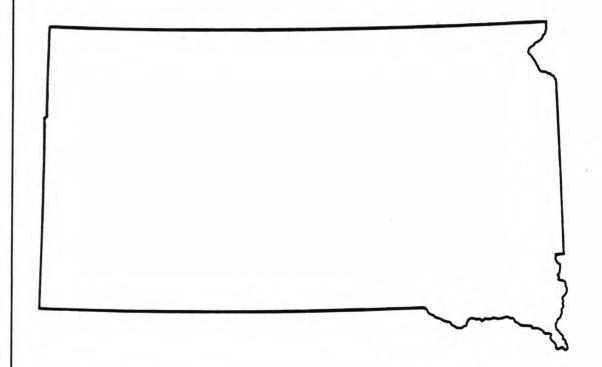
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# Water Resources Data South Dakota Water Year 1989

by M.J. Burr, R.D. Benson and D.S. Hansen



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT SD-89-1 Prepared in cooperation with the State of South Dakota and with other agencies

# UNITED STATES DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., Secretary

GEOLOGICAL SURVEY

Dallas L. Peck, Director

For information on the water program in South Dakota write to
District Chief, Water Resources Division
U.S. Geological Survey
Room 408, Federal Building
200 4th St. SW
Huron, South Dakota 57350

# PREFACE

This volume of the annual hydrologic data report of South 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 water quality 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.

General direction for the series is by Phillip Cohen, Chief Hydrologist, U.S. Geological Survey, James F. Daniel, Assistant Chief Hydrologist for Scientific Information Management, and James F. Blakey, Regional Hydrologist, Central Region. This report was prepared by personnel of the South Dakota District of the Water Resources Division of the U.S. Geological Survey under the supervision of Richard E. Fidler, District Chief, and John R. Little, Chief, Hydrologic Data Collection and Analysis Section. Other South Dakota personnel who contributed significantly to the collecting, processing, and tabulating the data, and typing the manuscript were:

M.J.	Burr	D.G.	Driscoll	D.S.	Hansen	K.M.	Neitzert	J.L.	Whitaker
T.K.	Lockner	L.L.	Evensen	D.G.	Hern	D.L.	Rahder	C.J.	Winter
M.D.	Stevens	M.E.	Freese	D.M.	Hernandez	C.J.	Ross	D.R.	Winter
J.S.	Clark	T.J.	Gabert	K.L.	Korkow	S.K.	Sando	V.J.	Wipf
R.M.	Crowfoot	K.G.	Guttormson	D.K.	Matthews	C.E.	Solberg	G.R.	Wisnieski
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15. Supplementary Notes

Prepared in cooperation with the State of South Dakota and with other agencies.

# 16. Abstract (Limit: 200 words)

Water Resources Data for the 1989 water year for South Dakota consists of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels in wells. This report contains discharge records for 147 streamflow-gaging stations; stage and contents records for 10 lakes and reservoirs, stage for 7 streams and 4 lakes; water-quality records for 16 streamflow-gaging stations, 3 daily-sediment stations, 3 wells, 6 ungaged streamsites, 1 lake, 1 sewage lagoon, and 1 precipitation site; water levels for 30 wells; daily precipitation records at 38 sites; and 9 partial-record crest-stage gage sites. Additional water data were collected at various sites, not part of the systematic data-collection program, and are published as miscellaneous measurements and analyses. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in South Dakota.

# 17. Document Analysis a. Descriptors

\*South Dakota, \*Hydrologic data, \*Surface water, \*Ground water, \*Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediments, Water temperatures, Sampling sites, Water levels, Water analyses.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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[Letters after station name designate type of data: (d) discharge, (e) gage height, elevation, or contents, (c) chemical, (b) biological, (m) microbiological, (p) pesticide, (r) precipitation, (t) water temperature (s) sadiment.

(t) water temperature, (s) sediment	Dage
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Well 443226099563701	Local	number	112N76W 2BBAB	375
			112N76W 2BBBB	375
	Local	number	7N 2E10BAD	375
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SULLY COUNTY				
			113N76W31BBBB	
			113N76W25AAAA	
			113N7 5W19DDDD	
Well 443255099472401	Local	number	113N7 6W35CCDC	378
			QUALITY OF GROUND WATER	
MINNEHAHA COUNTY				1323
			103N48W 5CACA	
Well 434400096362201	Local	number	103N48W 9CCDA	
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# WATER RESOURCES DATA - SOUTH DAKOTA, 1989

#### INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State agencies, obtains a large amount of data pertaining to the water resources of South Dakota each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published amnually in this report series entitled "Water Resources Data - South Dakota."

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 147 streamflow-gaging stations; (2) stage and contents records for 10 lakes and reservoirs, stage for 7 streams and 4 lakes; (3) water-quality records for 16 streamflow-gaging stations, 3 daily sediment stations, 3 wells, 6 ungaged streamsites, 1 lake, 1 sewage lagoon, and 1 precipitation site; (4) water levels for 30 wells; (5) precipitation records at 38 sites; and (6) 9 partial-record crest-stage gage stations.

This series of annual reports for South Dakota began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for South Dakota were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 6A and 6B." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." The above mentioned Water-Supply Papers may be consulted in the libraries of the principal cities of the United States and may be purchased from Distribution Branch, Text Products Section, U.S. Geological Survey, 604 South Pickett Street, Alexandria, VA 22304.

Publications similar to this report are published annually by the Geological Survey for all States. These official Survey reports have 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 SD-89-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. 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 back of title page.

# COOPERATION

The U.S. Geological Survey and agencies of the State of South Dakota have had cooperative agreements for the collection of surface-water records since 1914, for ground-water levels since 1935, and for water-quality since 1947. Organizations that assisted in collecting the data in this report through cooperative agreement with the Survey are: Department of Water and Natural Resources; Department of Transportation; East Dakota Water Development District; West Dakota Water Development District; Tennessee Valley Authority; EROS Data Center; State of Wyoming; City of Rapid City; and City of Watertown.

Assistance in the form of funds or services was given by the U.S. Army Corps of Engineers; U.S. Department of Interior, Bureau of Indian Affairs; U.S. Department of Interior, Bureau of Reclamation; and the Missouri River basin development program for gaging and water-quality stations.

Organizations that supplied data are acknowledged in station descriptions.

# SUMMARY OF HYDROLOGIC CONDITIONS

# By Rick D. Benson

Water year 1989 was a year of less than normal precipitation across most of South Dakota. The southwest part of the State received the least amount of precipitation (13.21 inches), which was 3.41 inches less than normal (table 1). The only part of the State that received greater than normal precipitation was the northeast, which received 20.93 inches—1.33 inches more than normal. All other parts of the State received less than normal precipitation, ranging from a deficit of 0.17 inch in the northwest to a deficit of 6.55 inches in the southeast.

Precipitation data from published reports of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, for the nine divisions in South Dakota are shown in table 1. The cumulative precipitation and departures from normal are shown for the end of each quarter.

# Surface Water

Less than normal precipitation across most of South Dakota during water year 1989 caused total streamflow for the water year to be less than normal at all five of the representative streamflow-gaging stations. Castle Creek, which derives most of its water from the Madison aquifer, had almost normal discharge throughout the year (fig. 1) and ended the water year with total discharge at 87 percent of normal. The Moreau, James, Big Sioux, and White Rivers derive most of their flow from surface rumoff. The Moreau River, located in the northwest and north-central parts of the State, which received slightly less than normal precipitation, had less than normal discharge during all months except May and September (fig. 1); total discharge during the water year was 64 percent of normal. The James River, located in the eastern part of the State, had greater than normal

discharge during April and May and less than normal discharge during the remainder of water year 1989 (fig. 1); total discharge during the water year was 75 percent of normal. The Big Sioux River, also located in the eastern part of the State, had less than normal discharge throughout the water year; total discharge during the water year was only 39 percent of normal. Precipitation data (table 1) show that deficits occurred during each quarter of the water year for the southeast; precipitation deficits occurred during October-December and during April-June for the east-central part. Total discharge of the White River near Oacoma was only 42 percent of normal during the water year. Precipitation within the south-central part of South Dakota, which contains most of the White River basin, ended the water year at 5.98 inches less than normal; precipitation was less than normal during each of the first three quarters of the water year, with the largest deficit (5.52 inches) occurring during April-June.

Table 1Cumulative precipitation and departures from normal1, in it	in inches	35
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National	October-	December	Octobe	r-March	Octobe	r-June	October-September		
Weather Service Division	Precipi- tation	Departure from normal	Precipi- tation	Departure from normal	Precipi- tation	Departure from normal	Precipi- tation	Departure from normal	
Northwest	0.86	-0.82	3.28	0.13	9.36	-1.26	15.11	-0.17	
North Central	1.33	-0.67	4.12	0.43	10.68	-1.10	16.59	-0.74	
Northeast	1.96	-0.52	4.84	0.39	11.36	-1.71	20.93	1.33	
Black Hills	2.36	-0.31	4.54	-0.90	11.80	-3.48	19.66	-1.64	
Southwest	1.50	-0.26	3.19	-0.39	7.34	-4.30	13.21	-3.41	
Central	1.56	-0.42	3.56	-0.19	7.80	-3.68	14.64	-2.26	
East Central	1.46	-1.32	4.18	-0.86	9.73	-4.15	17.61	-3.29	
South Central	1.35	-0.98	2.81	-1.79	6.43	-7.31	14.17	-5.98	
Southeast	1.70	-1.25	3.26	-2.30	8.90	-6.03	16.52	-6.55	

<sup>&</sup>lt;sup>1</sup>Based on data from 1951 to 1980. <sup>2</sup>Shown in figure 1.

Peak discharges at the representative streamflow-gaging stations indicate the effects of the less than normal precipitation throughout most of South Dakota during the water year--the peak discharges for four of the five stations have recurrence intervals of less than 2 years (table 2). The 1989 peak discharge (2,540 cubic feet per second) for the James River near Scotland, which occurred on April 18, is estimated to have a recurrence interval of slightly more than 2 years.

Because low-flow analyses are done for the period from April 1 through March 31, the analysis for 1989 consisted of the period from April 1, 1988, through March 31, 1989. The minimum 1-day and 7-day discharges that occurred during 1989 are compared with those from the long-term period for the representative gaging stations in table 3. The minimum daily mean discharge for the White River near Oacoma during the 1989 low-flow year was 25 cubic feet per second on August 31 and September 1, 1988, and February 3, 1989, whereas minimum daily mean discharges of zero have occurred on many days during the long-term period of record. The lowest 7-day mean discharge during 1989 for the White River near Oacoma was 29 cubic feet per second (the recurrence interval of a 7-day minimum daily mean discharge of 29 cubic feet per second is slightly less than 2 years). There is only a 10-percent chance in a given year that the mean discharge for 7 consecutive days will be equal to or less than 3.9 cubic feet per second for the White River near Oacoma. Similar interpretations of the data for the other stations can be made.

Combined storage in the four Missouri River reservoirs (Lakes Oahe, Sharpe, Francis Case, and Lewis and Clark) was 17,819,000 acre-feet on September 30, 1989, a decrease of 2,613,000 acre-feet during water year 1989. Most of this decrease in storage occurred in Lake Oahe which contained 12,619,000 acre-feet on September 30-2,196,000 acre-feet less than the previous record minimum of 14,815,000 acre-feet which occurred on September 25, 1981.

# Water Quality

The dissolved-solids concentration of surface-water samples collected during water year 1989 is compared to median concentrations for the period of record in figure 2. Of the 10 stations shown in figure 2, all are National Stream-Quality Accounting Network (NASQAN) stations except for Castle Creek above Deerfield Reservoir near Hill City (which is a hydrologic bench-mark station) and Little Vermillion River near Salem. Dissolved-solids concentrations ranged from as little as 179 milligrams per liter in the July sample at the Castle Creek above Deerfield Reservoir station to as much as 3,790 milligrams per liter in the January sample at the Belle Fourche River near Elm Springs station. The graph for the Little Vermillion River near Salem station is for specific conductance, which was 320 microsiemens per centimeter at 25 degrees Celsius in the only sample taken during the year. The dissolved-solids concentrations in water collected from the James River stations during the winter of 1989 generally were somewhat greater than the long-term medians for those stations; the dissolved-term medians.

# Ground Water

Water levels in wells and the quality of water from wells are key measurements in monitoring ground-water trends; however, these hydrologic measurements need to be integrated with other data from studies of ground-water systems in order to be useful. During 1989, the U.S. Geological Survey regularly monitored about 240 observation wells in South Dakota. About 120 other wells, known as project wells because they are used for specific (generally short-term) studies, were also monitored during 1989. The hydrographs in figure 3 are from six of the wells in the observation-well network. Water-level declines in five of the wells correlate with precipitation deficits (table 1) in the areas where the wells are located: The water level in the Lawrence County well had a net decline of 4.61 feet during water year 1989; the water level in the Aurora County well had a net decline of 3.70 feet; the water level in the Lincoln County well had a net decline of 2.96 feet; the water level in the Beadle County well had a net decline of 1.54 feet; and the water level in the Fall River well had a net decline of 0.30 foot during water year 1989. The net water level rise of 0.36 foot in the Marshall County well during water year 1989 correlates with the greater than normal precipitation in the northeast part of the State.

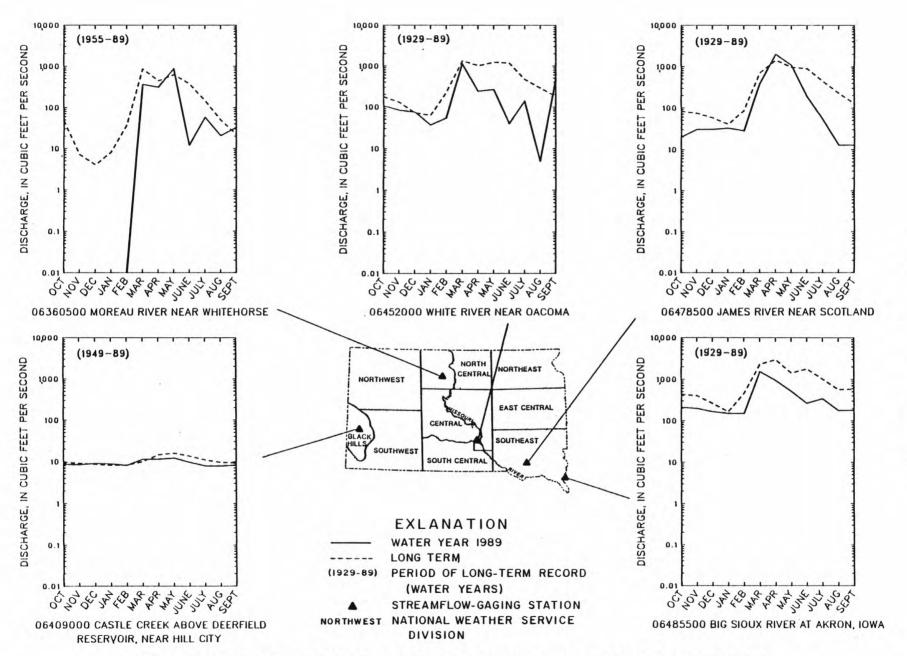


Figure 1.--Comparison of 1989 monthly mean to long-term monthly mean discharges.

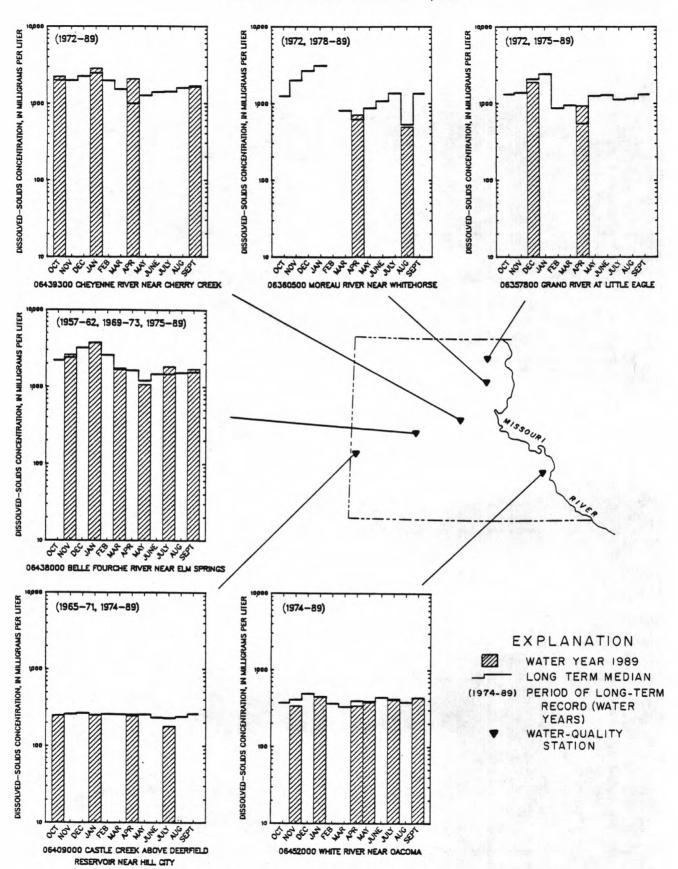


Figure 2.--Comparison of 1989 monthly dissolved-solids concentrations or specific conductance to the long-term median monthly values.

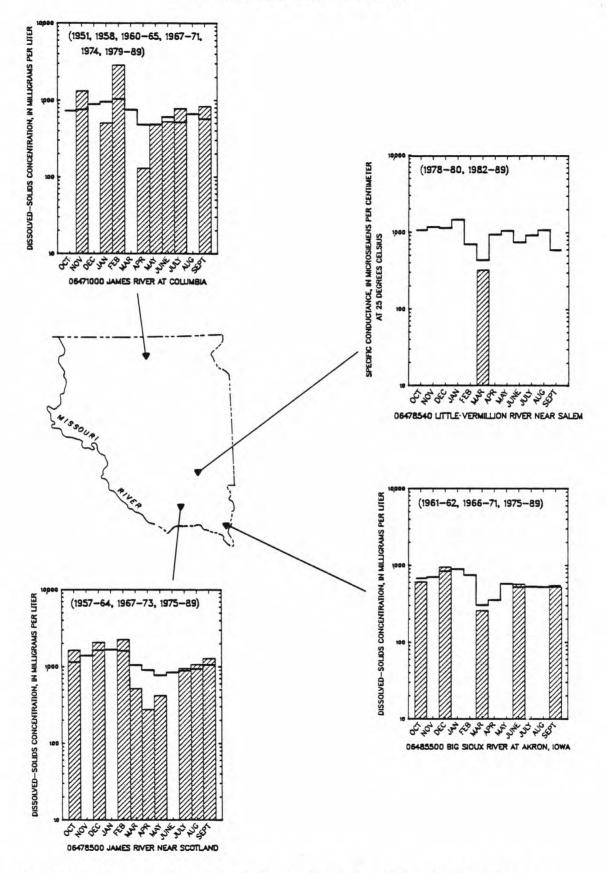


Figure 2.--Comparison of 1989 monthly dissolved-solids concentrations or specific conductance to the long-term median monthly values.--Continued

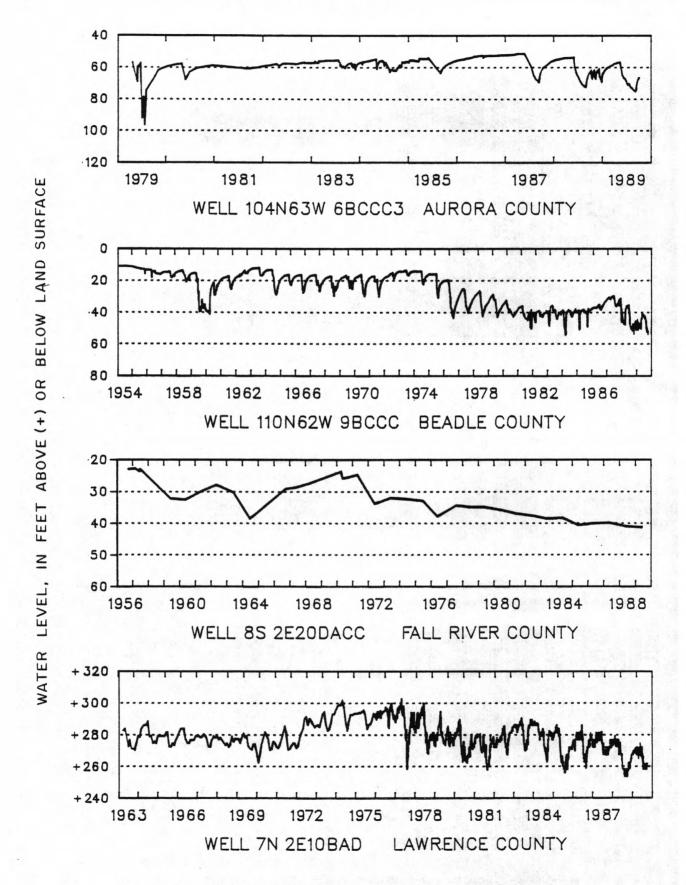


Figure 3. -- Water levels from selected observation wells.

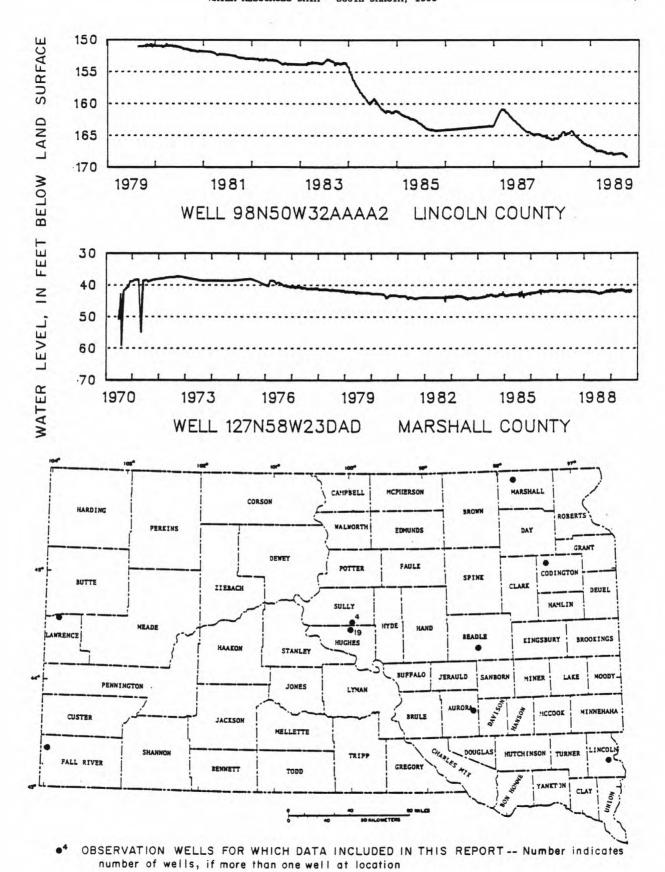


Figure 3.--Water levels from selected observation wells.--Continued

Table 2.--Comparison of current-year maximum discharge to maximum for long-term periods [ft<sup>3</sup>/s, cubic feet per second]

			Peak discharges					
		Long-term	1989 Water year			Long-term period		
Gaging-station number and name		period used (water years)	Peak (ft <sup>3</sup> /s)	Date	Return interval (years)	Peak (ft /s)	Date	Return interval (years)
06360500	Moreau River near Whitehorse	1955-89	4,820	5- 2-89	<2	27,700	5-24-82	25
06409000	Castle Creek above Deerfield Reservoir, near Hill City	1948-89	23	3- 9-89	<2	1,120	5-22-52	>100
06452000	White River near Oacoma	1929-89	7,130	9-23-89	<2	51,900	3-30-52	>100
06478500	James River near Scotland	1929-89	2,540	4-18-89	2	29,400	6-23-84	>100
06485500	Big Sioux River at Akron, Iowa	1929-89	4,100	3-12-89	<2	80,800	4- 9-69	>100

<sup>&</sup>lt;sup>1</sup>Long-term period through water year 1989.

Table 3.--Comparison of current-year minimum discharge to minimum for long-term periods [ft $^3$ /s, cubic feet per second]

			Minimum discharges						
		Long-term	1989 Water year 1			Long-term period			
Gaging-station number and name		period used (water years)	1-day			1-day		7-day,	
			(ft <sup>3</sup> /s)	Date	7-day (ft <sup>3</sup> /s)	(ft <sup>3</sup> /s)	) Date	(ft <sup>3</sup> /s)1	
06360500	Moreau River near Whitehorse	1955-89	0	(214 days)	0	0.0	many days	0.09	
06409000	Castle Creek above Deerfield Reservoir, near Hill City	1948-89	7.0	12-11, 12-1988	7.7	2.0	several days	4.1	
06452000	White River near Oacoma	1929-89	25	8-31-,9- 1-1988, 2- 3-1989	29	0.0	many days	3.9	
06478500	James River near Scotland	1929-89	8.8	9-10,11-1988	9.2	0.0	many days	1.7	
06485500	Big Sioux River at Akron, Iowa	1929-89	98	8-21-1988	105	4.0	1-17-77	19.4	

<sup>1</sup> Low-flow water year is April 1 to March 31.

# SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 57 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

National Stream-Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in natural or regional water-quality planning and management. The 500 or so sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey Office of Water Data Coordination in consultation with the Water Resources Council. The objectives of NASQAN are (1) to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting such that the data may be used for, (2) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (3) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) providing a nationally consistent data base useful for water-quality assessment and hydrologic research.

The National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

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.

Tritium network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

#### EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1989 water year that began October 1, 1988, and ended September 30, 1989. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface and ground water, and ground-water-level data. The locations of the stations and wells where the data were collected are shown in figures 3, 4, and 5. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

#### Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The system used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in South Dakota, for surface-water stations where only miscellaneous measurements are made.

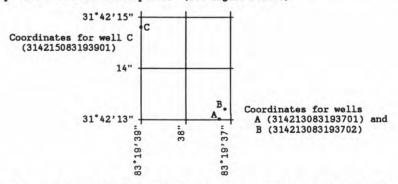
#### Downstream Order System

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 with respect to the stream to which it is immediately tributary is indicated by an indention in the "List of Stations" in the front of this report. Each indention represents one rank. This downstream order and system of indention show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

The station-identification number is assigned according to downstream order. 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 eight-digit number for each station, such as 06442500, which appears just to the left of the station name, includes the two-digit Part number "06" plus the six-digit downstream-order number "442500." The Part number designates the major river basin; for example, part "06" is the Missouri River basin.

#### Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude. The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a 1-second grid. This site-identification number, once assigned, is a pure number, and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LCCATION paragraph of the station description. (See figure below.)



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

# Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges commonly are published for such stations, they are referred to as "daily stations." By contrast, partial records are obtained through discrete measurements. The nature of the partial record is indicated by table title such as "Monthend elevation and contents."

# Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relation between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relation between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

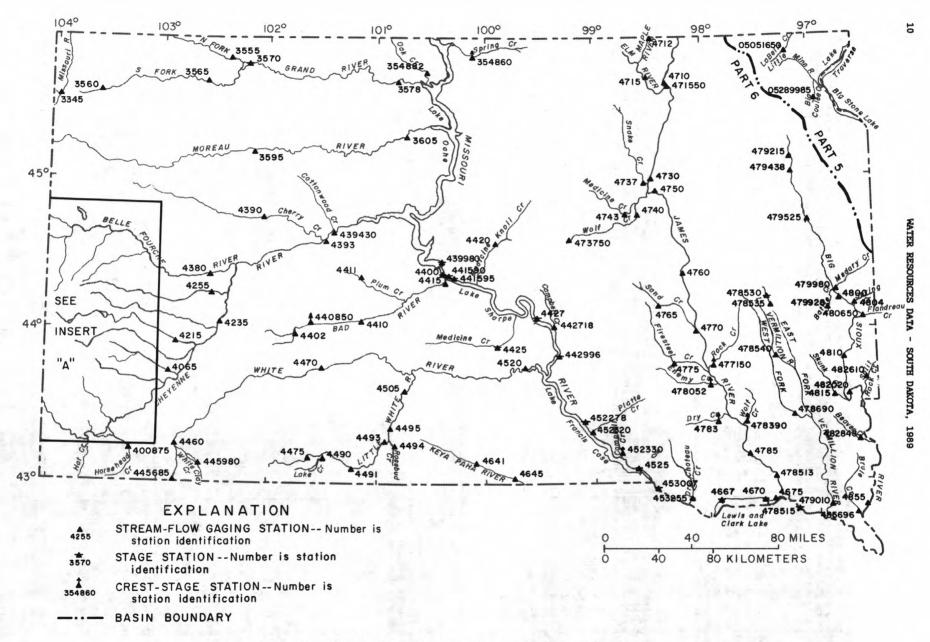


Figure 4.--Location of lake and stream-gaging stations.

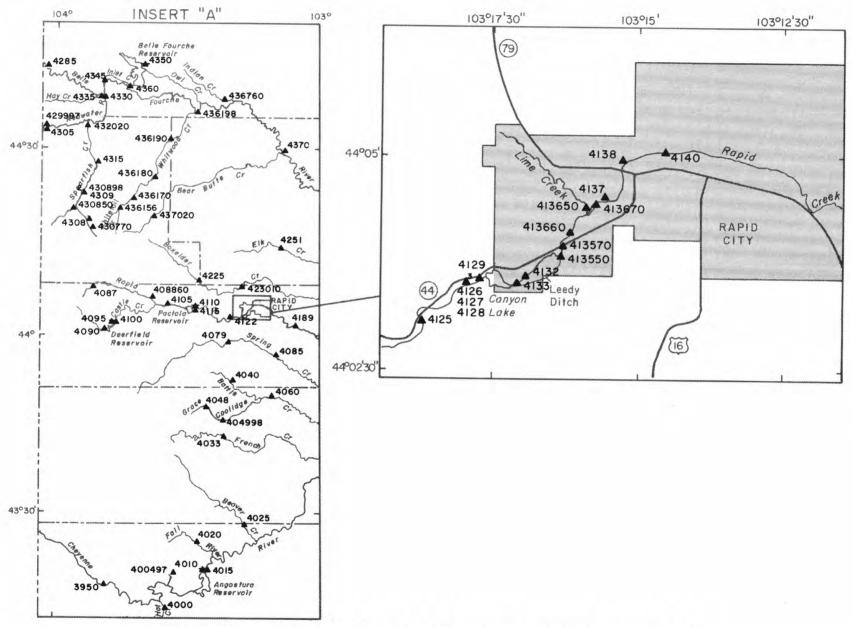


Figure 4.--Location of lake and stream-gaging stations.--Continued

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage or with digital recorders that punch stage values on paper tapes at selected time intervals. Measurements of discharge are made with current meters using methods adapted by the Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations, Book 3, Chapter A6.

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. 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 determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

In computing records of lake or reservoir contents, it is necessary to have available from surveys, curves or tables defining the relation of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Even when this is done, the contents computed may become increasingly in error as time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relation much as other stream discharges are computed.

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 from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

# Data Presentation

The records published for each gaging station consist of two parts, the manuscript or station description and the data table for the current water year. The manuscript provides, under various headings, descriptive information, such as station location; period of record; average discharge; historical extremes; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages, given for only a few stations, were determined by methods given in "River Mileage Measurement," Bulletin 14, Revision of October 1968, prepared by the Water Resources Council or were provided by the U.S. Army Corps of Engineers.

DRAINAGE AREA. -- Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.—This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORD. --Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted 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 most recently revised figure was first published is given.

GAGE. -- The type of gage in current use, the datum of the current gage referred to National Geodetic Vertical Datum of 1929 (see glossary), and a condensed history of the types, locations and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record are identified by date in this paragraph of the station description for water-discharge stations. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, to special methods of computation, to conditions that affect natural flow at the station and, possibly, to other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION. -- Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic mean of the water-year mean discharges. It is computed only for stations having at least 5 water years of complete record, and only water years of complete record are included in the computation. It is not computed for stations where diversions, storage, or other water-use practices cause the value to be meaningless. If water developments significantly altering flow at a station are put into use after the station has been in operation for a period of years, a new average is computed as soon as 5 water years of record have accumulated following the development. The median of yearly mean discharges also is given under this heading for stations having 10 or more water years of record, if the median differs from the average given by more than 10 percent.

EXTREMES FOR PERIOD OF RECORD. --Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same mammer as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD. --Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR. --Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the District office to determine if the published records were ever revised after the station was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

The daily table for stream-gaging stations gives 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 is expressed in acre-feet (line headed "AC-FT"). In the yearly summary below the monthly summary, the figures shown are the appropriate discharges for the calendar and water years. At some stations daily observed discharges are adjusted for diversions. These stations are identified by a statement in the "Remarks" paragraph.

# Accuracy of the Records

The accuracy of streamflow records 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 measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under "REMARKS." "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned are rated "poor." Different accuracies may be attributed to different parts of a given record.

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

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. 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 observed discharge.

# Other Records Available

Information used in the preparation of the records in this publication, such as discharge-measurement notes, gage-height records, temperature measurements, and rating tables are on file in the South Dakota District office. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the District office.

# Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

# Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be once or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records of the quality of surface water are shown in figure 5.

#### Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

# Onsite Measurements and Sample Collection

In obtaining water-quality data, a major objective is assuring that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, in treating the samples to prevent changes in quality pending analysis, and in shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are given in publications on "Techniques of Water-Resources Investigations," Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. All of these references are listed on p. 25 and 26 of this report. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey District office.

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 widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network are obtained from at least several verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

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 uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with water-quality monitors, the records consist of daily maximum, minimum, and mean 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. The accuracy attributed to the water-quality monitors is indicated under "REMARKS." "Good" means that 90 percent of the water-quality monitor data was within 10 percent of the field values, and "fair" within 15 percent. Records that do not meet the criteria mentioned are rated "poor." More detailed records (hourly values) may be obtained from the U.S.G.S. District office whose address is given on the back of the title page of this report.

# Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal 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. Water temperatures measured at the time of water-discharge measurements are on file in the District office.

# 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

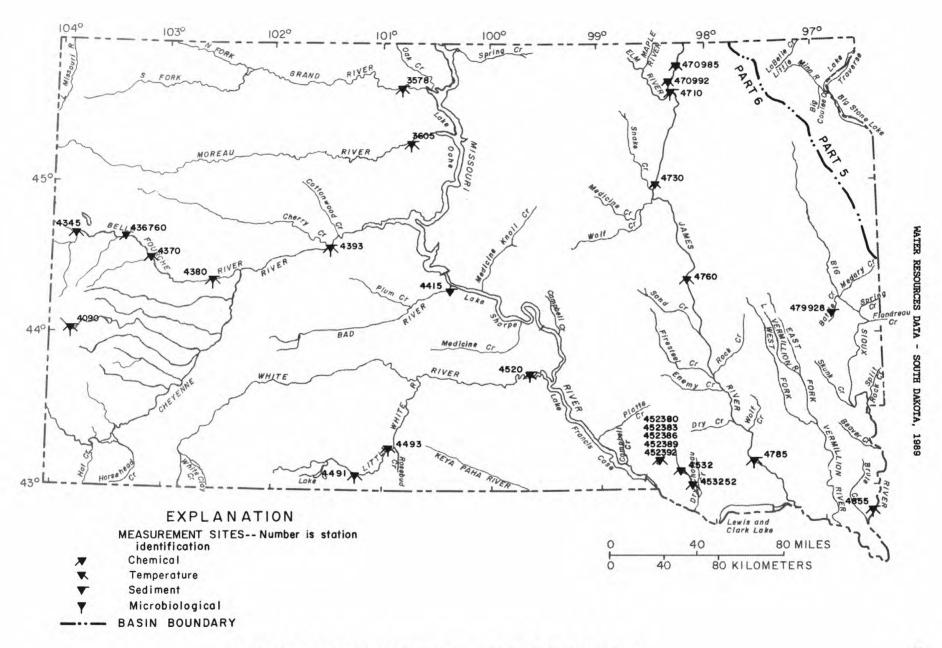


Figure 5.--Location of surface-water quality stations.

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 discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed 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 and in predicting long-term sediment-discharge characteristics of the stream.

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

#### Laboratory Measurements

Samples for indicator bacteria and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratories in Arvada, Colo. or Iowa City, Ia. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the Geological Survey laboratories are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4. In March 1989, the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values in this report have not been corrected for this bias.

# Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION .-- See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA. -- See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.—This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

REMARKS. -- Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION. -- Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES. --Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file to insure the most recent updates.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

# Remark Codes

The following remark codes may appear with the water-quality data in this report:

PRINTED OUTPUT	REMARK
E	Estimated value
>	Actual value is known to be greater than the value shown
<	Actual value is known to be less than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
L	Biological organism count less than 0.5 percent (organism may be observed rather than counted)
D	Biological organism count equal to or greater than 15 percent (dominant)
TNTC	Too numerous to count

# Records of Ground-Water Levels

Records of water levels are presented for 30 wells. Records are obtained through cooperative efforts of many Federal, State, and local agencies for several thousand observation wells throughout South Dakota and are placed in computer storage. Information about the availability of the data in the water-level file may be obtained from the District Chief, South Dakota District. (See address on back of front page.)

#### Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears in the upper left corner of the table. The secondary identification number is the local well number, an alphanumeric number, derived from the townshiprange location of the well.

Water-level records are obtained from direct measurements with a steel tape or from the graph or punched tape of a water-stage recorder. The water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum is given in the well description. The height of the measuring point (MP) 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 (eom).

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 of 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 to a tenth of a foot.

#### Data Presentation

Each well record consists of two parts, the station description and the data table of water levels observed during the water year. The description of the well is presented first through use of descriptive headings preceding the tabular data. The comments to follow clarify information presented under the various headings.

LOCATION. -- This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes, and seconds); a landline location designation; the hydrologic-unit number; the distance and direction from a geographic point of reference; and the owner's name.

AQUIFER. -- This entry designates by name (if a name exists) and geologic age the aquifer(s) open to the well.

WELL CHARACTERISTICS.--This entry describes the well in terms of depth, diameter, casing depth and/or screened interval, method of construction, use, and additional information such as casing breaks, collapsed screen, and other changes since construction.

INSTRUMENTATION. -- This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on weekly, monthly, or some other frequency of measurement.

DATUM.--This entry describes both the measuring point and the land-surface elevation at the well. The measuring point is described physically (such as top of collar, notch in top of casing, plug in pump base and so on), and in relation to land surface (such as 1.3 ft above land-surface datum). The elevation of the land-surface datum is described in feet above (or below) National Geodetic Vertical Datum of 1929 (NGVD of 1929); it is reported with a precision depending on the method of determination.

PERIOD OF RECORD. -- This entry indicates the period for which there are published records for the well. It reports the month and year of the start of publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the Geological Survey, may be noted.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum and all taped measurements of water level are listed. For wells equipped with recorders, only abbreviated tables are published; generally, only water-level lows are listed for every fifth day and at the end of the month (eom). The highest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

# Records of Ground-Water Quality

Records of ground-water quality in this report differ from other types of records in that for most sampling sites they consist of only one set of measurements for the water year. The quality of ground water ordinarily changes only slowly; therefore, for most general purposes one annual sampling, or only a few samples taken at infrequent intervals during the year, is sufficient. Frequent measurement of the same constituents is not necessary unless one is concerned with a particular problem, such as monitoring for trends in nitrate concentration. In the special cases where the quality of ground water may change more rapidly, more frequent measurements are made to identify the nature of the changes.

# Data Collection and Computation

The records of ground-water quality in this report were obtained as part of a special county study. As a result, the records for this year, by themselves, do not provide a balanced view of ground-water quality statewide. Such a view can be attained only by considering records for this year in context with similar records obtained for these and other counties in earlier years.

Most methods for collecting and analyzing water samples are described in the "U.S. Geological Survey Techniques of Water Resources Investigations" manuals listed on a following page. The values reported in this report represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. All samples were obtained by trained personnel. The wells sampled were pumped long enough to assure that the water collected came directly from the aquifer and had not stood for a long time in the well casing where it would have been exposed to the atmosphere and to the material, possibly metal, comprising the casings.

#### Data Presentation

The records of ground-water quality are published in a section titled QUALITY OF GROUND WATER. Data for quality of ground water are identified by well number. The prime identification number for wells sampled is the 15-digit number derived from the latitude-longitude locations. No descriptive statements are given for ground-water-quality records; however, the well number, date of sampling, and other pertinent data are given in the table containing the chemical analyses of the ground water. The REMARK codes listed for surface-water-quality records are also applicable to ground-water-quality records.

#### ACCESS TO WATSTORE DATA

The National WATer Data STOrage and REtrieval System (WATSTORE) was established for handling water data collected through the activities of the U.S. Geological Survey and to provide for more effective and efficient means of releasing the data to the public. The system is operated and maintained on the central computer facilities of the Survey at its National Center in Reston, Virginia.

WATSTORE can provide a variety of useful products ranging from simple data tables to complex statistical analyses. A minimal fee, plus the actual computer cost incurred in producing a desired product, is charged to the requester. Information about the availability of specific types of data, the acquisition of data or products, and user charges can be obtained locally from each of the Water Resources Division's District offices (see address given on the back of the title page).

General inquiries about WATSTORE may be directed to:

Chief Hydrologist U.S. Geological Survey 437 National Center Reston, Virginia 22092

#### 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 English units to International System of 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 equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is an organic, phosphate-rich, compound important to the transfer of energy in organisms. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multi-celled plants, containing chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

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, tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

<u>Bacteria</u> are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while 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.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaeobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C ± 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal coliform bacteria are bacteria that are present in the intestines or feces of warm-blooded animals. They are often 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 in number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also 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 KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which 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 (mL) or liters (L).

<u>Cfs-day</u> 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.

 $\underline{Chlorophyl1} \text{ refers to the green pigments of plants. } \text{ Chlorophyl1} \ \underline{a} \ \text{ and } \underline{b} \ \text{are the two most common green pigments in plants.}$ 

<u>Color unit</u> is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

<u>Contents</u> is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

<u>Control</u> 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 over 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.

Cubic foot per second (ft<sup>3</sup>/s) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

<u>Discharge</u> 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.

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

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

<u>Dissolved</u> refers to that material in a representative water sample which passes through a 0.45  $\mu$ m membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

<u>Dissolved-solids concentration</u> of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

<u>Drainage area</u> of a stream at a specific 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 stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

<u>Drainage basin</u> 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 is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

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

<u>Hardness</u> of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate (CaCO<sub>3</sub>).

<u>Hydrologic unit</u> 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 eight-digit number.

<u>Land-surface datum</u> (1sd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substance (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram  $(\mu g/g)$  is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analyzed.

Micrograms per liter (UG/L,  $\mu$ g/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 one 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 mg/L and is based on the mass of dry 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.

Organism is any living entity.

Organism count/area refers to the number of organisms\_collected and enumerated in a sample and adjusted to the number per unit area habitat, usually square meters (m<sup>2</sup>), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

<u>Parameter Code</u> is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

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

<u>Particle-size</u> is the diameter, in millimeters (mm), of a particle 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).

<u>Particle-size classification</u> used in this report agrees with recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

Classification	Size (mm)	Method of analysis
Clay	0.00024 - 0.004	Sedimentation
Silt	.004062	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 matter 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.

<u>Percent composition</u> 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.

<u>Pesticides</u> are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

<u>Picocurie</u> (PC, pCi) is one trillionth  $(1 \times 10^{-12})$  of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7 x  $10^{10}$  radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

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

<u>Primary productivity</u> is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [mg C/(m² •time)] for periphyton and macrophytes and [mg C/(m³ •time)] for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [mg  $O_2/(m^2 \cdot time)$ ] for periphyton and macrophytes and [mg  $O_2/(m^3 \cdot time)$ ] for phytoplankton are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of

primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Recoverable from bottom material is the amount 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 amount (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.

Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

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 humas. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

<u>Suspended sediment</u> 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 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

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

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge  $(ft^3/s)$  x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

<u>Total-sediment discharge</u> (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 mass or volume, that passes a section during a given time.

<u>Total-sediment load</u> or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q10) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within 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 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 microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). 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-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.

Substrate is the physical surface upon which an organism lives.

<u>Natural substrate</u> refers to any naturally occurring emersed or submersed solid surface, such as a rock or tree, upon which an organism lives.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with cleam streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton.

Surface area of a lake is that area outlined on the latest U.S.G.S. 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 planimetered. All areas shown are those for the stage when the planimetered map was made.

<u>Surficial bed material</u> is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-micrometer filter.

Suspended, recoverable is the amount 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  $\mu$ m 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" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are 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) <u>dissolved</u> and (2) <u>total recoverable</u> concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45  $\mu$ m 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 methodology 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) <u>dissolved</u> and (2) <u>total</u> concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, <a href="Hexagenia limbata">Hexagenia limbata</a>, is the following:

 Kingdom.
 Animal

 Phylum.
 Arthropoda

 Class.
 Insecta

 Order.
 Ephemeroptera

 Family.
 Ephemeridae

 Genus.
 Hexageria

 Species.
 Hexagenia

 Limbata

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

<u>Time-weighted average</u> 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 of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount 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 methodology 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 determined all of the constituent in the sample.)

<u>Total discharge</u> is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative watersuspended 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" amount (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 are required of all laboratories
performing such analyses, because different digestion procedures are likely to produce different analytical
results.

<u>Turbidity</u> (NTU) is based on the comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension of Formazin polymer under the same conditions.

<u>Water year</u> in Geological Survey reports dealing with surface-water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1986, is called the "1986 water year."

<u>WDR</u> is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

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 discharges. 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.

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

#### PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting 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) pertains to 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, Books and Open-File Reports Section, Federal Center, Box 25425, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for 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-D2. Application of seismic-refraction techniques to hydrologic studies, by F. P. Haeni: USGS-TWRI Book 2, Chapter D2. 1988. 86 pages.
- 2-El. Application of borehole geophysics to water-resources investigations, by W. S. Keys and L. M. MacCary: USGS-TWRI Book 2, Chapter El. 1971. 126 pages.
- 2-F1. Application of drilling, coring, and sampling techniques to test holes and wells, by Eugene Shuter and Warren E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.
- 3-Al. General field and office procedures for indirect discharge measurements, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter Al. 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 Hulsing: 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.
- 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 in streams by dye tracing, by F. A. Kilpatrick and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 pages.
- 3-A10. Discharge ratings at gaging stations, by E. J. Kennedy: USGS-TWRI Book 3, Chapter A10. 1984. 59 pages.
- 3-All. Measurement of discharge by moving-boat method, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter All. 1969. 22 pages.
- 3-A12. Fluorometric procedures for dye tracing, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS-TWRI Book 3, Chapter A12. 1986. 41 pages.
- 3-A13. Computation of continuous records of streamflow, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53
- 3-A14. Use of flumes in measuring discharge, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.
- 3-A15. Computation of water-surface profiles in open channels, by Jacob Davidian: USGS-TWRI Book 3, Chapter A15. 1984.
  48 pages.
- 3-A16. Measurement of discharge using tracers, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.
- 3-A17. Acoustic velocity meter systems, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.
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### PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS-Continued

- 3-Bl. Aquifer-test design, observation, and data analysis, by R. W. Stallman: USGS--TWRI Book 3, Chapter Bl. 1971. 26 pages.
- 3-B2. Introduction to ground-water hydraulics, a programmed 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-B5. Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction, by 0. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.
- 3-B6. The principle of superposition and its application in ground-water hydraulics, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS-TWRI Book 3. Chapter B6. 1987. 28 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-Al. Some statistical tools in hydrology, by H. C. Riggs: USGS--TWRI Book 4, Chapter Al. 1968. 39 pages.
- 4-A2. Frequency curves, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-Bl. Low-flow investigations, by H. C. Riggs: USGS--TWRI Book 4, Chapter Bl. 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
- 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-Al. Methods for determination of inorganic substances in water and fluvial sediments, by M. J. Fishman and L. C. Friedman: USGS-TWRI Book 5, Chapter Al. 1989. 545 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 the determination of organic substances in water and fluvial sediments, edited by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.
- 5-A4. Methods for collection and analysis of aquatic biological and microbiological samples, by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 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-A6. Quality assurance practices for the chemical and biological analyses of water and fluvial sediments, by L. C. Friedman and D. E. Erdmann: USGS-TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-Cl. Laboratory theory and methods for sediment analysis, by H. P. Guy: USGS--TWRI Book 5, Chapter Cl. 1969. 58
- 6-Al. A modular three-dimensional finite-difference ground-water flow model, by M. G. McDonald and A. W. Harbaugh: USGS-TWRI Book 6, Chapter Al. 1988. 586 pages.
- 7-Cl. 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 Cl. 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. Schaffrannek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-Al. Methods of measuring water levels in deep wells, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter Al. 1968, 23 pages.
- 8-A2. Installation and service manual for U.S. Geological Survey manometers, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 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.

### RED RIVER OF THE NORTH BASIN

### 05051650 LA BELLE CREEK NEAR VEBLEN. SD

LOCATION.--Lat 45°53'33", long 97°21'40", in SW\SW\SW\SW\SSE\sec.1, T.128 N., R.54 W., Marshall County, Hydrologic Unit 09020105, on right bank 5 ft downstream from highway bridge, 3.0 mi west of Veblen on State Highway 25, 2.0 mi north, and 0.5 mi west.

DRAINAGE AREA. -- 8.74 mi<sup>2</sup>.

PERIOD OF RECORD. -- September 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,330 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50 ft<sup>3</sup>/s, Mar. 26, 1989, gage height, 8.58 ft, backwater from ice; no flow for many days in each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 15 ft 3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 26	1415	*50	a*8.58	Apr. 3	0015	16	4.50

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice.
No flow for many months.

					1	MEAN VALUE	ES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	e10	2.6	.99	.00	.00	.81
2	.00	.00	.00	.00	.00	.00	e12	2.3	.73	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	13	2.1	.43	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	14	2.3	.09	.01	.00	.00
5	.00	.00	.00	.00	.00	.00	14	2.0	.02	.01	.00	.00
6	.00	.00	.00	.00	.00	.00	9.8	1.6	.02	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	7.5	1.5	.02	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	e7.0	1.4	.02	.04	.00	.00
9	.00	.00	.00	.00	.00	.00	6.7	1.3	.02	.00	.00	.00
10	.00	.00	.00	.00	.00	e.50	e4.0	1.1	.02	.00	.01	.00
11	.00	.00	.00	.00	.00	e1.0	3.5	1.1	.02	.00	.00	.00
12	.00	.00	.00	.00	.00	e1.5	3.4	1.0	.03	.00	.15	.00
13	.00	.00	.00	.00	.00	e2.0	4.1	.92	.01	.00	.40	.00
14	.00	.00	.00	.00	.00	e1.0	4.1	.83	.01	.00	.38	.00
15	.00	.00	.00	.00	.00	e.50	3.9	.78	.01	.00	. 26	.00
13	.00	.00	.00	.00	.00	e.50	3.9	.70	.01	.00	. 20	.00
16	.00	.00	.00	.00	.00	e.50	4.3	.68	.02	.00	.00	.00
17	.00	.00	.00	.00	.00	e.50	4.3	1.5	.02	.00	.00	.00
18	.00	.00	.00	.00	.00	e.50	4.1	1.9	.02	.00	.41	.00
19	.00	.00	.00	.00	.00	e.50	4.0	1.2	.03	.00	3.8	.00
20	.00	.00	.00	.00	.00	e.50	3.9	1.0	.03	.00	.72	.01
21	.00	.00	.00	.00	.00	e.50	3.4	.81	e.05	.00	.02	.01
22	.00	.00	.00	.00	.00	e.50	3.1	.76	.01	.00	.00	.00
23	.00	.00	.00	.00	.00	e1.0	2.9	. 94	.02	.00	.00	.00
24	.00	.00	.00	.00	.00	e1.0	2.6	.74	.05	.00	.00	.00
25	.00	.00	.00	.00	.00	e1.0	2.3	.88	.70	.00	.00	.00
26	.00	.00	.00	.00	.00	e10	2.0	.73	.05	.00	.26	.00
27	.00	.00	.00	.00	.00	e20	2.0	. 59	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	e15	2.5	. 23	.01	.22	.40	.00
29	.00	.00	.00	.00		e20	3.4	.11	.00	.35	.00	.00
30	.00	.00	.00	.00		e10	2.8	.32	.00	.00	.39	.00
31	.00		.00	.00		e9.0		1.4		.00	1.5	
TOTAL	0.00	0.00	0.00	0.00	0.00	97.00	164.6	36.62	3.45	0.63	8.70	0.83
MEAN	.00	.00	.00	.00	.00	3.13	5.49	1.18	.11	.020	.28	.028
MAX	.00	.00	.00	.00	.00	20	14	2.6	.99	.35	3.8	.81
MIN	.00	.00	.00	.00	.00	.00	2.0	.11	.00	.00	.00	.00
AC-FT	.00		.00						6.8	1.2	17	1.6
AC-FT	.0	.0	.0	.0	.0	192	326	73	0.0	1.2	1/	1.0
CAL YR WTR YR		TOTAL 48.6 TOTAL 311.8		.13 MAX .85 MAX	3.5 MII		FT 97					
WIR YR	1989	TOTAL 311.8	3 MEAN	XAM CB.	ZU MII	N .00 AC-	FT 619					

e Estimated

### MINNESOTA RIVER BASIN

### 05289985 BIG COULEE CREEK NEAR PEEVER, SD

LOCATION.--Lat 45°29'14", long 96°57'26", in SW\sW\sW\sW\sw\sw\s sec.29, T.124 N., R.50 W., Roberts County, Hydrologic Unit 07020001, on right downstream side of county highway bridge, 3.9 mi south of Peever.

DRAINAGE AREA. -- 12.1 mi 2.

PERIOD OF RECORD . -- October 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,240 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 100 ft<sup>3</sup>/s, Mar. 25 or 26, 1989, gage height, 8.98 ft, backwater from ice; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 30 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date		Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
a		*100	b*8.98	Apr.	28	1600	31	4.55
Apr. 4	0045	37	4.83	Sept.	1	0845	30	4.52

a Mar. 25 or 26.
b Backwater from ice.
No flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	20	8.1	.46	.00	.00	12
2	.00	.00	.00	.00	.00	.00	26	7.1	. 13	.00	.00	4.0
3	.00	.00	.00	.00	.00	.00	25	6.3	.08	.00	.00	2.2
4	.00	.00	.00	.00	.00	.00	25	5.9	.01	.00	.00	1.5
5	.00	.00	.00	.00	.00	.00	17	5.6	.00	.00	.00	.91
3	.00	.00	.00	.00	.00	.00	1,	5.6	.00	.00	.00	.51
6	.00	.00	.00	.00	.00	.00	16	4.6	.00	.00	.00	.52
7	.00	.00	.00	.00	.00	.00	12	4.3	.00	.00	.00	.11
8	.00	.00	.00	.00	.00	.00	9.2	4.0	.00	.00	.00	06
9	.00	.00	.00	.00	.00	.00	8.6	3.8	.00	.00	.00	.02
10	.00	.00	.00	.00	.00	e1.0	6.9	3.5	.00	.00	.00	.02
10	.00	.00	.00	.00	.00	61.0	0.9	3.3	.00	.00	.00	.02
11	.00	.00	.00	.00	.00	e5.0	4.9	3.3	.00	.00	.00	.02
12	.00	.00	.00	.00	.00	e10	2.7	3.0	. 22	.00	.00	e.01
13	.00	.00	.00	.00	.00	e5.0	3.9	2.9	.33	.00	.00	e.01
14	.00	.00	.00	.00	.00	e4.0	9.1	2.9	.37	.00	.00	.00
15	.00	.00	.00	.00	.00	e3.0	9.0	2.6	.16	.00	.00	.00
					142							
16	.00	.00	.00	.00	.00	e3.0	13	2.5	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e2.0	9.4	2.3	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	e1.0	7.1	2.1	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	e1.0	7.3	2.0	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	e1.0	8.2	1.6	.00	.00	.00	.03
20	.00	.00	.00	.00	.00	61.0	0.2	1.0	.00		.00	.00
21	.00	.00	.00	.00	.00	e1.0	7.9	1.3	.00	.00	.00	5.6
22	.00	.00	.00	.00	.00	e1.0	8.3	1.2	.00	.00	.00	3.5
23	.00	.00	.00	.00	.00	e2.0	9.2	.98	.00	.00	.00	1.9
24	.00	.00	.00	.00	.00	e50	7.9	.87	.00	.00	.00	1.4
25	.00	.00	.00	.00	.00	e75	15	.88	.00	.00	.00	.90
23	.00	.00	.00	.00	.00	6/3	13	.00	.00		.00	. 50
26	.00	.00	.00	.00	.00	e50	11	.27	.00	.00	.00	.49
27	.00	.00	.00	.00	.00	e40	9.7	. 26	.00	.00	.00	.32
28	.00	.00	.00	.00	.00	e35	18	. 27	.00	.00	.00	. 13
29	.00	.00	.00	.00		e30	21	.05	.00	.00	.00	.01
30	.00	.00	.00	.00		e25	11	. 29	.00	.00	.00	.02
31	.00	222	.00	.00		e20		.71		.00	.08	
					100	100						05.00
TOTAL	0.00	0.00	0.00	0.00	0.00	365.00	359.3	85.48	1.76	0.00	0.08	35.68
MEAN	.00	.00	.00	.00	.00	11.8	12.0	2.76	.059	.00	.003	1.19
MAX	.00	.00	.00	.00	.00	75	26	8.1	. 46	.00	.08	12
MIN	.00	.00	.00	.00	.00	.00	2.7	.05	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	724	713	170	3.5	.0	. 2	71

CAL YR 1988 TOTAL 273.67 MEAN .75 MAX 10 MIN .00 AC-FT 543 WTR YR 1989 TOTAL 847.30 MEAN 2.32 MAX 75 MIN .00 AC-FT 1680

e Estimated

#### MINNESOTA RIVER BASIN

### 05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD

LOCATION.--Lat 45°17'32", long 96°29'14", in SEkNWk sec.18, T.121 N., R.46 W., Grant County, Hydrologic Unit 07020001, on right bank 20 ft downstream from former highway bridge site, 1.5 mi west of Big Stone City, and 4.5 mi upstream from Big Stone Lake.

DRAINAGE AREA. -- 389 mi<sup>2</sup>.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1910 to November 1912 (no winter records), and March 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS. -- WSP 895: Drainage area. WSP 1308: 1932(M), 1935(M).

GAGE.--Water-stage recorder. Datum of gage is 996.96 ft adjustment of 1912. Mar. 8, 1910, to Nov. 30, 1912, nonrecording gage 2 mi downstream at different datum. Mar. 18, 1931, to May 3, 1939, nonrecording gage, at site 20 ft upstream at present datum. May 4, 1939, to Nov. 8, 1952, water-stage recorder at site 80 ft downstream at present datum.

REMARKS. -- Records good except those for estimated daily discharges, which are fair. Data provided by District office, U.S. Geological Survey, St. Paul, Minnesota.

AVERAGE DISCHARGE.--58 years (water years 1932-89), 49.8 ft<sup>3</sup>/s, 1.74 in/yr, 36,080 acre-ft/yr; median of yearly mean discharges, 35 ft<sup>3</sup>/s, 1.22 in/yr, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,870 ft<sup>3</sup>/s, Apr. 8, 1969, gage height, 14.32 ft from floodmark; no flow at times in most years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, about 26 ft in June 1919, present site and datum, from information by local resident, discharge 29,000 ft<sup>3</sup>/s.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 14 Mar. 25 Mar. 26	1815 1000 1230	370 2,290 ice jam	a5.84 a9.97 *a10.88	Mar. 27 Apr. 29	1815 2200	*3,490 423	10.76 4.72

a Backwater from ice. Minimum discharge, 0.41 ft<sup>3</sup>/s, Aug. 11, gage height, 0.78 ft.

### 05291000 WHETSTONE RIVER NEAR BIG STONE CITY, SD--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.7	2.4	e2.6	e2.8	e3.4	e3.7	324	263	10	3.0	3.6	3.0
2	2.5	2.4	e2.7	e2.8	e3.4	e3.7	258	169	9.5	2.4	2.5	2.5
3	2.0	2.4	e2.9	e2.8	e3.3	e3.7	323	116	8.8	2.4	2.4	2.4
4	1.7	2.8	e3.0	e2.8	e3.2	e3.7	290	91	7.9	1.8	2.3	2.9
5	1.7	3.3	e3.3	e2.8	e3.2	e3.7	254	77	6.9	1.4	2.2	2.9
6	1.7	3.3	e3.4	e2.8	e3.2	e3.7	198	68	6.2	.89	2.0	3.5
7	1.6	3.3	e3.4	e2.8	e3.2	e3.8	145	61	5.1	.73	1.7	3.3
8	1.4	3.3	e3.3	e2.7	e3.2	e4.0	122	56	4.2	. 87	1.6	2.6
9	1.1	3.3	e3.0	e2.7	e3.2	e4.6	94	51	4.1	1.2	1.2	2.5
10	.88	3.3	e2.8	e2.6	e3.3	e69	78	45	3.6	1.9	.67	2.4
11	.88	e3.2	e2.6	e2.6	e3.3	e208	70	39	3.0	1.3	. 47	2.7
12	. 93	e3.1	e2.7	e2.6	e3.4	e311	63	34	5.3	1.6	.48	2.9
13	.93	e3.1	e2.7	e2.6	e3.4	e339	57	29	4.2	1.6	. 63	2.5
14	. 93	e3.2	e2.7	e2.6	e3.4	e343	52	26	4.6	1.6	4.3	2.4
15	. 93	e3.2	e2.7	e2.6	e3.4	e233	48	22	4.4	1.3	4.3	2.4
16	. 93	e3.1	e2.7	e2.7	e3.4	e210	46	20	4.1	1.7	2.8	2.4
17	1.2	e3.0	e2.7	e2.7	e3.3	e192	46	19	3.6	1.5	2.4	2.4
18	1.3	e3.0	e2.8	e2.7	e3.3	e210	47	19	4.2	4.3	2.2	2.4
19	1.3	e3.0	e2.8	e2.8	e3.3	e190	47	18	3.7	5.3	4.3	2.3
20	1.6	e3.0	e2.8	e2.8	e3.2	e147	43	17	2.7	6.0	5.4	2.3
21	1.4	e2.9	e2.8	e2.9	e3.2	e109	35	16	3.6	3.9	5.6	2.4
22	1.7	e2.8	e2.9	e3.0	e3.2	e94	31	15	3.7	2.5	4.7	2.4
23	1.6	e2.8	e3.0	e3.1	e3.2	e185	29	15	3.1	2.4	5.2	2.3
24	1.6	e3.0	e3.0	e3.1	e3.6	e995	41	15	2.7	2.4	4.9	2.1
25	1.7	e3.0	e2.9	e3.1	e3.7	e1760	41	14	3.1	2.3	3.8	1.6
26	1.7	e2.9	e2.9	e3.1	e3.7	e1740	41	12	5.0	2.2	5.5	2.0
27	1.7	e2.9	e2.8	e3.3	e3.7	2950	68	10	3.9	1.1	5.0	3.1
28	1.9	e2.9	e2.8	e3.3	e3.7	1710	122	10	3.7	.79	3.3	3.3
29	2.0	e2.9	e2.8	e3.2		761	318	10	3.3	4.8	3.4	3.0
30	2.1	e2.8	e2.8	e3.5		688	373	9.7	3.5	7.6	3.2	2.5
31	2.3		e2.8	e3.5		618		10		5.8	3.4	
TOTAL	47.91	89.6	89.1	89.4	94.0	14096.6	3704	1376.7	141.7	78.58	95.45	77.4
MEAN	1.55	2.99	2.87	2.88	3.36	455	123	44.4	4.72	2.53	3.08	2.58
MAX	2.7	3.3	3.4	3.5	3.7	2950	373	263	10	7.6	5.6	3.5
MIN	.88	2.4	2.6	2.6	3.2	3.7	29	9.7	2.7	.73	.47	1.6
AC-FT	95	178	177	177	186	27960	7350	2730	281	156	189	154
CFSM	.00	.01	.01	.01	.01	1.17	.32	.11	.01	.01	.01	.01
IN.	.00	.01	.01						.01	.01	.01	.01
TIA.	,00	.01	.01	.01	.01	1.35	.35	. 13	.01	.01	.01	.01

CAL YR 1988 TOTAL 3213.69 MEAN 8.78 MAX 153 MIN .13 AC-FT 6370 CFSM .02 IN. .31 WTR YR 1989 TOTAL 19980.44 MEAN 54.7 MAX 2950 MIN .47 AC-FT 39630 CFSM .14 IN. 1.91

e Estimated

#### MINNESOTA RIVER BASIN

#### 05292000 MINNESOTA RIVER AT ORTONVILLE, MN

LOCATION.--Lat 45°17'44", long 96°26'38", in NE\nW\s sec.16, T.121 N., R.46 W., Big Stone County, Hydrologic Unit 07020001, on left bank 400 ft downstream from bridge on U.S. Highway 12 and 1,300 ft downstream from dam at outlet of Big Stone Lake, at Ortonville.

DRAINAGE AREA. -- 1,160 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- February 1938 to current year.

REVISED RECORDS. -- WSP 895: 1939. WSP 1508: 1942 (yearly mean).

GAGE.--Water-stage recorder. Datum of gage is 956.38 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 31, 1939, nonrecording gage on downstream side of dam 1,300 ft upstream at datum 1.31 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Some regulation by Big Stone Lake (station 05291500). Data provided by District office, U.S. Geological Survey, St. Paul, Minnesota.

AVERAGE DISCHARGE.--51 years, 108 ft<sup>3</sup>/s, 78,250 acre-ft/yr; median of yearly mean discharges, 80 ft<sup>3</sup>/s, 58,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,060 ft<sup>3</sup>/s, Apr. 13, 1952, gage height, 12.92 ft; no flow Dec. 13, 1940.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,780 ft<sup>3</sup>/s, Mar. 27, gage height, 10.76 ft; minimum, 0.25 ft<sup>3</sup>/s, Nov. 2, gage height, 1.17 ft; minimum gage height, 1.13 ft, Oct. 6, due to regulation.

		DISCHARGE,	IN	CUBIC FEET	PER SECO	ND, WATER MEAN VALU	YEAR OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB		APR	MAY	JUN	JUL	AUG	SEP
DAI	001	MOA	DEC	JAN	FED	MAR	APR	MAI	JUN	JOL	AUG	SEF
1	. 56	.66	1.5	e2.0	e2.2	e2.0	659	720	12	5.3	6.4	2.4
2	. 58	. 28	1.5	e2.0	e2.2	e2.0	516	757	7.8	5.3	6.0	2.4
3	. 56	.28	1.4	e2.1	e2.1	e2.0	450	694	8.1	5.3	6.2	2.4
4	.45	.85	1.8	e2.1	e2.0	e2.0	407	559	7.9	5.3	6.2	3.2
5	.47	1.5	1.8	e2.1	e1.9	e1.9	286	378	8.4	5.3	6.1	1.2
6 7 8	.41	1.5	2.0	e1.8	e1.9	e1.9	292	177	8.4	5.7	5.3	1.1
7	.51	1.5	2.1	e2.1	e1.9	e2.0	618	93	8.4	5.7	5.3	4.7
8	.75	1.1	2.1	e2.1	e1.9	e2.5	939	93	8.4	5.9	5.3	7.0
9	.93		e2.1	e2.1	e1.8	e2.7	1180	90	7.3	6.2	5.3	5.4
10	.92		e2.0	e2.1	e1.8	e10	882	88	5.7	6.2	5.1	4.3
11	.77	1.0	e1.7	e2.1	e1.8	e135	365	86	5.0	6.2	4.9	3.8
12	.76	1.5	1.7	e2.1	e1.9	e205	212	86	4.4	6.6	4.9	2.0
13	.73	1.3	1.5		e1.9	e290	188	77	4.1	6.7	5.0	1.7
14	.65		e1.5		e2.0	e300	170	64	4.1	6.7	5.0	1.6
15	.77	1.6	e1.4	e2.0	e2.0	e250	168	64	4.1	6.7	4.9	1.8
16	1.1	1.4	e1.3	e2.1	e1.9	e210	166	61	4.1	6.7	4.3	1.8
17	. 92	1.3	1.3	e2.1	e1.9	e200	162	40	4.1	7.0	3.8	2.1
18	.81	1.2	1.3	e2.2	e1.9	e190	92	23	4.1	9.8	3.2	2.1
19	.83	1.3	1.5	e2.2	e1.9	e175	58	22	4.0	7.5	4.0	2.1
20	1.1	1.2	1.5	e2.2	e1.9	e167	50	22	3.8	7.0	3.8	2.1
21	.96	1.0	1.6	e2.4	e1.9	e160	49	22	6.1	7.0	3.5	2.1
22	1.0	.99	1.7	e2.4	e1.9	e160	48	23	5.4	7.0	3.8	32
23	1.1	1.0	1.9		e1.9	e195	48	23	5.3	7.1	3.4	52
24	1.0	1.1	2.1	e2.4	e2.0	e460	46	23	5.3	6.9	3.3	49
25	1.0	1.2	2.1	e2.3	e2.0	e1040	122	22	5.3	6.7	3.1	41
26	1.1	1.2	2.1	e2.3	e2.0	e1840	199	22	5.9	6.7	3.8	39
27	1.1	1.2	2.1	e2.4	e2.0	e2460	381	20	5.3	6.7	3.5	35
28	1.0	1.4	2.1		e2.0	e1790	584	19	5.3	6.7	3.1	35
29	1.0		e2.1	e2.3		e1120	660	19		10	3.1	35
30	1.0		e2.1	e2.3		805	646	19	5.3	7.2	2.9	36
31	.97		e2.0	e2.3		734		19		6.7	2.8	
TOTAL	25.81	34.96	54.9	67.5	54.5	12915.0	10643	4425	178.7 2	05.8	137.3	411.3
MEAN	. 83		1.77	2.18	1.95	417	355	143		6.64	4.43	13.7
MAX	1.1	1.6	2.1	2.4	2.2	2460	1180	757	12	10	6.4	52
MIN	.41	.28	1.3	1.8	1.8	1.9	46	19	3.8	5.3	2.8	1.1
AC-FT	51	69	109	134	108	25620		8780	354	408	272	816
CFSM	.00	.00	.00	.00	.00	.36	.31	.12	.01	.01	.00	.01
	.00	.00	.00						.01	.01	.00	
IN.	.00	.00	.00	.00	.00	.41	.34	. 14	.01	.01	.00	.01

CAL YR 1988 TOTAL 2311.90 MEAN 6.32 MAX 126 MIN .05 AC-FT 4590 CFSM .01 IN. .07 WTR YR 1989 TOTAL 29153.77 MEAN 79.9 MAX 2460 MIN .28 AC-FT 57830 CFSM .07 IN. .93

e Estimated

### LITTLE MISSOURI RIVER BASIN

### 06334500 LITTLE MISSOURI RIVER AT CAMP CROOK, SD

LOCATION.--Lat 45°32'49", long 103°58'23", in SWk sec.2, T.18 N., R.1 E., Harding County, Hydrologic Unit 10110201, on left bank 15 ft upstream from bridge on State Highway 20 at east edge of Camp Crook.

DRAINAGE AREA. -- 1,970 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- September 1903 to November 1906, May 1956 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS. -- WSP 1309: 1904. WSP 1729: Drainage area.

GAGE. --Water-stage recorder. Datum of gage is 3,108.98 ft above National Geodetic Vertical Datum of 1929. Sept. 2, 1903, to Nov. 30, 1906, nonrecording gage at site 0.5 mi upstream at different datum. May 1956 to Oct. 8, 1957, nonrecording gage at site 15 ft downstream, and Oct. 9, 1957, to Sept. 30, 1976, water-stage recorder at present site both at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Small diversions upstream from station for irrigation. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--36 years, 127 ft<sup>3</sup>/s, 92,000 acre-ft/yr; median of yearly mean discharges, 110 ft<sup>3</sup>/s, 79,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,420 ft<sup>3</sup>/s, Mar. 24, 1978, gage height, 16.90 ft, present datum; no flow at times.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of 1952 reached a stage of about 18 ft, present datum, from local residents

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Oischarge (ft <sup>3</sup> /s)	Gage height (ft)
May 4	1100	*1,530	*8.27	No other p	eak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 0.35 ft3/s, Feb. 3.

		DIDOLLA	, 11. 00	210 1221	I DECO	MEAN VALU		, , , , , , , , , , , , , , , , , , ,	10 00110			
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2 3	2.3	2.6	2.8	1.2	e2.0	e2.5	194	671	22	16	12	1.3
2	1.6	2.8	2.9	1.4	e1.0	e2.4	131	962	21	14	9.5	1.7
3	1.6	2.5	2.4	1.5	e.35	e2.4	92	1130	20	16	8.1	.79
4	8.1	2.4	2.2	1.1	e.40	e2.3	70	1460	18	11	7.0	1.1
5	8.3	2.5	2.4	1.1	e.60	e2.2	63	1230	15	6.9	5.6	.98
6	4.3	2.3	2.7	1.1	e.80	e2.4	53	496	13	6.7	6.1	.72
7	2.7	2.5	2.0	e1.0	e1.0	e2.7	48	416	11	3.5	5.5	. 47
8	2.9	2.6	2.1	e.80	e.80	e3.0	43	358	9.6	2.4	4.3	.49
9	2.5	2.8	1.7	e.60	e1.2	e3.5	35	262	11	1.5	4.1	.41
10	1.9	2.7	1.7	e.80	e1.6	e4.0	25	176	12	3.7	3.7	.45
11	1.9	2.8	1.7	e1.0	e1.6	e4.5	28	117	14	3.9	3.0	.74
12	1.7	2.7	2.1	e1.2	e1.8	e4.0	26	83	13	2.8	2.2	. 47
13	1.7	3.0	2.2	e1.2	e2.0	e3.8	23	71	10	5.9	1.7	.47
14	1.7	3.0	e2.1	e1.1	e1.8	e3.6	20	60	11	277	1.4	.83
15	1.7	2.7	e1.8	e1.0	e1.6	e3.4	19	345	11	113	1.4	.89
16	1.7	2.4	1.6	e1.4	e1.4	e3.2	16	454	9.4	460	1.1	.66
17	2.8	2.8	1.5	e1.8	e1.4	e3.0	12	372	10	597	1.2	.41
18	2.5	2.8	1.6	e2.0	e1.6	e3.2	13	345	8.1	500	.94	.42
19	3.4	2.9	1.7	e2.2	e1.8	e3.2	13	220	6.6	320	1.1	.42
20	2.8	2.5	1.7	e2.1	e2.1	e3.4	12	194	5.6	243	1.6	2.2
21	2.8	2 2	1 4	-2.0	-2.2	-2.5	11	150	e 1	145	1.5	2.4
		3.3	1.4	e2.0	e2.3	e3.5	11	158	6.4	145		
22	2.6	3.1	1.6	e2.2	e2.2	e3.7	9.7	117	7.7	91	1.3	.71
23	2.7	3.5	e1.3	e2.2	e2.4	e4.0	8.8	87	9.5	63	1.4	.90
24	2.3	3.5	1.1	e2.0	e2.8	e4.5	8.0	65	9.2	48	1.1	1.2
25	2.5	2.4	e1.0	e1.8	e3.1	e5.0	7.9	52	25	39	1.0	1.2
26	2.4	3.1	e.65	e1.9	e3.0	e10	10	47	13	32	1.0	1.2
27	2.1	e2.6	e.76	e2.0	e2.8	e30	19	42	9.7	27	.99	1.5
28	1.9	2.8	.81	e2.1	e2.6	e145	258	38	7.6	22	1.4	1.7
29	2.1	3.0	.80	e2.2		469	144	34	6.3	19	1.3	1.6
30	2.6	2.8	1.1	e2.4		569	155	30	15	16	. 97	1.5
31	2.8		1.1	e2.5		338		25		17	1.0	
TOTAL	84.9	83.4	52.52	48.90	48.05	1644.5	1567.4	10117	360.7	3123.3	94.50	29.83
MEAN	2.74	2.78	1.69	1.58	1.72	53.0	52.2	326	12.0	101	3.05	.99
MAX	8.3	3.5	2.9	2.5	3.1	569	258	1460	25	597	12	2.4
MIN	1.6	2.3	.65	.60	.35	2.2	7.9	25	5.6	1.5	.94	.41
AC-FT	168	165	104	97	95	3260	3110	20070	715	6200	187	59
	-00	100	104	٥,	33	0200	0110	20070	, 15	-200	10,	

CAL YR 1988 TOTAL 3230.31 MEAN 8.83 MAX 113 MIN .00 AC-FT 6410 WTR YR 1989 TOTAL 17255.00 MEAN 47.3 MAX 1460 MIN .35 AC-FT 34230

e Estimated

### 06342500 MISSOURI RIVER AT BISMARCK, ND

LOCATION.--Lat 46°48'51", long 100°49'12", in SEkNWkSEk 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 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

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, above National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Sept. 30, 1937.

REMARKS.--Estimated daily discharges: Dec. 25 to Apr. 3. Records good except those for period of estimated daily discharge, which are fair. Flow regulated by Lake Sakakawea (station 06338000) 75.4 mi upstream since November 1953.

AVERAGE DISCHARGE. -- 61 years (water years 1929-89), 22,630 ft<sup>3</sup>/s, 16,400,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 500,000 ft<sup>3</sup>/s, Apr. 6, 1952, gage height, 27.90 ft. Since completion of Garrison Dam in 1953, maximum discharge, 68,900 ft<sup>3</sup>/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 ft<sup>3</sup>/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, about 26,500 ft<sup>3</sup>/s, Feb. 5, gage height, 13.12 ft, backwater from ice; maximum gage height, 14.44 ft, Jan. 1, backwater from ice; minimum discharge, 8,890 ft<sup>3</sup>/s, Oct. 10, gage height, 3.75 ft.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11100	10600	17900	e19500	e22800	e16800	e17000	18200	25100	24700	24900	20600
2	10400	11000	19000	e19500	e23800	e16800	e17000	17900	25200	24800	25000	20200
3	10700	10900	19600	e17500	e24800	e17000	e17000	19700	25100	24600	25300	20000
4	10800	10900	19700	e17100	e25900	e17200	18500	19400	24800	24800	25100	19600
5	11400	11100	19700	e17400	e26200	e16200	17600	19000	25200	24800	25100	17800
•			20,00	027 100	020200	020200	2,000	20000	20200			
6	11600	10700	20000	e17700	e25600	e16900	17100	18700	25000	24900	24700	16900
7	13200	10900	19400	e17400	e25300	e16700	17600	20000	25100	24600	24800	16200
8	15600	10900	19500	e17100	e25500	e16500	15900	20300	25000	24700	24700	16000
9	13700	10900	19600	e16900	e25200	e16300	16000	20600	24700	24900	24600	15500
10	10100	11200	19200	e17400	e25400	e16500	14900	21600	24800	24700	24800	15400
	10100	11200	10200	017400	025400	910300	14000	21000	24000	21700	21000	25.00
11	10900	11100	19100	e19600	e25600	e16500	15600	21400	24800	25000	24500	16400
12	10700	10900	21000	e19500	e26000	e16000	15000	21900	25100	25000	25000	15200
13	10900	10200	19500	e19700	e25700	e17000	15900	21900	25000	24800	24900	15600
14	11400	11100	18100	e19700	e25600	e16700	15000	21700	24700	24700	24600	15400
15	11200	11200	19600	e20000	e24900	e17300	15100	21900	24600	24600	24700	15900
					02.000	02.000	20200					
16	11000	11000	20700	e19700	e25600	e19300	14600	21500	24700	24200	24400	14500
17	10800	10700	23100	e19700	e24600	e18000	15700	23800	24900	24900	24800	13000
18	11200	10800	24800	e20300	e25800	e18800	17600	24600	25000	25300	24500	13300
19	10800	11200	21500	e20800	e24600	e18500	18300	24400	24700	25000	24600	12500
20	10900	11500	21500	e20900	e25600	e18000	18200	24600	24900	24700	24000	11400
									7			
21	10700	11700	22200	e21300	e24500	e18600	18000	24800	25100	24500	24000	11800
22	10400	11200	22500	e20800	e24900	e18700	17800	24900	24700	24900	24300	11900
23	10500	11400	22100	e22100	e23400	e18800	17900	24900	24800	24800	24000	11700
24	10200	11100	22700	e22300	e23400	e19000	18000	25200	24800	24900	23800	11800
25	10400	11200	e22500	e22400	e24000	e18000	16700	25300	24800	24800	24600	12000
26	10300	11400	e21300	e23400	e22700	e17500	18600	25100	24700	24900	24700	11700
27	10600	10800	e19900	e24000	e21000	e17000	19000	24900	24600	24900	22800	12000
28	10700	10400	e18700	e23300	e18700	e17000	18800	25100	24500	25000	23800	11600
29	11000	12200	e19300	e23300		e17000	18200	25000	25000	25200	23700	11500
30	10800	15000	e19600	e22700		e17000	18000	25400	24600	25100	23300	11800
31	10500		e19000	e22900		e17000		25200		24800	22300	
01	10300		913000	622500		617000		23200		2,000	22000	
TOTAL	344500	335200	632300	625900	687100	538600	510600	698900	746000	769500	756300	439200
MEAN	11110	11170	20400	20190	24540	17370	17020	22550	24870	24820	24400	14640
MAX	15600	15000	24800	24000	26200	19300	19000	25400	25200	25300	25300	20600
MIN	10100	10200	17900	16900	18700	16000	14600	17900	24500	24200	22300	11400
AC-FT	683300	664900	1254000	1241000	1363000	1068000	1013000	1386000	1480000	1526000	1500000	871200
		30.000										77.77

CAL YR 1988 TOTAL 7340200 MEAN 20060 MAX 33000 MIN 10100 AC-FT 14560000 WTR YR 1989 TOTAL 7084100 MEAN 19410 MAX 26200 MIN 10100 AC-FT 14050000

### OAK CREEK BASIN 33

### 06354882 OAK CREEK NEAR WAKPALA. SD

LOCATION.--Lat 45°42'43", long 100°33'32", in SW\sE\nW\sec.9, T.20 N., R.29 E., Corson County, Hydrologic Unit 10130102, on right bank at upstream side of bridge on farm access road, 1.6 mi east of Rattlesnake Butte, and 4.0 mi northwest of Wakpala.

DRAINAGE AREA. -- 356 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- October 1984 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,690 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 5 years, 30.4 ft3/s, 22,020 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,780 ft<sup>3</sup>/s, Mar. 4, 1986, gage height, 17.73 ft; maximum gage height, 18.35 ft, Mar. 23, 1987, backwater from ice; no flow for many days each year.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 26	unknown	*2,140	*14.89	Apr. 26	1130	313	7.04
Apr. 25	0215	409	7.73	Apr. 28	1930	1,440	12.51

No flow for many days.

		DISCHARGE,	IN CUBIC	FEET		ND, WATER MEAN VALU		OBER 1988	TO SEPTEME	ER 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	78	e200	2.0	.47	.00	.00
2	.00	.00	.00	.00	.00	.00	59	96	2.1	.49	.00	.00
3	.00	.00	.00	.00	.00	.00	44	63	2.0	. 47	.00	.00
4	.00	.00	.00	.00	.00	.00	34	55	1.6	. 45	.00	.00
5	.00	.00	.00	.00	.00	.00	27	37	1.6	.33	.00	.00
6	.00	.00	.00	.00	.00	.00	25	28	1.5	.20	.00	.00
7	.00	.00	.00	.00	.00	.00	27	22	1.2	. 16	.00	.00
8	.00	.00	.00	.00	.00	.00	21	18	1.0	. 14	.00	.00
9	.00	.00	.00	.00	.00	e1.0	17	14	. 97	. 12	.00	.00
10	.00	.00	.00	.00	.00	e5.0	15	11	.72	.07	.00	.00
11	.00	.00	.00	.00	.00	e40	13	8.9	.65	.10	.00	.00
12	.00	.00	.00	.00	.00	e55	13	6.9	.65	.09	.00	.00
13	.00	.00	.00	.00	.00	e50	15	6.0	. 56	.07	.00	.00
14	.00	.00	.00	.00	.00	e40	17	6.6	. 57	.05	.00	.00
15	.00	.00	.00	.00	.00	e34	16	5.6	.49	.05	.00	.00
16	.00	.00	.00	.00	.00	e30	18	4.4	.68	.04	.00	.00
17	.00	.00	.00	.00	.00	e25	19	3.7	.71	.03	.00	.00
18	.00	.00	.00	.00	.00	e23	19	3.2	. 65	.02	.00	.00
19	.00	.00	.00	.00	.00	e25	21	2.7	. 63	.02	.00	.00
20	.00	.00	.00	.00	.00	e23	22	2.2	. 52	.01	.00	.00
21	.00	.00	.00	.00	.00	e25	20	2.0	. 57	.00	.00	.00
22	.00	.00	.00	.00	.00	e27	22	1.8	.40	.00	.00	.00
23	.00	.00	.00	.00	.00	e30	23	1.6	.32	.00	.00	.00
24	.00	.00	.00	.00	.00	e36	24	1.5	.28	.00	.00	.00
25	.00	.00	.00	.00	.00	e250	139	1.3	.38	.00	.00	.00
26	.00	.00	.00	.00	.00	1660	94	1.2	.31	.00	.00	.00
27	.00	.00	.00	.00	.00	1480	55	1.4	. 27	.00	.00	.00
28	.00	.00	.00	.00	.00	526	e387	1.4	. 26	.00	.00	.00
29	.00	.00	.00	.00		371	e503	1.3	.38	.00	.00	.00
30	.00	.00	.00	.00		204	e474	1.5	. 44	.00	.00	.00
31	.00		.00	.00		110		1.6	12-21	.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	5070.00	2261	610.8	24.41	3.38	0.00	0.00
MEAN	.00	.00	.00	.00	.00	164	75.4	19.7	.81	.11	.00	.00
MAX	.00	.00	.00	.00	.00	1660	503	200	2.1	.49	.00	.00
MIN	.00	.00	.00	.00	.00	.00	13	1.2	. 26	.00	.00	.00
AC-FT	.0	.0	.0	. 0	.0	10060	4480	1210	48	6.7	.0	.0

CAL YR 1988 TOTAL 805.40 MEAN 2.20 MAX 68 MIN .00 AC-FT 1600 WTR YR 1989 TOTAL 7969.59 MEAN 21.8 MAX 1660 MIN .00 AC-FT 15810

e Estimated

#### 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 mi 2.

#### 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 above 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.--Estimated daily discharges: Oct. 6 to Nov. 10, Dec. 3 to Mar. 31, July 13, 29 to Aug. 4, Aug. 25-30, Sept. 1, and 15-26. Records fair except those for periods of estimated daily discharge and beaver activity period of Sept. 19-30, which are poor. Flow regulated since August 1966 by Bowman-Haley Lake (station 06354988) 8 mi upstream.

AVERAGE DISCHARGE.--53 years (water years 1908-17, 1946-89), 26.3 ft<sup>3</sup>/s, 19,050 acre-ft/yr; median of yearly mean discharges, 20 ft<sup>3</sup>/s, 14,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,100 ft<sup>3</sup>/s, Apr. 7, 1952, gage height, 17.03 ft, from rating curve extended above 4,500 ft<sup>3</sup>/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, 14 ft<sup>3</sup>/s, Apr. 28, gage height, 4.89 ft; maximum gage height, 5.72 ft, Mar. 9, backwater from ice; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		2230	,		N	MEAN VALUE	S	1000 10	-			
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.29	e1.8	.99	e.42	e.40	e.33	2.8	3.5	3.0	3.0	e.15	e3.4
2	.38	e1.8	1.0	e.45	e.35	e.31	2.2	2.8	2.7	2.7	e.05	3.1
3	. 45	e1.8	e1.0	e.60	e.30	e.29	1.9	2.5	3.0	2.7	e.03	2.5
4	. 54	e1.6	e1.0	e.75	e.27	e.29	1.5	2.3	4.4	2.3	e.01	2.7
5	.61	e1.6	e1.1	e.85	e.25	e.30	1.5	2.0	4.4	1.5	.00	2.7
6	e.80	e1.8	e1.1	e.87	e.23	e.32	1.4	1.7	4.3	. 57	.00	1.8
7	e.94	e1.8	e1.1	e.80	e.21	e.35	1.4	1.6	4.6	. 43	.00	1.1
8	e1.0	e1.8	e1.1	e.70	e.20	e.40	1.2	1.6	5.0	.45	.00	.85
9	e1.1	e1.8	e1.1	e.60	e.20	e5.5	.98	1.5	5.5	.26	.00	1.0
10	e1.1	e2.0	e1.1	e.50	e.20	e5.0	.98	1.4	3.2	.50	.00	1.4
11	e1.3	2.0	e1.0	e.40	e.21	e5.5	.96	.99	2.2	.68	.00	1.7
12	e1.1	2.0	e1.1	e.30	e.23	e4.5	. 93	.95	1.8	.76	.00	1.6
13	e1.3	1.8	e1.1	e.25	e.25	e3.0	.84	. 95	1.5	e1.0	.00	1.4
14	e1.5	1.7	e1.1	e.25	e.30	e2.0	.71	.99	1.7	5.7	.00	1.2
15	e1.0	1.1	e.95	e.25	e.40	e2.0	.58	1.1	1.9	7.2	.00	e1.2
16	e1.0	.92	e.95	e.27	e.40	e2.0	. 56	1.1	1.7	7.8	.00	e1.0
17	e1.5	1.1	e1.1	e.30	e.40	e2.0	.60	1.1	1.8	8.6	.00	e1.0
18	e1.8	7.0	e1.3	e.35	e.38	e1.5	. 57	. 92	1.5	8.5	.00	e1.1
19	e2.0	2.6	e1.5	e.45	e.36	e1.5	.60	9.7	1.2	8.6	.00	e1.1
20	e2.0	1.8	e1.5	e.55	e.35	e1.5	.56	7.7	.75	8.7	.00	e1.1
	62.0	1.0		6.33	6.33	61.5	. 30				.00	
21	e1.8	.75	e1.3	e.60	e.36	e2.0	. 53	6.7	.68	6.7	.00	e1.1
22	e1.6	. 40	e1.6	e.55	e.38	e2.0	.39	5.1	.88	3.5	.00	e1.1
23	e2.0	.91	e1.5	e.50	e.40	e2.0	.29	4.8	.71	1.9	.00	e1.1
24	e1.8	. 95	e1.1	e.45	e.45	e4.0	.44	4.6	. 82	1.5	.00	e1.1
25	e1.8	.91	e1.0	e.40	e.55	e5.5	.63	4.7	1.0	.99	e.76	e1.1
26	e1.8	.89	e.95	e.45	e.45	e7.5	1.5	5.3	1.1	.55	e3.2	e1.1
27	e1.8	.22	e.60	e.45	e.40	e8.5	7.9	5.9	1.2	.43	e3.4	1.1
28	e1.6	.78	e.30	e.45	e.35	e6.6	12	3.6	2.0	.24	e4.0	1.1
29	e1.6	, 96	e.33	e.45		e5.0	8.0	3.2	2.8	e.24	e4.6	1.3
30	e1.8	. 95	e.35	e.50		e4.0	5.0	3.2	3.2	e.39	e4.0	1.5
31	e1.8		e.38	e.60		e3.5		3.2		e.39	3.9	
TOTAL	41.11	47.54	31.60	15.31	9.23	89.19	59.45	96.70	70.54	88.78	24.10	44.55
MEAN	1.33	1.58	1.02	.49	.33	2.88	1.98	3.12	2.35	2.86	.78	1.48
MAX	2.0	7.0	1.6	.87	.55	8.5	12	9.7	5.5	8.7	4.6	3.4
MIN									.68	.24	.00	.85
	. 29	.22	.30	.25	.20	.29	.29	.92			48	
AC-FT	82	94	63	30	18	177	118	192	140	176	48	88

CAL YR 1988 TOTAL 324.15 MEAN .89 MAX 7.0 MIN .00 AC-FT 643 WTR YR 1989 TOTAL 618.10 MEAN 1.69 MAX 12 MIN .00 AC-FT 1230

e Estimated

### 06355500 NORTH FORK GRAND RIVER NEAR WHITE BUTTE, SD

LOCATION.--Lat 45°47'39", long 102°21'59", in NE\sE\sec.10, T.21 N., R.14 E., Perkins County, Hydrologic Unit 10130301, on right bank 1,400 ft upstream from highway bridge and 9.8 mi south of White Butte.

DRAINAGE AREA. -- 1,190 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS .-- WSP 1279: 1947, 1950.

GAGE.--Water-stage recorder. Elevation of gage is 2,275 ft, by barometer. See WSP 1917 for history of changes prior to June 12, 1951. June 12, 1951, to Aug. 20, 1975, water-stage recorder, and Aug. 21 to Sept. 10, 1975, nonrecording gage at site 1,300 ft downstream; Sept. 11, 1975, to Mar. 22, 1976, nonrecording gage at present site, and Mar. 23 to July 28, 1976, nonrecording gage at site 1,400 ft downstream, all at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Bowman-Haley Dam, capacity, 93,000 acre-ft, 71 mi upstream, beginning August 1966. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years, 52.1 ft<sup>3</sup>/s, 37,750 acre-ft/yr; median of yearly mean discharges, 32 ft<sup>3</sup>/s, 23,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,900 ft<sup>3</sup>/s, Apr. 16, 1950, gage height, 20.0 ft, from floodmarks, from rating curve extended above 19,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 287 ft<sup>3</sup>/s at 2030 hours, Apr. 29, gage height, 3.88 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

						MEAN VALUE	ES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e1.6	e.05	84	198	18	.72	.00	.00
2	.00	.00	.00	.00	e.50	e.04	64	170	17	.80	.00	.00
3	.00	.00	.00	.00	e.10	e.04	57	132	15	.74	.00	.00
4	.00	.00	.00	.00	e.05	e.02	47	107	11	.33	.00	.00
5	.00	.00	.00	.00	e.00	e.04	41	87	10	. 13	.00	.00
6	.00	.00	.00	.00	e.00	e.06	38	69	9.4	.11	.00	.00
7	.00	.00	.00	.00	e.00	e.09	33	57	7.4	.16	.00	.00
8	.00	.00	.00	.00	e.00	e.12	28	49	5.9	. 14	.00	.00
9	.00	.00	.00	.00	e.00	e.40	25	43	4.9	.06	.00	.00
10	.00	.00	.00	.00	e.00	e.62	22	37	4.1	.01	.00	.00
11	.00	.00	.00	.00	e.00	e1.4	20	31	4.1	.15	.00	.00
12	.00	.00	.00	.00	e.06	e2.8	18	27	3.6	.00	.00	.00
13	.00	.00	.00	.00	e.10	e6.0	16	24	3.9	.00	.00	.00
14	.00	.00	.00	e.04	e.20	e11	14	22	3.9	.14	.00	.00
15	.00	.00	.00	e.20	e.16	e23	13	20	3.1	.26	.00	.00
16	.00	.00	.00	e.50	e.10	e46	12	18	3.0	.31	.00	.00
17	.00	.00	.00	e1.0	e.08	e105	11	20	2.9	1.4	.00	.00
18	.00	.00	.00	e2.0	e.06	e95	11	16	4.8	2.0	.00	.00
19	.00	.00	.00	e1.7	e.04	e88	10	13	2.5	1.6	.00	.00
20	.00	.00	.00	e1.5	e.03	e80	9.9	11	3.4	1.1	.00	.00
21	.00	.00	.00	e1.4	e.02	e72	8.8	9.8	4.5	.24	.00	.00
22	.00	.00	.00	e1.3	e.02	68	7.5	9.3	3.7	.09	.00	.00
23	.00	.00	.00	e1.2	e.06	69	7.4	7.8	3.2	.08	.00	.00
24	.00	.00	.00	e1.1	e.10	108	6.8	7.8	2.0	.05	.00	.00
25	.00	.00	.00	e1.3	e.08	150	5.5	6.3	3.0	.01	.00	.00
26	.00	.00	.00	e1.7	e.06	210	8.2	68	3.6	.00	.00	.00
27	.00	.00	.00	e2.2	e.06	228	17	67	3.3	.00	.00	.00
28	.00	.00	.00	e3.0	e.06	196	149	44	3.0	.00	.00	.00
29	.00	.00	.00	e3.2		170	273	29	2.2	.00	.00	.00
30	.00	.00	.00	e2.9		130	240	23	1.3	.00	.00	.00
31	.00		.00	e2.6		144		20		.00	.00	
TOTAL	0.00	0.00	0.00	28.84	3.54	2004.68	1297.1	1443.0	167.7	10.63	0.00	0.00
MEAN	.00	.00	.00	. 93	. 13	64.7	43.2	46.5	5.59	.34	.00	.00
MAX	.00	.00	.00	3.2	1.6	228	273	198	18	2.0	.00	.00
MIN	.00	.00	.00	.00	.00	.02	5.5	6.3	1.3	.00	.00	.00
AC-FT	.00	.00	.00	57	7.0	3980	2570	2860	333	21	.0	.0
110 11				57	7.0	3300	23/0	2000	000		. •	

CAL YR 1988 TOTAL 1445.74 MEAN 3.95 MAX 120 MIN .00 AC-FT 2870 WTR YR 1989 TOTAL 4955.49 MEAN 13.6 MAX 273 MIN .00 AC-FT 9830

e Estimated

### 06356000 SOUTH FORK GRAND RIVER AT BUFFALO. SD

LOCATION.--Lat 45°34'34", long 103°32'38", in SW% sec.29, T.19 N., R.5 E., Harding County, Hydrologic Unit 10130302, on right bank at downstream side of bridge on U.S. Highway 85, 0.3 mi south of Buffalo.

DRAINAGE AREA, -- 148 mi 2.

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

REVISED RECORDS. -- WSP 1917: 1956-57. WDR SD-76-1: 1974(M), 1975.

GAGE.--Water-stage recorder. Datum of gage is 2,839.60 ft above National Geodetic Vertical Datum of 1929. Prior to May 5, 1970, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --34 years, 8.55 ft<sup>3</sup>/s, 6,190 acre-ft/yr; median of yearly mean discharges, 7.2 ft<sup>3</sup>/s, 5,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 2,780 ft<sup>3</sup>/s, June 14, 1963, gage height, 9.01 ft, from rating curve extended above 550 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in 1956-58, 1960, 1962, 1965, 1972.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood in 1908 reached a stage of 15.4 ft, from information by South Dakota Department of Transportation.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 27 May 2	0830 0430	482 309	7.14 6.53	July 14	1045	*745	*7.72

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 0.82 ft3/s, July 6, 7.

		DIDOMMOI	, IN 00	210 1221	I III BLOO	MEAN VALUE	S S	DER 1500	10 00110	IDDA 1000		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	2.0	2.4	e2.2	e1.6	e4.5	e9.0	123	2.8	1.1	1.6	1.3
2	2.0	2.0	2.4	e2.0	e1.4	e4.5	e8.0	149	2.8	.98	1.7	1.1
3	1.8	2.0	2.5	e2.0	e1.1	e4.0	e7.0	84	2.5	. 95	1.9	1.1
4	1.7	2.0	2.4	e2.0	e1.2	e3.5	e6.0	66	2.5	.91	1.8	1.0
5	1.7	2.0	2.4	e2.2	e1.2	e3.0	e5.0	21	2.3	.89	1.8	1.2
6	1.8	2.0	2.5	e2.2	e1.2	e3.0	e4.0	8.8	2.1	.82	2.0	1.2
7	1.8	2.1	2.4	e1.8	e1.2	e3.0	3.7	5.3	2.0	. 82	2.1	1.4
8	1.8	2.0	2.5	e1.6	e1.2	e4.0	3.4	3.9	2.0	.90	2.0	1.5
9	1.8	2.1	2.6	e1.6	e1.2	e8.0	3.7	3.5	1.8	.86	2.0	1.5
10	1.9	2.2	2.6	e1.6	e1.4	e20	3.8	3.1	1.7	1.0	2.0	1.7
11	1.9	2.2	2.7	e1.6	e1.7	e50	3.8	2.5	3.1	2.2	1.8	1.9
12	1.9	2.1	2.6	e1.6	e1.8	e30	3.9	2.5	2.6	2.5	1.6	1.8
13	1.9	2.1	2.7	e1.6	e2.0	e20	3.6	2.9	2.5	13	1.6	1.7
14	1.9	2.1	2.7	e1.6	e2.0	e18	3.4	4.3	2.5	411	1.6	1.7
15	2.0	2.2	2.3	e1.6	e2.0	e15	3.6	3.4	2.4	79	1.6	1.7
16	2.0	2.2	e2.2	e1.6	e2.0	e15	3.7	2.7	2.5	10	1.5	1.6
17	2.1	2.2	e2.2	e1.6	e1.8	e14	3.6	2.6	4.4	4.6	1.4	1.5
18	2.0	1.8	e2.2	e1.7	e1.8	e10	3.6	2.2	3.8	4.7	1.4	1.5
19	2.0	1.8	e2.2	e1.8	e1.8	e10	3.6	2.2	2.6	3.8	1.6	1.6
20	2.0	1.7	e2.2	e1.8	e2.0	e10	3.6	2.1	1.3	2.8	1.5	5.8
21	2.0	1.8	e2.3	e2.0	e2.2	e10	3.1	2.1	2.0	2.3	1.5	4.5
22	2.1	1.8	e2.3	e2.0	e2.2	e12	3.2	2.2	1.6	2.0	1.2	4.2
23	2.0	1.9	e2.3	e2.0	e2.2	e20	2.9	2.2	1.6	2.0	1.1	2.4
24	2.0	1.9	e2.5	e1.8	e3.5	e40	2.7	2.2	8.7	2.0	1.2	1.9
25	2.0	1.8	e2.5	e1.7	e4.5	e70	2.7	2.2	12	1.9	1.3	1.9
26	2.0	2.1	e2.5	e1.6	e5.5	e120	40	2.2	11	1.8	1.3	1.9
27	2.2	1.3	e2.0	e1.6	e5.0	e60	242	2.2	3.1	1.8	1.3	1.9
28	2.1	1.9	e2.0	e1.6	e5.0	e15	83	2.3	1.9	1.8	1.4	1.9
29	2.0	2.4			95.0		23	2.3	1.5	1.9	1.2	1.9
			e2.0	e1.7		e12						
30	2.1	2.4	e2.2	e1.7		e11	70	2.6	1.4	1.8	1.2	1.8
31	2.0		e2.2	e2.0		e10		2.8		1.8	1.3	===
TOTAL	61.1	60.1	73.5	55.4	61.7	629.5	562.6	520.3	95.0	563.93	48.5	58.1
MEAN	1.97	2.00	2.37	1.79	2.20	20.3	18.8	16.8	3.17	18.2	1.56	1.94
MAX	2.6	2.4	2.7	2.2	5.5	120	242	149	12	411	2.1	5.8
MIN	1.7	1.3	2.0	1.6	1.1	3.0	2.7	2.1	1.3	. 82	1.1	1.0
AC-FT	121	119	146	110	122	1250	1120	1030	188	1120	96	115

CAL YR 1988 TOTAL 1388.35 MEAN 3.79 MAX 199 MIN .51 AC-FT 2750 WTR YR 1989 TOTAL 2789.73 MEAN 7.64 MAX 411 MIN .82 AC-FT 5530

e Estimated

### 06356500 SOUTH FORK GRAND RIVER NEAR CASH, SD

LOCATION.--Lat 45°38'56", long 102°38'27", in SWkSWk sec.33 , T.20 N., R.12 E., Perkins County, Hydrologic Unit 10130302, on left bank at downstream side of highway bridge, 1.0 mi upstream from Little Nasty Creek, 4.0 mi north of Cash, 10 mi south of Lodgepole, 12 mi northwest of Bison, and 16 mi downstream from Big Nasty Creek.

DRAINAGE AREA. -- 1,350 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,422.75 ft above National Geodetic Vertical Datum of 1929.
Prior to Oct. 25, 1946, nonrecording gage, and Oct. 25, 1946, to May 16, 1966, water-stage recorder, at site 500 ft upstream. May 17, 1966, to May 2, 1968, nonrecording gage, at present site, all at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years, 52.2 ft<sup>3</sup>/s, 37,820 acre-ft/yr; median of yearly mean discharges, 36 ft<sup>3</sup>/s, 26,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 27,000 ft<sup>3</sup>/s, Apr. 15, 1950, gage height, 15.40 ft, from rating curve extended above 14,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 27	0730	541	4.10	July 16	0345	713	4.63
Apr. 28	1545	824	4.88	Aug. 25	0430	*1,170	*5.57

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 2.0 ft3/s, Feb. 4.

					1	MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.6	9.6	e7.0	e2.7	e4.0	e3.5	76	e200	16	14	9.9	8.3
2	9.5	9.6	e7.0	e2.7	e3.0	e3.2	47	e320	16	12	9.6	7.9
3	12	e9.2	e6.6	e2.9	e2.5	e3.0	39	e450	15	11	9.3	7.8
4	9.8	e9.0	e6.8	e3.1	e2.0	e2.8	34	e290	15	10	9.0	7.5
5	8.8	e8.4	e7.0	e3.1	e2.5	e2.7	29	e200	15	9.7	8.6	7.4
6	7.9	e8.0	e6.6	e3.0	e3.0	e2.6	27	e100	14	8.6	8.3	7.2
7	8.3	e7.8	e6.0	e2.8	e4.0	e5.0	24	e70	14	8.0	8.6	6.9
8	8.2	e7.6	e5.4	e2.8	e3.5	e13	23	e45	13	8.0	8.7	6.9
9	8.3	e7.4	e5.2	e2.8	e3.9	e30	23	e38	13	8.1	8.7	6.9
10	8.2	e7.4	e5.0	e2.8	e4.0	e50	21	e34	12	8.2	8.8	7.0
11	8.0	e7.6	e5.0	e2.9	e4.1	e95	20	30	13	13	8.5	7.7
12	8.0	e7.4	e5.2	e3.0	e4.5	e170	20	27	12	16	8.3	7.4
13	8.6	e7.2	e5.6	e3.0	e4.3	e150	19	25	13	20	8.5	7.7
14	8.8	e7.0	e5.2	e3.0	e4.0	e140	18	24	13	23	8.0	7.6
15	8.9	e6.8	e4.5	e3.0	e3.6	e130	18	23	13	292	8.0	7.7
16	8.9	e6.6	e4.2	e3.1	e3.5	e120	17	23	13	551	7.8	7.5
17	9.3	e6.4	e4.3	e3.2	e3.5	e110	17	24	22	181	7.7	7.4
18	9.7	e6.2	e4.5	e3.5	e3.6	e100	18	22	27	89	8.0	7.4
19	9.3	e6.4	e4.3	e3.8	e3.8	e95	17	21	28	58	8.3	6.9
20	9.1	e6.6	e4.0	e4.0	e4.0	e100	17	19	18	38	8.6	7.8
21	8.6	e7.0	e4.0	e4.0	e4.0	e120	16	18	15	29	8.2	22
22	8.9	e7.0	e3.7	e3.9	e4.0	e140	17	17	15	24	8.4	57
23	7.9	e7.4	e3.4	e3.8	e4.5	154	16	17	15	19	8.1	27
24	8.1	e7.0	e3.1	e3.7	e5.0	170	16	16	14	17	7.9	16
25	8.0	e7.0	e2.8	e3.7	e4.7	204	15	15	15	16	421	16
26	7.7	e6.4	e2.8	e3.7	e4.5	262	18	14	18	14	47	13
27	8.1	e6.0	e2.7	e3.8	e4.3	445	59	14	25	13	22	11
28	e8.6	e6.2	e2.6	e4.0	e4.0	337	624	15	22	12	14	9.3
29	9.6	e6.4	e2.7	e4.4		193	488	14	23	12	9.5	8.8
30	e9.8	e6.4	e2.8	e5.0		125	e120	15	16	12	8.7	8.8
31	10		e2.8	e5.4		93		16		11	8.7	
TOTAL	273.5	219.0	142.8	106.6	106.3	3568.8	1913	2156	493	1557.6	734.7	337.8
MEAN	8.82	7.30	4.61	3.44	3.80	115	63.8	69.5	16.4	50.2	23.7	11.3
MAX	12	9.6	7.0	5.4	5.0	445	624	450	28	551	421	57
MIN	7.7	6.0	2.6	2.7	2.0	2.6	15	14	12	8.0	7.7	6.9
AC-FT	542	434	283	211	211	7080	3790	4280	978	3090	1460	670

CAL YR 1988 TOTAL 5108.90 MEAN 14.0 MAX 235 MIN .00 AC-FT 10130 WTR YR 1989 TOTAL 11609.1 MEAN 31.8 MAX 624 MIN 2.0 AC-FT 23030

e Estimated

#### 06357000 SHADEHILL RESERVOIR AT SHADEHILL, SD

LOCATION.--Lat 45°45'12", long 102°12'12", in Els sec.25, T.21 N., R.15 E., Perkins County, Hydrologic Unit 10130302, at dam on Grand River, 1.3 mi southwest of Shadehill.

DRAINAGE AREA. -- 3,120 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- June 1950 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Apr. 3, 1952, occasional elevations obtained by level circuits and Apr. 3, 1952, to Apr. 28, 1970, nonrecording gage at same site and datum.

REMARKS.--Reservoir formed by earthfill dam. Storage began July 1, 1950; dam completed August 1951. Conservation storage, 81,443 acre-ft between elevations 2,250.8 ft (invert of canal and river outlet) and elevation 2,272.0 ft (crest of morning-glory spillway). Dead storage, 58,231 acre-ft below elevation 2,250.8 ft. Flood control, 217,708 acre-ft between elevations 2,272.0 ft and 2,302.0 ft (crest of emergency spillway). Surcharge, 111,203 acre-ft at elevation 2,312.0 ft (maximum pool elevation). Total reservoir capacity is 468,585 acre-ft at elevation 2,312.0 ft. The reservoir provides flood control and water for irrigation purposes. Figures given herein represent usable contents above elevation 2,250.8 ft. Prior to Oct. 1, 1968, reservoir contents published as total contents and included dead storage.

COOPERATION .-- Records of elevation and contents provided by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD. --Maximum usable contents observed, 259,900 acre-ft, Apr. 10, 1952, elevation, 2,297.86 ft; minimum usable observed since first filling to spillway level, 24,941 acre-ft, Nov. 17, 1981, elevation, 2,258.62 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 61,605 acre-ft, May 31, elevation, 2,267.75 ft; minimum, 40,440 acre-ft, Feb. 28, elevation, 2,262.73 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

							I	Dat	te										Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept. 30 Oct. 3: Nov. 30 Dec. 3:	0	: : :	: :	:	:	:		:		:	:	:	:	:	:			:	2,264.39 2,263.92 2,263.64 2,263.38	47,168 45,235 44,095 43,042	-1,933 -1,140 -1,053
CAL Y	YR	19	88																	-	-14,150
Jan. 3: Feb. 26 Mar. 3: Apr. 36 May 3: June 36 July 3: Aug. 3: Sept. 36	1 0 1 0 1				 								 		 	 	 		 2,263.09 2,262.73 2,264.43 2,266.22 2,267.75 2,267.67 2,267.67 2,266.97 2,266.53	41,877 40,440 47,333 54,894 61,605 61,249 61,249 58,159 56,239	-1,165 -1,437 +6,893 +7,561 +6,711 -356 0 -3,090 -1,920
WTR 1	YR	19	89																_	-	+9,071

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## 06357800 GRAND RIVER AT LITTLE EAGLE, SD (National stream-quality accounting network station)

LOCATION.--Lat 45°39'28", long 100°49'04", in NE\nE\s sec.32, T.20 N., R.27 E., Corson County, Hydrologic Unit 10130303, on left bank at downstream side of bridge on State Highway 63, 1.3 mi southwest of Little Eagle, and 4.7 mi downstream from Little Oak Creek.

DRAINAGE AREA. -- 5,370 mi<sup>2</sup>, approximately.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD .-- July 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,628.63 ft above National Geodetic Vertical Datum of 1929.

Prior to May 12, 1959, nonrecording gage, and May 12, 1959, to Aug. 11, 1970, water-stage recorder at site 0.6 mi downstream at datum 2.00 ft lower. U.S. Army Corps of Engineers satellite data-collection platform at station.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Shadehill Dam 144 mi upstream. (See station 06357000.)

AVERAGE DISCHARGE. --31 years, 242 ft<sup>3</sup>/s, 175,300 acre-ft/yr; median of yearly mean discharges, 180 ft<sup>3</sup>/s, 130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,000 ft<sup>3</sup>/s, Mar. 23, 1987, gage height, 19.16 ft; maximum gage height, 21.76 ft, Mar. 18, 1966, from floodmarks, ice jam, site and datum then in use; no flow at times in 1958-62, 1969, 1975, 1977-85.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,930 ft<sup>3</sup>/s at 1430 hours, Mar. 26, gage height, 9.82 ft; maximum gage height, 9.87 ft, Mar. 25, backwater from ice; minimum daily discharge, 3.5 ft<sup>3</sup>/s, Feb. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY   OCT   NOV   DEC   JAN   FEB   MAR   AFR   MAY   JUN   JUL   AUG   SEP							MEAN VALUE	S					
2 9.6 14 e17 e13 e4.0 e5.0 530 2220 30 15 6.9 65 3 111 15 e16 e13 e3.5 e4.7 448 1430 29 13 5.7 45 4 12 16 e17 e14 e3.8 e4.5 376 844 27 11 5.2 29 5 11 19 e18 e13 e4.5 e4.7 320 560 28 8.5 5.2 23  6 111 19 e18 e13 e5.5 e4.7 320 560 28 8.5 5.2 23  6 111 19 e18 e13 e5.5 e4.7 320 560 28 8.5 5.2 23  6 111 19 e18 e13 e5.5 e5.1 264 300 23 6.8 5.3 18 8 111 17 e16 e12 e5.0 e5.3 215 213 21 5.8 5.1 17 9 10 17 e15 e11 e5.5 e6.0 184 146 20 5.0 5.9 5.9 16 10 10 17 e16 e10 e6.0 e7.0 180 119 18 4.8 9.2 16  11 10 17 e16 e10 e6.5 e14 129 100 17 6.0 5.8 21 12 10 17 e17 e11 e6.2 e27 100 85 16 5.5 6.1 22 13 12 18 e18 e12 e6.0 e55 87 76 15 5.3 8.5 27 14 12 17 e17 e13 e5.7 e100 74 68 16 5.4 6.8 41 15 13 17 e16 e14 e5.4 e90 67 62 15 6.9 7.4 42  16 12 19 e17 e15 e44 e5.4 e90 67 62 15 6.9 7.4 42  16 12 19 e17 e15 e4.3 e5.7 e100 74 68 16 5.4 6.8 41 15 13 16 e18 e15 e4.6 e70 57 54 14 41 8.1 25 18 13 e15 e19 e15 e4.3 e65 59 51 14 113 7.3 20 19 13 e14 e19 e14 e4.0 e7.4 3 e65 59 51 14 113 7.3 20 19 13 e14 e19 e14 e4.0 e7.4 3 e65 59 51 14 113 7.3 20 19 13 e14 e14 e17 e15 e5.0 e80 61 58 15 29 9.1 32 21 14 e14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e14 e14 e17 e15 e5.0 e80 68 29 19 11 21 11 24 22 14 e16 e13 e15 e4.5 e100 42 36 27 23 28 24 23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e13 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 6240 68 29 19 11 21 11 24 28 13 e16 e14 e11 e5.4 2700 673 26 19 11 21 14 24 28 13 e16 e14 e11 e5.4 2700 673 26 19 11 21 14 24 29 14 e15 e16 e15 e11 e 1500 1700 26 17 13 71 16 30 14 e16 e13 e12 e5.6 6240 68 29 19 11 21 11 24 29 14 e15 e15 e11 e 1500 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 e 1500 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 e 1500 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 e 1500 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 e 1500 1700 26 17 13 11 14 e  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9636 616 636.0 713.2 849  MEAN 15 19 19 15 6.5 6240 2330 2630 33 113 114 65	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
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12 10 17 e17 e11 e6.2 e27 100 85 16 5.5 6.1 22 13 12 18 e18 e12 e6.0 e55 87 76 15 5.3 8.5 27 14 12 17 e17 e13 e5.7 e100 74 68 16 5.4 6.8 41 15 13 17 e16 e14 e5.4 e90 67 62 15 6.9 7.4 42  16 12 19 e17 e15 e5.0 e80 61 58 15 29 9.1 32 17 13 16 e18 e15 e4.6 e70 57 54 14 41 8.1 25 18 13 e15 e19 e15 e4.3 e65 59 51 14 113 7.3 20 19 13 e14 e19 e14 e4.0 e74 59 47 14 82 11 19 20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e14 e17 e15 e5.2 e200 45 38 33 29 46 24 23 13 13 e15 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 24 14 e16 e14 e18 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42 25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 230 27 15 12 89 14 31 15 e15 e9.0 1170 29 11 114	10	10	17	e16	e10	e6.0	e7.0	160	119	18	4.8	9.2	16
13 12 18 e18 e12 e6.0 e55 87 76 15 5.3 8.5 27 14 12 17 e17 e13 e5.7 e100 74 68 16 5.4 6.8 41 15 13 17 e16 e14 e5.4 e90 67 62 15 6.9 7.4 42 16 12 19 e17 e15 e5.0 e80 61 58 15 29 9.1 32 17 13 16 e18 e15 e4.6 e70 57 54 14 41 8.1 25 18 13 e15 e19 e15 e4.3 e65 59 51 14 113 7.3 20 19 19 13 e14 e19 e14 e4.0 e74 59 47 14 82 11 19 20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19 21 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 22 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 24 14 e16 e14 e18 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42 25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52 26 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52 26 14 e15 e15 e14 e5.8 e400 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 6240 62 31 20 13 12 12 24 27 15 e17 e13 e12 e5.6 6240 62 31 20 13 12 34 28 29 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1500 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1170 29 11 114 100 100 100 100 100 100 100 100 100					e11		e14	129					21
14       12       17       e17       e13       e5.7       e100       74       68       16       5.4       6.8       41         15       13       17       e16       e14       e5.4       e90       67       62       15       6.9       7.4       42         16       12       19       e17       e15       e5.0       e80       61       58       15       29       9.1       32         17       13       16       e18       e15       e4.6       e70       57       54       14       41       8.1       25         18       13       e15       e4.9       e15       e4.3       e65       59       51       14       41       8.1       25         19       13       e14       e19       e14       e4.0       e74       59       47       14       82       11       19         20       14       e14       e17       e15       e4.5       e102       48       40       23       40       99       23         21       14       e14       e15       e4.5       e102       48       40       23       40       99							e27	100					22
15 13 17 e16 e14 e5.4 e90 67 62 15 6.9 7.4 42  16 12 19 e17 e15 e5.0 e80 61 58 15 29 9.1 32  17 13 16 e18 e15 e4.6 e70 57 54 14 41 8.1 25  18 13 e15 e19 e15 e4.3 e65 59 51 14 113 7.3 20  19 13 e14 e19 e14 e4.0 e74 59 47 14 82 11 19  20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24  23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24  24 14 e16 e15 e15 e14 e5.8 e400 42 36 27 23 28 24  24 14 e16 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34  27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24  28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 24  28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18  29 14 e15 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16  31 15 e15 e9.0 1170 2330 27 15 12 89 14  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849  MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3  MMX 15 19 19 19 15 6.5 6240 2330 2630 33 113 114 65  MMX 15 19 19 19 15 6.5 6240 2330 2630 33 113 114 65  MMN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1			18		e12	e6.0	e55	87		15			27
16     12     19     e17     e15     e5.0     e80     61     58     15     29     9.1     32       17     13     16     e18     e15     e4.6     e70     57     54     14     41     8.1     25       18     13     e15     e19     e15     e4.3     e65     59     51     14     113     7.3     20       19     13     e14     e19     e14     e4.0     e74     59     47     14     82     11     19       20     14     e14     e18     e14     e4.2     e84     54     42     13     51     58     19       21     14     e14     e18     e14     e4.2     e84     54     42     13     51     58     19       21     14     e14     e18     e14     e4.2     e84     54     42     13     51     58     19       21     14     e14     e18     e14     e4.2     e84     54     42     13     51     58     19       21     14     e15     e16     e15     e4.5     e102     48     40     23     40     99					e13	e5.7	e100	74			5.4	6.8	41
17 13 16 e18 e15 e4.6 e70 57 54 14 41 8.1 25 18 13 e15 e19 e15 e4.3 e65 59 51 14 113 7.3 20 19 13 e14 e19 e14 e4.0 e74 59 47 14 82 11 19 20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42 25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24 28 13 e16 e14 e11 e5.4 2780 673 26 19 12 11 24 28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18 29 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1530 1700 26 17 13 71 16 31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MMAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	15	13	17	e16	e14	e5.4	e90	67	62	15	6.9	7.4	42
18     13     e15     e19     e15     e4.3     e65     59     51     14     113     7.3     20       19     13     e14     e19     e14     e4.0     e74     59     47     14     82     11     19       20     14     e14     e18     e14     e4.2     e84     54     42     13     51     58     19       21     14     e14     e17     e15     e4.5     e102     48     40     23     40     99     23       22     14     e15     e16     e15     e5.2     e200     45     38     33     29     46     24       23     13     e15     e15     e14     e5.8     e400     42     36     27     23     28     24       24     14     e16     e14     e13     e6.2     e1000     40     32     21     19     18     42       25     14     e16     e13     e12     e5.6     6240     62     31     20     13     12     34       27     15     e17     e13     e12     e5.6     4850     68     29     19     12     11 <td></td> <td>32</td>													32
19 13 e14 e19 e14 e4.0 e74 59 47 14 82 11 19 20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e14 e17 e15 e4.5 e102 48 40 23 40 99 23 22 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42 25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24 28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18 29 14 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1170 2330 27 15 12 89 14 31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MMX 15 19 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1		13	16	e18	e15	e4.6	e70	57	54	14	41	8.1	25
20 14 e14 e18 e14 e4.2 e84 54 42 13 51 58 19  21 14 e14 e17 e15 e4.5 e102 48 40 23 40 99 23  22 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24  23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24  24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42  25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34  27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24  28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18  29 14 e15 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e11 1170 2330 27 15 12 89 14  31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849  MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3  MAX 15 19 19 15 6.5 6240 230 2630 33 113 114 65  MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	18	13	e15	e19	e15	e4.3	e65	59	51	14	113	7.3	
21 14 e14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52 25 14 e16 e17 e12 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24 28 13 e15 e15 e14 e11 e5.4 2780 673 26 19 11 21 18 29 14 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e15 e11 1170 2330 27 15 12 89 14 E16 e15 e15 e9.0 1170 29 11 114 TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 19 15 6.5 6240 230 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	19	13	e14	e19	e14	e4.0	e74	59	47	14	82	11	19
22 14 e15 e16 e15 e5.2 e200 45 38 33 29 46 24 23 13 e15 e15 e14 e5.8 e400 42 36 27 23 28 24 24 14 e16 e14 e13 e6.2 e1000 40 32 21 19 18 42 25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52 26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34 27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24 28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18 29 14 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1170 2330 27 15 12 89 14 15 15 e15 e9.0 1170 29 11 114 TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	20	14	e14	e18	e14	e4.2	e84	54	42	13	51	58	19
23	21	14	e14	e17	e15	e4.5	e102	48	40	23	40	99	23
24     14     e16     e14     e13     e6.2     e1000     40     32     21     19     18     42       25     14     e16     e13     e12     e6.0     e3000     47     30     21     16     13     52       26     14     e17     e12     e12     e5.6     6240     62     31     20     13     12     34       27     15     e17     e13     e12     e5.6     4850     68     29     19     12     11     24       28     13     e16     e14     e11     e5.4     2780     673     26     19     11     21     18       29     14     e15     e15     e11      1530     1700     26     17     13     71     16       30     14     e16     e15     e11      1170     2330     27     15     12     89     14       31     15      e15     e9.0      1170      29      11     114        TOTAL     382.0     488     501     395.0     144.5     23153.4     9344     9836     6		14	e15	e16	e15	e5.2	e200	45	38	33	29	46	
25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34  27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24  28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18  29 14 e15 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e11 1170 2330 27 15 12 89 14  31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849  MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3  MMAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65  MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	23	13	e15	e15	e14	e5.8	e400	42	36	27	23	28	24
25 14 e16 e13 e12 e6.0 e3000 47 30 21 16 13 52  26 14 e17 e12 e12 e5.6 6240 62 31 20 13 12 34  27 15 e17 e13 e12 e5.6 4850 68 29 19 12 11 24  28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18  29 14 e15 e15 e11 1530 1700 26 17 13 71 16  30 14 e16 e15 e11 1170 2330 27 15 12 89 14  31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849  MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3  MMAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65  MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	24	14	e16	e14	e13	e6.2	e1000	40	32	21	19	18	42
27     15     e17     e13     e12     e5.6     4850     68     29     19     12     11     24       28     13     e16     e14     e11     e5.4     2780     673     26     19     11     21     18       29     14     e15     e15     e11      1530     1700     26     17     13     71     16       30     14     e16     e15     e11      1170     2330     27     15     12     89     14       31     15      e15     e9.0      1170      29      11     114        TOTAL     382.0     488     501     395.0     144.5     23153.4     9344     9836     616     636.0     713.2     849       MEAN     12.3     16.3     16.2     12.7     5.16     747     311     317     20.5     20.5     23.0     28.3       MAX     15     19     19     15     6.5     6240     2330     2630     33     113     114     65       MIN     9.4     14     12     9.0     3.5     4.5     40     26 <td>25</td> <td>14</td> <td>e16</td> <td>e13</td> <td>e12</td> <td>e6.0</td> <td>e3000</td> <td>47</td> <td>30</td> <td>21</td> <td>16</td> <td>13</td> <td>52</td>	25	14	e16	e13	e12	e6.0	e3000	47	30	21	16	13	52
28 13 e16 e14 e11 e5.4 2780 673 26 19 11 21 18 29 14 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1170 2330 27 15 12 89 14 31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	26	14	e17	e12	e12	e5.6	6240	62	31	20	13	12	34
29 14 e15 e15 e11 1530 1700 26 17 13 71 16 30 14 e16 e15 e11 1170 2330 27 15 12 89 14 31 15 e15 e9.0 1170 29 11 114   TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	27	15	e17	e13	e12	e5.6	4850	68	29	19	12	11	24
30 14 e16 e15 e11 1170 2330 27 15 12 89 14 31 15 1170 e15 e9.0 1170 29 11 114   TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	28	13	e16	e14	e11	e5.4	2780	673	26	19	11	21	18
30 14 e16 e15 e11 1170 2330 27 15 12 89 14 31 15 1170 e15 e9.0 1170 29 11 114   TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849 MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	29	14	e15	e15	e11		1530	1700	26	17	13	71	16
31 15 e15 e9.0 1170 29 11 114  TOTAL 382.0 488 501 395.0 144.5 23153.4 9344 9836 616 636.0 713.2 849  MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3  MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65  MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	30	14	e16	e15	e11		1170		27	15		89	
MEAN 12.3 16.3 16.2 12.7 5.16 747 311 317 20.5 20.5 23.0 28.3 MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	31	15		e15	e9.0						11	114	
MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14		382.0	488	501	395.0	144.5	23153.4	9344	9836	616			
MAX 15 19 19 15 6.5 6240 2330 2630 33 113 114 65 MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	MEAN	12.3	16.3	16.2							20.5	23.0	28.3
MIN 9.4 14 12 9.0 3.5 4.5 40 26 13 4.8 5.1 14	MAX												

CAL YR 1988 TOTAL 21328.10 MEAN 58.3 MAX 2120 MIN .20 AC-FT 42300 WTR YR 1989 TOTAL 47058.1 MEAN 129 MAX 6240 MIN 3.5 AC-FT 93340

e Estimated

### 06357800 GRAND RIVER AT LITTLE EAGLE, SD--Continued (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

PERIOD OF RECORD. --October 1955 to September 1956, October 1968 to September 1969, October 1971 to current year.

PERIOD OF DAILY RECORD . --

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976. SPECIFIC CONDUCTANCE: October 1975 to September 1976, October 1977 to September 1981.

WATER TEMPERATURE: October 1975 to September 1980.

EXTREMES FOR PERIOD OF DAILY RECORD .--

COLI-

STREP-

SEDIMENT CONCENTRATION: Maximum daily mean, 19,000 mg/L, May 2, 1972; minimum daily mean, 0 mg/L, Jan. 10, 11, Feb. 5-10, 1975.

SEDIMENT LOAD: Maximum daily, 259,000 tons, Mar. 12, 1972; minimum daily, 0 ton, Jan. 10, 11, Feb. 5-10,

1975.

SPECIFIC CONDUCTANCE: Maximum daily, 3,100 microsiemens, Dec. 4, 7-9, 1976; minimum daily, 290 microsiemens, Feb. 7, 1976.
WATER TEMPERATURE: Maximum daily, 33.0°C, Aug. 26, 1976; minimum daily, 0.0°C on many days during winter

periods.

### WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
DEC 20 APR	1410	18	2530	8.59		-1.5	0.0	44	715	12.3	91
12 JUN	1405	99	1310	7.68	230	14.0	6.0	92	720	9.8	84
16	1520	16	2260	8.47		33.5	25.0	4.7	710	7.7	101

DATE	FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)
DEC										
20 APR	<2	<2	330	52	48	530	77	13	9.5	428
12	К33	К93	220	48	23	230	69	7	7.3	246
JUN 16	180	220	290	59	35	380	73	10	14	286
		CHLO-	FLUO-	SILICA.	SOLIDS, RESIDUE	SOLIDS, SUM OF	SOLIDS,	SOLIDS,	NITRO- GEN,	NITRO- GEN,
	SULFATE DIS- SOLVED	RIDE, DIS- SOLVED	RIDE, DIS- SOLVED	DIS- SOLVED (MG/L	AT 180 DEG. C DIS-	CONSTI- TUENTS, DIS-	DIS- SOLVED (TONS	DIS- SOLVED (TONS	NITRITE DIS- SOLVED	NO2+NO3 DIS- SOLVED
DATE	(MG/L AS SO4) (00945)	(MG/L AS CL) (00940)	(MG/L AS F) (00950)	AS SIO2) (00955)	SOLVED (MG/L) (70300)	SOLVED (MG/L) (70301)	PER AC-FT) (70303)	PER DAY) (70302)	(MG/L AS N) (00613)	(MG/L AS N) (00631)
DEC										
20 APR	950	15	0.50	4.3	1880	1920	2.56	91.4	<0.010	<0.100
12 JUN	410	23	0.30	7.3	933	888	1.27	249	0.020	<0.100
16	830	21	0.40	4.2	1590	1550	2.16	68.7	<0.010	<0.100

### 06357800 GRAND RIVER AT LITTLE EAGLE, SD--Continued

### WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	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)
DEC 20	0.050	0.050	0.06	1.0	0.030	0.030	<0.010	<10	1	100
APR 12 JUN	0.160	0.050	0.06	1.1	0.100	0.080	<0.010	20	<1	43
16	0.010	0.020	0.03	0.30	0.020	<0.010	<0.010	10	1	<100
DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	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)
DEC 20 APR	<10	1	1	<1	6	10	<5	90	20	<0.1
12 JUN 16	<0.5 <10	<1 <1	1	<3 <1	3	23	<5 <1	73 140	21	0.1 <0.1
DATE	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)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
DEC 20	8	4	1	<1.0	920	2	<10	102	5.0	99
APR 12	<10	5	<1	<1.0	570	<6	<3	294	79	100
JUN 16	4	2	<1	1.0	990	2	<10	52	2.2	97

### 06359500 MOREAU RIVER NEAR FAITH, SD

LOCATION.--Lat 45°11'52", long 102°09'22", in NWkNWk sec.10, T.14 N., R.16 E., Perkins County, Hydrologic Unit 10130306, on left bank 10 ft downstream from bridge on State Highway 73, 3.1 mi downstream from Rabbit Creek, and 13.5 mi northwest of Faith.

DRAINAGE AREA. -- 2,660 mi<sup>2</sup>, approximately.

PERIOD OF RECORD . -- March 1943 to current year.

REVISED RECORDS. -- WSP 1176: 1944. WSP 1279: 1946(M).

GAGE.--Water-stage recorder. Datum of gage is 2,238.68 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 5, 1949, nonrecording gage 0.3 mi upstream and Oct. 5, 1949, to July 16, 1959, nonrecording gage and crest-stage gage at present site; both at datum 1.0 ft higher. July 17, 1959, to Sept. 1, 1971, recording gage at site 500 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--46 years, 135 ft<sup>3</sup>/s, 97,810 acre-ft/yr; median of yearly mean discharges, 94 ft<sup>3</sup>/s, 68,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,000 ft<sup>3</sup>/s, Apr. 9, 1944, gage height, 20.9 ft, from floodmarks, site and datum then in use, from rating curve extended above 12,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in 1944, 1946, 1948-51, 1955-66, 1968-71, 1974-75, 1978-81, 1985, 1988-89.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 30	1100	3,500	8.78	May 3	1530	*4,130	*9.46

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow Aug. 23, 24.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	6.1	e8.4	e5.5	e1.0	e1.6	883	2380	21	6.2	7.3	56
2	3.8	6.9	e8.8	e5.0	e.60	e1.4	463	3250	21	5.9	5.8	35
3	3.9	7.2	e8.2	e4.5	e.40	e1.4	239	3910	19	5.3	5.5	24
4	3.7	7.5	e7.8	e4.8	e.50	e1.4	157	2750	18	3.7	4.4	18
5	3.7	7.3	e8.2	e5.0	e.60	e1.2	117	1300	17	3.4	3.4	15
6	3.8	6.7	e7.8	e4.8	e.80	e1.0	99	732	15	2.9	2.8	12
7	5.1	7.3	e7.0	e4.3	e1.0	e.76	83	474	13	2.3	1.9	9.1
8	5.2	7.1	e6.5	e4.0	e.80	e1.1	72	323	12	1.7	1.9	7.6
9	5.0	7.3	e6.0	e3.7	e1.0	e1.8	60	222	10	1.5	1.7	6.7
10	5.0	7.5	e6.4	e3.5	e1.2	e2.5	52	158	9.5	1.3	1.7	6.3
11	4.5	7.6	e6.8	e3.5	e1.6	e3.0	46	122	8.5	181	1.6	6.1
12	4.4	7.4	e7.0	e3.6	e1.6	e2.9	41	99	8.2	85	1.3	5.6
13	4.4	7.5	e7.0	e3.7	e1.4	e2.8	37	87	8.3	46	1.3	4.9
14	4.2	7.6	e6.5	e3.7	e1.2	e2.7	35	77	8.6	107	1.2	4.3
15	4.3	e7.8	e5.8	e3.6	e1.0	e2.6	32	67	8.0	175	1.1	3.3
16	4.3	e7.0	e6.0	e3.7	e.80	e2.6	31	58	7.7	113	. 62	2.6
17	4.4	e7.0	e6.0	e3.7	e.80	e2.6	28	53	11	238	.42	1.7
18	4.5	e7.2	e6.4	e3.8	e.80	e2.8	27	47	13	437	.32	1.4
19	4.1	e7.2	e6.2	e3.8	e1.0	e2.8	25	41	18	249	.32	1.4
20	4.6	e7.4	e6.0	e3.7	e1.2	e3.0	23	38	13	140	.22	40
21	3.8	e7.8	e6.0	e3.8	e1.6	e5.0	21	39	13	91	.02	67
22	4.3	e7.8	e6.0	e3.7	e1.4	e9.0	19	37	14	65	.00	34
23	4.0	e8.0	e5.8	e3.4	e1.8	e15	18	35	12	47	.00	46
24	4.4	e7.8	e5.6	e3.0	e2.0	e28	17	32	12	36	.11	62
25	4.9	e7.6	e5.4	e2.7	e2.0	e45	17	28	14	28	355	38
26	4.9	e7.6	e5.6	e2.5	e2.0	e80	30	26	13	22	310	25
27	6.2	e7.0	e5.8	e2.7	e1.8	e140	257	22	11	18	212	18
28	5.4	e7.2	e5.2	e2.5	e1.8	e250	423	22	10	15	387	14
29	6.0	e7.6	e5.5	e2.2		e480	1960	21	9.8	13	98	14
30	5.9	e8.0	e5.8	e1.9		890	3340	21	7.9	12	65	11
31	6.2		e6.0	e1.4		926		22		9.4	77	
TOTAL	142.9	221.0	201.5	111.7	33.70	2909.96	8652	16493	376.5	2161.6	1548.93	590.0
MEAN	4.61	7.37	6.50	3.60	1.20	93.9	288	532	12.5	69.7	50.0	19.7
MAX	6.2	8.0	8.8	5.5	2.0	926	3340	3910	21	437	387	67
MIN	3.7	6.1	5.2	1.4	.40	.76	17	21	7.7	1.3	.00	1.4
AC-FT	283	438	400	222	67	5770	17160	32710	747	4290	3070	1170

TOTAL 16121.45 MEAN 44.0 MAX 3490 MIN .00 AC-FT 31980

TOTAL 33442.79 MEAN 91.6 MAX 3910 MIN .00 AC-FT 66330

**CAL YR 1988** 

WTR YR 1989

e Estimated

MOREAU RIVER BASIN 43

### 06360500 MOREAU RIVER NEAR WHITEHORSE, SD

LOCATION.--Lat 45°15'21", long 100°50'33", in SW\sE\sec.17, T.15 N., R.27 E., Dewey County, Hydrologic Unit 10130306, on left bank 30 ft downstream from bridge, 2.4 mi southeast of Whitehorse, 8.8 mi downstream from Little Moreau River, and 16.3 mi southeast of town of Timber Lake.

DRAINAGE AREA, --4,880 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- June 1954 to current year.

REVISED RECORDS. -- WDR SD-78-1: 1977.

GAGE.--Water-stage recorder. Datum of gage is 1,661.48 ft above National Geodetic Vertical Datum of 1929.

Prior to Nov. 24, 1954, nonrecording gage at same site and datum. National Weather Service telemeter and U.S. Army Corps of Engineers satellite data-collection platform at station.

REMARKS .-- Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--35 years, 218 ft<sup>3</sup>/s, 157,900 acre-ft/yr; median of yearly mean discharges, 140 ft<sup>3</sup>/s, 101,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,700 ft<sup>3</sup>/s, May 24, 1982, gage height, 26.00 ft; maximum gage height, 26.20 ft, Mar. 14, 1972, backwater from ice; no flow at times each year.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood in June 1953 reached a stage of about 26.2 ft. Flood in March 1947 was probably higher.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1.800 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 27 May 2	0715 0800	1,810 *4,820	6.32 *11.05	May 5	0830	4,100	10.04

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

		33-33-0				MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	907	3650	30	4.2	16	173
2	.00	.00	.00	.00	.00	.00	897	4490	27	3.1	11	101
3	.00	.00	.00	.00	.00	.00	877	3090	27	1.6	7.0	65
4	.00	.00	.00	.00	.00	.00	576	3780	25	.36	4.7	50
5	.00	.00	.00	.00	.00	.00	392	3910	24	.01	3.0	51
6	.00	.00	.00	.00	.00	.00	282	2440	22	.00	1.8	41
7	.00	.00	.00	.00	.00	.00	218	1350	21	.00	.90	31
8	.00	.00	.00	.00	.00	.00	178	871	17	.00	.51	25
9	.00	.00	.00	.00	.00	.00	146	657	16	.00	.13	20
10	.00	.00	.00	.00	.00	e10	119	504	14	.00	.01	17
11	.00	.00	.00	.00	.00	e210	99	398	12	.00	.00	16
12	.00	.00	.00	.00	.00	e200	84	305	12	e.00	.00	14
13	.00	.00	.00	.00	.00	e160	71	245	12	e110	.00	12
14	.00	.00	.00	.00	.00	e150	60	201	12	e50	.00	11
15	.00	.00						168		e30	.00	8.6
15	.00	.00	.00	.00	.00	e140	51	168	9.5	e30	.00	0.0
16	.00	.00	.00	.00	.00	e150	44	144	7.7	e50	.00	6.9
17	.00	.00	.00	.00	.00	e160	39	128	6.7	e80	.00	4.9
18	.00	.00	.00	.00	.00	e150	35	108	6.7	e140	.00	2.9
19	.00	.00	.00	.00	.00	e140	31	95	7.0	128	.00	1.6
20	.00	.00	.00	.00	.00	e130	27	82	5.5	138	.00	1.5
21	.00	.00	.00	.00	.00	e120	25	72	4.7	299	.00	3.4
22	.00	.00	.00	.00	.00	125	21	61	4.0	210	.00	13
23	.00	.00	.00	.00	.00	192	19	53	3.4	135	.00	22
24	.00	.00	.00	.00	.00	833	17	46	2.6	89	.00	14
25	.00	.00	.00	.00	.00	1100	17	42	2.9	77	.00	76
26	.00	.00	.00	.00	.00	1410	18	37	4.1	e58	.00	63
27	.00	.00	.00	.00	.00	1680	28	37	4.9	42	.00	41
28	.00	.00	.00	.00	.00	982	934	33	5.3	35	.00	28
29	.00	.00	.00	.00		737	1590	31	7.1	61	.00	37
30	.00	.00	.00	.00		1180	1380	31	5.6	30	144	34
31	.00		.00	.00		1220		32		21	443	
TOTAL	0.00	0.00	0.00	0.00	0 00	11179.00	9182	27091	358.7	1792.27	632.05	984.8
MEAN	.00	.00	.00	.00	.00	361	306	874	12.0	57.8	20.4	32.8
MAX	.00	.00	.00	.00	.00	1680	1590	4490	30	299	443	173
MIN	.00	.00	.00	.00	.00	.00	17	31	2.6	.00	.00	1.5
AC-FT	.00							53730	711	3550	1250	1950
AC-FI	. 0	.0	.0	.0	.0	22170	18210	33/30	/11	3330	1230	1900

CAL YR 1988 TOTAL 19897.84 MEAN 54.4 MAX 3090 MIN .00 AC-FT 39470 WTR YR 1989 TOTAL 51219.82 MEAN 140 MAX 4490 MIN .00 AC-FT 101600

e Estimated

### MOREAU RIVER BASIN

### 06360500 MOREAU RIVER NEAR WHITEHORSE, SD--Continued

### WATER-QUALITY RECORDS

PERIOD OF RECORD. --October 1968 to September 1969, October 1971 to September 1976, October 1977 to current year.

PERIOD OF DAILY RECORD . --

SUSPENDED-SEDIMENT DISCHARGE: October 1970 to September 1976.

REMARKS.--Sediment-discharge records prior to Oct. 1, 1971, on file in the District office, U.S. Army Corps of Engineers, Omaha, Nebraska.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SEDIMENT CONCENTRATION: Maximum daily mean, 20,300 mg/L, May 9, 1972; minimum daily mean, 0 mg/L on many days most years.

SEDIMENT LOAD: Maximum daily, 420,000 tons, May 10, 1975; minimum daily, 0 ton on many days each year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	Т	IME	CHAR INS CUB FE PE SEC (000	GE, T. IC ET R OND	SPE CIF CON DUC ANC (US/	IC I- IT- IE CM)	PH (STA ARI UNIT (004	ND- D S)	ALK LINI WAT TOT FIE MG/L CAC (004	TY WH FET LD AS O3	TEMP	RE R C)	TEME ATU WAT (DEG	TER G C)	BI III (NI	JR- ID- TY TU) D76)	MET PRI SI (N	RO- FRIC ES- JRE M OF 3)	OXYO DI SOI	S- VED	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	
APR 11	1	245	98		1	.310	7	. 88		96		9.0		5.5	840	0		720	1	.0.5	89	J
JUN 13	1	345	12		2	210	8	.61		175	1:	3.0	1	14.5	8	3.7		710		9.8	104	
AUG 31	1	240	372			780	7	.40		86	2:	3.0	2	21.5	2200	0		710		8.2	100	
DATE	FO: FE: 0. UM (CO: 100	LI- RM, CAL, 7 -MF LS./ ML) 625)	STR TOCO FEC. KF A (COL. PE 100 (316	CCI AL, GAR S. R ML)		S AL /L	CALC DIS SOL (MG AS	VED /L CA)	DI	UM, S- VED /L MG)	SODII DIS- SOLVI (MG AS 1	ED /L NA)	PERC		SOF	NOI	SOI (MC AS	TAS- TUM, IS- LVED G/L K)	ALK LINI LA (MG AS CAC	TY B /L (03)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	
APR 11		K67	v	500		280	56		34		190			59		5		5.4	104		550	
JUN 13		K620		360		380	80		44		370			67		8	13		200		960	
AUG 31		6000	K11			76	19			.9	130			77		6		5.8	146		250	
APR 11 JUN 13	DATE	RI DI SO (M AS	ILO- DE, S- LVED IG/L (CL) 940) 7.0	RII DI SOI (MX AS (009	UO- DE, IS- LVED G/L F) 950)	DI SO (M A SI (00	LVED G/L	SOL (MG (703	DUE 80 5. C S- VED	CON TUE D SO (M (70	IDS, OF STI- NTS, IS- LVED G/L) 301)	SOI (TO PI AC- (703	IS- LVED ONS	D SO (T P D (70	IDS, IS- LVED ONS ER AY) 302)	NI S (A (O	ITRO- GEN, TRITE DIS- OLVED MG/L S N) 0613)	NIII SC (N AS	ITRO- GEN, FRATE DIS- DLVED 4G/L S N) 0618)	NO2 I SO (N AS (OO	TTRO- SEN, 14-NO3 DIS- DLVED MG/L 5 N) 0631)	
AUG 31	DATE	NI G AMM TO	TRO- EN, ONIA TAL	NIII	TRO- EN, ONIA IS- LVED G/L	NI G AMM D SO	TRO- EN, ONIA IS- LVED G/L	NII GEN, MONI	A + NIC	PHO	476 OS- ROUS TAL	PHO PHOF DI SOI	OS-ROUS	PHO	OS- ROUS THO, S- VED	AI	LUM- NUM, DIS- OLVED UG/L	ARS I SC	SENIC DIS- DLVED JG/L	BAF DI SOI		
APR · 11 JUN		(00	(N) (610)	AS (000	N) 608)	AS (71	NH4) 846) 0.08	AS (006	N)	AS (00	P) 665)	AS (006		AS (00		A	S AL) 1106) <10	AS	S AS) 1000)	AS	3 BA) 1005) 26	
		0	.020	0	.020		0.03	0	.40	0	.050	0.	020	<0	.010							
		0	.540	0	.090		0.12	0	.70	3	.80	0.	150	0	.020		<10		1		17	

### MOREAU RIVER BASIN

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### 06360500 MOREAU RIVER NEAR WHITEHORSE, SD--Continued

### WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	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)
APR										
11 JUN	<0.5	<1	1	<3	6	6	<5	120	3	<0.1
13 AUG										
31	<0.5	<1	<1	<3	7	41	<1	64	2	<0.1
DATE	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)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
APR										
11 JUN	<10	2	3	2.0	710	<6	4	1970	521	100
13 AUG								48	1.6	98
31	10	5	3	<1.0	250	<6	7	6810	6840	100

### 06392900 BEAVER CREEK AT MALLO CAMP, NEAR FOUR CORNERS, WY

LOCATION.--Lat 44°05'04", long 104°03'41", in NE½NE½ sec.4, T.47 N., R.60 W., Weston County, Hydrologic Unit 10120107, between U.S. Forest Service Road 811 and right bank at Mallo Campgrounds, 300 ft upstream from mouth, 800 ft upstream from dam on Stockade Beaver Creek, and 3.8 mi east of Four Corners.

PERIOD OF RECORD. --October 1974 to September 1982 (discontinued).

### PRECIPITATION RECORDS

PERIOD OF DAILY RECORD . --

PRECIPITATION: May to September 1989 (seasonal record).

INSTRUMENTATION. --Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 6,000 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Frecipitation gage is located 0.2 mi south of discontinued streamflow gaging station.

## ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1									.00	.00	.00	.00
2									.10	.00	.00	.00
3									.00	.00	.00	.00
4									.16	.00	.00	.00
5									.03	.00	.34	.00
6									.00	.00	.04	.00
7									.00	.00	.00	.05
8									.10	.00	.00	.31
9												
									.00	.00	.07	.24
10									.02	. 12	.02	.07
11									.02	.00	.16	.00
12									.12	.10	.00	.00
13									.02	.19	.00	.00
14									.00	.18	.00	.00
15									.00	.03	.05	.00
16									.76	.04	. 17	.00
17									.04	.08	.00	.00
18									.00	.00	.00	.00
19									.00	.00	. 22	.00
20									.03	.00	.00	1.27
21									.39	.00	.00	.18
22									.00	.00	.00	.03
23									. 17	.00	.03	.00
24									. 57	.00	.22	.00
25									.18	.00	.00	.00
26									.00	.06	.01	.00
27									.00	.00	.74	.03
28									.00	.20	.00	.00
29												.00
									.00	.00	.00	
30									.00	.00	.00	.00
31								.10		.00	.00	
TOTAL									2.71	1.00	2.07	2.18

### 06395000 CHEYENNE RIVER AT EDGEMONT. SD

- LOCATION.--Lat 43°18'20", long 103°49'14", in SW\sE\sE\sec.36, T.8 S., R.2 E., Fall River County, Hydrologic Unit 10120106, on right bank at downstream side of bridge on U.S. Highway 18, at Edgemont, 300 ft downstream from Burlington Northern Railroad bridge, and 600 ft upstream from Cottonwood Creek.
- DRAINAGE AREA. -- 7.143 mi<sup>2</sup>.
- PERIOD OF RECORD. -- June 1903 to November 1906 (no winter records), April 1928 to February 1933, October 1946 to current year.
- REVISED RECORDS. -- WSP 1086: Drainage area, WSP 1116: 1947. WDR SD-78-1: 1977.
- GAGE.--Water-stage recorder. Datum of gage is 3,414.56 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 1, 1906, nonrecording gage 20 ft upstream at datum 0.7 ft lower. Apr. 11, 1928, to Feb. 28, 1933, Oct. 4, 1946, to Oct. 23, 1947, and Jan. 11, 1961, to Apr. 24, 1963, nonrecording gage, and Oct. 24, 1947, to Jan. 10, 1961, and Apr. 25, 1963, to Sept. 30, 1972, water-stage recorder all at present site at datum 2.00 ft higher.
- REMARKS.--Records good except those for estimated daily discharges, which are poor. Many small reservoirs above station used for stock and irrigation water, total capacity, about 45,000 acre-ft. Several observations of water temperature and specific conductance were made during the year. U.S. Bureau of Reclamation satellite data-collection platform at station.
- AVERAGE DISCHARGE.--47 years, 93.1 ft<sup>3</sup>/s, 67,450 acre-ft/yr; median of yearly mean discharges, 72 ft<sup>3</sup>/s, 52,200 acre-ft/yr.
- EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,000 ft<sup>3</sup>/s, May 20, 1978, gage height, 13.65 ft, present datum; no flow at times most years.
- EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of May 12, 1920, reached a stage of 13.0 ft and May 1, 1922, 14.0 ft, present datum, from floodmarks at railroad bridge.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,500 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date Ti	me	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 22	2330	*1,610	*5.16	No other peak	greates	r than base	discharge.

No flow for many days.

### 06395000 CHEYENNE RIVER AT EDGEMONT, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e5.5	.72	e.90	e.60	e2.5	e.00	37	9.0	e10	.00	.00	.20
2	e5.0	.68	e1.0	e.60	e1.5	e.00	33	12	e9.0	.00	.00	.20
3	e4.5	.72	e1.5	e.80	e.60	e.00	31	31	e8.0	.00	.00	.20
4	e3.9	.54	e1.3	e.90	e.00	e.00	23	18	e10	.00	.00	.20
5	3.3	.24	e1.3	e1.0	e.00	e.00	22	11	e15	.00	.00	.20
6	3.2	.22	e1.5	e.80	e.00	e.00	20	8.9	e10	.00	.00	.20
7	3.2	.49	e1.5	e.60	e.00	e.00	19	7.9	e10	.00	.00	.20
8	2.9	.48	e1.2	e.40	e.00	e1.0	18	6.9	e7.0	.00	.00	2.1
9	2.3	.68	e1.0	e.50	e.00	e4.5	15	5.4	e6.0	.00	.00	1.4
10	2.4	1.1	e1.0	e.70	e.00	e10	15	5.2	e5.0	.50	.00	140
11	3.1	1.6	e1.0	e.70	e.00	e15	15	6.5	e4.0	.21	.00	353
12	3.8	1.5	e.90	e.80	e.00	e18	12	10	e3.0	.00	.00	191
13	4.2	1.2	e1.2	e.80	e.00	e18	10	18	e2.6	253	.00	125
14	4.3	1.3	e1.0	e.90	e.00	e18	11	175	2.2	56	.00	46
15	4.3	1.2	e.90	e1.0	e.00	e20	11	231	2.1	22	.06	24
16	3.9	.62	e.80	e1.5	e.00	e20	11	174	1.8	8.5	.12	17
17	2.7	. 53	e1.0	e1.5	e.00	e18	13	164	1.9	5.4	.00	13
18	1.8	1.0	e1.2	e1.5	e.00	e15	9.2	296	1.9	4.0	.03	8.8
19	1.5	1.4	e1.5	e1.5	e.00	e18	9.9	263	1.7	2.8	.20	7.3
20	1.2	.68	e1.5	e1.0	e.00	e22	8.6	176	1.3	1.9	.20	` 11
21	1.0	.51	e1.3	e1.5	e.00	e25	8.2	104	1.1	1.6	.20	193
22	.81	e.45	e1.3	e1.8	e.00	e30	8.8	73	1.2	1.3	.20	890
23	. 82	e.65	e1.0	e2.0	e.00	e40	9.7	e60	1.2	. 90	.27	e1300
24	. 85	e1.5	e.70	e1.5	e.00	e50	8.0	e40	2.1	. 57	.40	e750
25	.84	e1.0	e.55	e1.0	e.00	e70	6.6	e30	1.9	.27	. 40	e350
26	.85	e.90	e.45	e1.0	e.00	90	7.1	e20	1.3	.00	.23	e100
27	. 68	e.80	e.50	e1.2	e.00	115	12	e15	. 84	.00	2.0	e50
28	. 52	e.75	e.70	e1.5	e.00	82	8.8	e8.0	. 54	.00	. 67	e30
29	. 46	e.80	e.80	e1.8		64	9.3	e7.0	.24	.08	.40	22
30	.68	e.90	e.70	e2.0		54	11	e10	.03	.0	. 22	18
31	.77		e.70	e2.5		45		e15		.00	.20	
TOTAL	75.28	25.16	31.90	35.90	4.60	862.50	433.2	2010.8	122.95	359.03	5.80	4644.00
MEAN	2.43	.84	1.03	1.16	.16	27.8	14.4	64.9	4.10	11.6	.19	155
MAX	5.5	1.6	1.5	2.5	2.5	115	37	296	15	253	2.0	1300
MIN	.46	.22	.45	.40	.00	.00	6.6	5.2	.03	.00	.00	.20
AC-FT	149	50	63	71	9.1	1710	859	3990	244	712	12	9210

CAL YR 1988 TOTAL 4010.02 MEAN 11.0 MAX 192 MIN .10 AC-FT 7950 WTR YR 1989 TOTAL 8611.12 MEAN 23.6 MAX 1300 MIN .00 AC-FT 17080

e Estimated

### 06400000 HAT CREEK NEAR EDGEMONT. SD

LOCATION.--Lat 43°14'24", long 103°35'16", in SWkSEkNEk sec.25, T.9 S., R.4 E., Fall River County, Hydrologic Unit 10120108, on right bank at upstream side of bridge on State Highway 71, 2.4 mi upstream from mouth, 2.0 mi west of Heppner, and 12.5 mi southeast of Edgemont.

DRAINAGE AREA. -- 1,044 mi 2.

PERIOD OF RECORD. --April 1905 to September 1906, October 1950 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,295.71 ft above National Geodetic Vertical Datum of 1929. Non-recording gage Apr. 8, 1905, to May 2, 1906, at site 0.6 mi downstream and May 3 to July 7, 1906, at site 0.4 mi upstream at different datum. Nov. 6, 1950, to May 1, 1951, and July 18 to Sept. 7, 1975, nonrecording gage and May 2, 1951, to July 17, 1975, recording gage, at site 0.4 mi downstream at present datum.

REMARKS.--Records fair. A few small diversions upstream from station for irrigation. Lander ditch diverts water from Hat Creek 0.4 mi upstream from gaging station for irrigating hay meadows downstream from station. Several observations of water temperature and specific conductance were made during the year. Results of discharge measurements, in cubic feet per second, of Lander ditch during water year 1989 are given herewith:

Oct.	4	0	Mar.	23	2.20	July	11	0
Nov.	15	0	Apr.	20	0	Aug.		0
Jan.	10	0	May		0	Sept.		1.33
Feb.	23	0	June	13	0	1.57		

AVERAGE DISCHARGE.--40 years, 17.9 ft<sup>3</sup>/s, 12,970 acre-ft/yr; median of yearly mean discharges, 12 ft<sup>3</sup>/s, 8,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 13,300 ft<sup>3</sup>/s, June 16, 1967, gage height, 13.35 ft, from rating curve extended above 2,600 ft<sup>3</sup>/s on basis of slope-area measurement at 11.98 ft; maximum gage height, 14.16 ft, June 11, 1986; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 23	1445	*22	*8.39				

No flow for many days.

### 06400000 HAT CREEK NEAR EDGEMONT, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

							_					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	e.00	1.0	.13	1.1	.00	.00	.00
2	.00	.00	.00	.00	.00	e.00	.85	.12	1.1	.00	.00	.00
3	.00	.00	.00	.00	.00	e.00	.68	.11	.98	.00	.00	.00
4	.00	.00	.00	.00	.00	e.00	.59	.13	1.1	.00	.00	.00
									.84		.00	.00
5	.00	.00	.00	.00	.00	e.00	.45	.12	. 84	.00	.00	.00
6	.00	.00	.00	.00	.00	e.00	.36	.11	. 52	.00	.00	.00
7	.00	.00	.00	.00	.00	e.00	.48	. 11	.41	.00	.00	.00
8	.00	.00	.00	.00	.00	e.00	. 67	. 12	.30	.00	.00	.00
9	.00	.00	.00	.00	.00	e.05	.75	.11	. 26	.00	.00	.00
10	.00	.00	.00	.00	.00	e.10	.64	.16	.18	.00	.00	.00
11	.00	.00	.00	.00	.00	e.20	.62	.15	.10	.00	.00	.00
										.00	.00	.00
12	.00	.00	.00	.00	.00	e.20	. 57	.08	.0			
13	.00	.00	.00	.00	.00	e.15	. 52	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	e.10	.39	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	e.07	.38	.01	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	e.06	.33	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e.05	.27	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	e.05	.26	.51	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	e.05	.20	.16	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	e.05	.09	.29	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	9.05	.09	.25	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	e.08	.00	.49	.00	.00	.00	3.0
22	.00	.00	.00	.00	.00	e.10	.04	.25	.00	.00	e.00	.24
23	.00	.00	.00	.00	.00	e.15	.07	.07	.00	.00	.00	7.5
24	.00	.00	.00	.00	.00	.15	.06	.00	.00	.00	.00	4.7
25	.00	.00	.00	.00	.00	.15	.09	.00	.00	.00	.00	3.5
			•••		•						00	7.1
26	.00	.00	.00	.00	.00	. 18	.07	.07	.00	.00	.00	7.1
27	.00	.00	.00	.00	.00	. 17	. 15	.29	.00	.00	.00	3.1
28	.00	.00	.00	.00	e.00	. 26	. 13	.45	.00	.00	.00	1.1
29	.00	.00	.00	.00		. 42	. 13	. 54	.00	.00	.00	.20
30	.00	.00	.00	.00		.91	.11	. 62	.00	.00	.00	.00
31	.00		.00	.00		1.0		. 89		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	4.70	10.95	6.09	6.89	0.00	0.00	30.44
MEAN	.00	.00	.00	.00	.00	.15	.36	.20	.23	.00	.00	1.01
MAX	.00	.00	.00	.00	.00	1.0	1.0	.89	1.1	.00	.00	7.5
							.00		.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00		.00			.00	60
AC-FT	.0	.0	.0	.0	.0	9.3	22	12	14	.0	.0	80

CAL YR 1988 TOTAL 515.05 MEAN 1.41 MAX 71 MIN .00 AC-FT 1020 WTR YR 1989 TOTAL 59.07 MEAN .16 MAX 7.5 MIN .00 AC-FT 117

e Estimated

### 06400497 CASCADE SPRINGS NEAR HOT SPRINGS, SD

LOCATION.--Lat 43°20'10", long 103°33'07", in SE%SW% sec.20, T.8 S., R.5 E., Fall River County, Hydrologic Unit 10120106, on right bank near upstream end of culvert on State Highway 71, 3.3 mi upstream from mouth, and 8.3 mi southwest of Hot Springs.

DRAINAGE AREA. -- 0.47 mi 2.

PERIOD OF RECORD . -- July 1976 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,440 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 13 years, 20.2 ft 3/s, 14,630 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 49 ft<sup>3</sup>/s, July 4, 1977, gage height, 6.25 ft; minimum daily, 16 ft<sup>3</sup>/s, Mar. 16, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 19 ft<sup>3</sup>/s on many days; minimum daily discharge, 17 ft<sup>3</sup>/s, May 30 to June 5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL	UG SEP
DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL	1110
1 18 19 19 18 18 18 18 18 17 18	18 19
2 18 19 19 18 18 18 18 18 17 19	18 19
2 18 19 19 18 18 18 18 17 19 3 18 19 19 18 18 18 19 18 17 19 4 18 19 19 18 18 18 19 18 17 19	18 e19
4 18 19 19 18 18 18 19 18 17 19	18 e19
5 18 19 19 18 18 19 18 17 18	18 e19
6 18 19 19 18 18 18 19 18 18 18	18 e19
7 18 19 19 18 18 18 18 19 18 18	18 e19
8 18 19 19 18 18 18 18 19 18 18	18 e19
9 18 19 19 18 18 18 18 18 18 18 18	18 e19
10 18 19 19 18 18 19 18 18 18	18 e19
11 18 19 19 18 18 18 19 18 18 18	18 e19
12 18 19 19 18 18 18 19 18 18 18	19 e19
13 18 19 19 18 18 18 19 18 18 18	19 e19
14 18 19 19 18 18 18 19 18 18 18	19 e19
15 18 19 19 18 18 19 18 18 18	19 e19
16 18 19 19 18 18 18 19 18 18 18	19 e18
17 18 19 19 18 18 18 19 18 18 18	19 e18
18 18 19 19 18 18 18 19 18 18 18	19 e18
19 18 19 19 18 18 18 19 18 19 18	19 e18
20 18 19 18 18 18 18 19 18 18 18	19 e18
21 18 19 18 18 18 18 19 18 18 18	19 e18
22 18 19 18 18 18 18 19 18 18 18	19 e18
23 18 19 18 18 18 18 19 18 18 18	19 e18
24 18 19 18 18 18 18 19 18 18 18	19 e18
25 18 19 18 18 18 19 18 18 18	19 e18
26 18 19 18 18 18 18 19 18 18 18	19 e18
27 18 19 18 18 18 18 18 18 19 18	19 e18
28 18 19 18 18 18 18 18 18 19 18	19 e18
29 18 19 18 18 18 18 18 19 18	19 18
30 18 19 18 18 18 18 17 19 18	19 18
31 18 18 18 17 18	19
TOTAL 558 570 577 558 504 558 561 558 540 561	78 555
	.6 18.5
MAX 18 19 19 18 18 18 19 19 19 19	19 19
MIN 18 19 18 18 18 18 18 17 17 18	18 18
	50 1100

CAL YR 1988 TOTAL 7025 MEAN 19.2 MAX 20 MIN 18 AC-FT 13930 WTR YR 1989 TOTAL 6678 MEAN 18.3 MAX 19 MIN 17 AC-FT 13250

e Estimated

### 06400875 HORSEHEAD CREEK AT OELRICHS, SD

LOCATION.--Lat 43°11'17", long 103°13'34", in SWkSWkSWkSWk sec.7, T.10 S., R.8 E., Fall River County, Hydrologic Unit 10120106, on left bank on downstream side of bridge on Highway 18, 1.5 mi upstream (corrected) from Lone Well Creek, and 0.6 mi northeast of Oelrichs.

DRAINAGE AREA. -- 187 mi<sup>2</sup>.

PERIOD OF RECORD .-- June 1983 to current year.

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 3,320 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records good .

AVERAGE DISCHARGE. -- 6 years, 6.94 ft3/s, 5,030 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,620 ft<sup>3</sup>/s, June 11, 1986, gage height, 17.23 ft, no flow for many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15 ft3/s at 1215 hours, July 27, gage height, 3.20 ft; no flow for many days.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			,		M	EAN VALUES	3					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
•	.00	.00	.00	.00	.00	.00	.00	.00	.00			
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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
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	e.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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	.07	.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	. 56	.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
30	.00	.00	.00	.00		.00	.00	.00	.00	.00	.00	.00
31	.00		.00	.00		.00		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00
					0.00				.00	.020	.00	.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00				
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	. 56	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	.0	. 0	1.2	.0	.0

CAL YR 1988 TOTAL 49.51 MEAN .14 MAX 30 MIN .00 AC-FT 98 WTR YR 1989 TOTAL 0.63 MEAN .002 MAX .56 MIN .00 AC-FT 1.2

e Estimated

### 06401000 ANGOSTURA RESERVOIR NEAR HOT SPRINGS. SD

LOCATION.--Lat 43°20'35", long 103°26'16", in SWkNWk sec.20, T.8 S., R.6 E., Fall River County, Hydrologic Unit 10120106, at dam on Cheyenne River, 6.5 mi southeast of Hot Springs.

DRAINAGE AREA. -- 9,100 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- October 1949 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Aug. 26, 1965, nonrecording gage at same site and datum.

REMARKS.--Reservoir formed by concrete gravity dam with earth embankment with gated concrete gravity spillway section. Storage began Oct. 3, 1949; dam completed December 1949. Conservation capacity, 82,443 acre-ft between elevations 3,139.75 ft (invert of lowest outlet) and 3,187.2 ft (top of spillway gates). Dead storage below elevation 3,139.75 ft, 8,598 acre-ft. Figures given herein represent contents above elevation 3,139.75 ft. Water stored for irrigation.

COOPERATION. -- Records of elevation, contents, and diversions to Angostura project provided by Bureau of

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 145,200 acre-ft, June 18, 1962, elevation, 3,189.00 ft; minimum observed since normal operating level reached, 45,350 acre-ft, Sept. 28, 1960, elevation, 3,162.90 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 68,867 acre-ft, May 31, elevation, 3,173.46 ft; minimum, 48,302 acre-ft, Aug. 31, elevation, 3,166.37 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 Elevation Contents Change in contents Date (acre-feet) (acre-feet) (feet) 3.169.32 56,409 Sept. 30 +342 56,751 Oct. 31 3,169.44 Nov. 30 3,169.83 57.866 +115 +1,475 Dec. 31 3,170.34 59,341 -30,199 3,170.77 60,604 +1,263 62,004 +1,400 Feb. 3,171,24 66,845 +4,841 Mar. 3.172.32 68.644 +1,799 Apr. 30 3,173,39 +223 31 3,173.46 68.867 May -3,945 June 30 3,172.20 64,922 57,929 July 31 3,169.63 -6,993 48,302 51,772 3,166.37 -9.627 31 Aug. +3.470 Sept. 30 3,167.66 -5.637

### 06401500 CHEYENNE RIVER BELOW ANGOSTURA DAM, SD

LOCATION.--Lat 43°20'42", long 103°26'12", in NE½NW½NW½ sec.20, T.8 S., R.6 E., Fall River County, Hydrologic Unit 10120109, on right bank 800 ft downstream from Angostura Dam, 4.8 mi upstream from Fall River, and 6.5 mi southeast of Hot Springs.

DRAINAGE AREA. -- 9,100 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year, seasonal records only beginning October 1978. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS. -- WSP 1309: 1946(M). WDR SD-78-1: 1962(M). 1967(M). 1971(M).

GAGE.--Water-stage recorder. Datum of gage is 3,058.02 ft above National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark). Prior to Oct. 17, 1946, nonrecording gage and Oct. 17, 1946, to July 7, 1953, water-stage recorder at site 4.8 mi downstream at different datum.

REMARKS.--Records good. Flow regulated by Angostura Dam 800 ft upstream since October 1949. Several observations of water temperature and specific conductance were made during period. U.S. Bureau of Reclamation satellite data-collection platform at station.

AVERAGE DISCHARGE --33 years (water years 1945-78), 78.5 ft<sup>3</sup>/s, 56,870 acre-ft/yr; median of yearly mean discharges, 52 ft<sup>3</sup>/s, 37,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,300 ft<sup>3</sup>/s, May 20, 1978, gage height, 15.97 ft, from rating curve extended above 12,000 ft<sup>3</sup>/s; no flow Oct. 9, 1949, to Feb. 5, 1950, Apr. 28, Aug. 26, 30, 1951.

EXTREMES FOR CURRENT PERIOD --Maximum discharge, 2.2 ft<sup>3</sup>/s at 1815 hours, July 13, gage height, 2.92 ft; minimum daily discharge, 0.87 ft<sup>3</sup>/s, Feb. 1, May 16, and July 26, 31.

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

						DAM VALUE						
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					. 87	1.5	1.1	1.0	1.4	1.2		
2					1.1	1.4	1.1	1.0	1.4	1.1		
3					.99	1.5	1.1	1.1	1.4	1.1		
4					.98	1.4	1.1	.99	1.4	1.1		
5					.98	1.5	1.1	.98	1.4	1.1		
6					.98	1.3	1.1	.95	1.4	1.1		
7					. 98	1.2	1.1	1.0	1.4	1.1		
8					. 96	1.2	1.1	1.1	1.6	. 95		
9					1.2	1.2	1.1	1.1	1.6	.97		
10					1.2	1.3	1.0	1.0	1.5	1.0		
11					1.2	1.3	1.0	.94	1.5	1.0		
12					1.2	1.4	1.0	. 99	1.5	1.0		
13					1.2	1.5	1.0	.98	1.6	1.2		
14					1.2	1.4	1.1	. 94	1.6	1.2		
15					1.2	1.3	1.1	.89	1.6	1.2		
16					1.2	1.5	1.2	. 87	1.5	1.1		
17					1.2	1.4	1.3	.89	1.5	1.0		
18					1.1	1.3	1.1	.89	1.4	.98		
19					1.1	1.3	1.0	.94	1.4	.98		
20					1.1	1.3	.99	1.0	1.4	.99		
21					1.1	1.3	1.0	1.1	1.5	.95		
22					1.1	1.3	1.0	1.1	1.5	.95		
23					1.1	1.3	1.1	1.1	1.5	.95		
24					1.1	1.2	1.1	1.1	1.5	. 93		
25					1.1	1.1	1.2	1.2	1.4	.92		
26					1.2	1.1	1.1	1.2	1.3	.87		
27					1.3	1.1	1.2	1.2	1.3	.89		
28					1.4	1.1	1.1	1.2	1.2	. 90		
29						1.1	1.1	1.4	1.2	. 94		
30						1.2	1.1	1.5	1.3	.88		
31						1.1		1.5		. 87		
TOTAL					31.34	40.1	32.69	33.15	43.2	31.42		
MEAN					1.12	1.29	1.09	1.07	1.44	1.01		
MAX					1.4	1.5	1.3	1.5	1.6	1.2		
MIN					. 87	1.1	.99	. 87	1.2	. 87		
AC-FT					62	80	65	66	86	62		

### 06402000 FALL RIVER AT HOT SPRINGS, SD

LOCATION. -- Lat 43°25'50", long 103°28'33", in NWkNWk sec. 24, T.7 S., R.5 E., Fall River County, Hydrologic Unit 10120109, on left bank at intersection of River Street and University Avenue in Hot Springs, and 6.0 mi upstream from mouth.

DRAINAGE AREA. -- 137 mi 2.

PERIOD OF RECORD .-- October 1937 to current year. Monthly discharge only for October 1937, published in WSP 

REVISED RECORDS. -- WSP 1279: 1938, 1941(M), 1947(M). WSP 1729: 1959(M).

GAGE. -- Water-stage recorder. Datum of gage is 3,413.20 ft above National Geodetic Vertical Datum of 1929. Prior to June 2, 1939, nonrecording gage at site 300 ft upstream at datum 3.00 ft higher.

REMARKS.--Records good. Flow regulated by dam forming Coldbrook Reservoir, capacity, 7,200 acre-ft, since September 1952, and dam forming Cottonwood Springs Lake, capacity, 8,385 acre-ft since June 1969. Some diversion above station for municipal supply of Hot Springs. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 52 years, 24.6 ft 3/s, 17,820 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft<sup>3</sup>/s, Sept. 4, 1938, gage height, 18.4 ft, site and datum then in use, from rating curve extended above 51 ft<sup>3</sup>/s on basis of weir formula and slope-area measurement of peak flow; minimum, 4.0 ft<sup>3</sup>/s, Sept. 23, 1940.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 143 ft<sup>3</sup>/s at 2315 hours, July 10, gage height, 3.48 ft, from floodmarks; minimum daily discharge, 18 ft<sup>3</sup>/s, Sept. 6, 29, 30.

MEAN VALUES DAY SEP OCT NOV DEC JAN FEB MAR APR MAY TIIN. JIII. AUG 2.2 2.2 TOTAL 19.9 MEAN 21.5 22.8 21.8 21.3 21.7 23.0 21.1 20.2 22.5 21.1 21.1 MAX MIN AC-FT 

**CAL YR 1988** TOTAL 7859 MEAN 21.5 MAX 34 MIN 15 AC-FT 15590 WTR YR 1989 TOTAL 7839 MEAN 21.5 MAX 26 MIN 18 AC-FT 15550

### 06402500 BEAVER CREEK NEAR BUFFALO GAP, SD

LOCATION.--Lat 43°28'00", long 103°18'20", in NE\SE\ sec.5, T.7 S., R.7 E., Fall River County, Hydrologic Unit 10120109, on left bank 1.5 mi south of Buffalo Gap and 4.5 mi upstream from mouth.

DRAINAGE AREA. -- 130 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1937 to current year. Monthly discharge only for October, November, 1957, published in WSP 1309.

REVISED RECORDS. -- WSP 956: 1941. WSP 1309: 1939-40(M). 1947(M).

GAGE.--Water-stage recorder. Elevation of gage is 3,150 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to June 20, 1939, nonrecording gage at site 0.8 mi downstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Nearly all flow is diverted above station during irrigation season. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 52 years, 7.07 ft3/s, 5,120 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 11,700 ft<sup>3</sup>/s, Sept. 4, 1938, gage height, 16.46 ft, site and datum then in use, from rating curve extended above 11 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in some years.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood in 1927 reached a stage of 18.0 ft, former site and datum, from information by local residents.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 24 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 22	1600	*18	4.65	Feb. 10	0400	a	*5.17

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 0.23 ft<sup>3</sup>/s, July 10.

DAY   OCT   NOV   DEC   JAN   FEB   MAR   AFR   MAY   JUN   JUL   AUG   SEP						1	MEAN VALUE	S .					
2 7.2 8.3 8.9 9.9 9.4 e8.0 8.9 6.1 2.5 5.5 4.3 2.1 4 7.0 8.1 9.0 9.8 e8.5 e7.5 8.9 3.7 2.7 4.5 4.3 2.1 5 5.7 8.1 9.2 9.8 e6.0 e6.5 8.8 3.2 2.6 3.7 4.1 2.1 5 5.7 8.1 9.2 9.8 e6.0 e6.5 8.8 3.2 2.6 3.7 4.1 2.1 5 5.5 8.8 8.2 8.4 e8.5 e7.0 e9.0 8.7 3.1 2.5 2.9 4.1 4.4 2.1 8 5.8 8.2 8.4 e8.5 e7.0 e9.0 8.7 3.1 2.5 2.9 4.1 4.4 8.6 10 5.5 8.8 8.2 8.4 e8.5 e7.0 e9.0 8.7 3.1 2.5 2.2 4.1 4.4 8.6 10 5.5 8.3 8.9 e9.0 e1.0 10 9.5 3.0 2.3 2.3 2.3 4.1 8.6 10 5.5 8.3 8.9 e9.0 e1.0 10 9.5 3.0 2.3 2.3 4.1 9.3 11 5.6 8.3 8.8 9.9 e1.0 9.9 8.5 3.0 2.3 2.3 4.1 9.3 11 5.6 8.3 8.8 9.9 e1.0 9.9 8.5 3.0 2.0 2.8 2.3 4.1 9.3 13 7.6 8.1 8.8 9.8 9.9 10 2.5 3.2 2.0 3.8 2.9 8.3 14 7.6 8.2 8.7 10 10 10 2.4 3.3 1.6 61 1.6 4.7 1.5 8.0 8.5 8.6 10 10 10 2.4 3.3 1.8 5 1.6 61 1.6 4.7 1.5 8.0 8.5 8.6 10 9.9 10 2.4 3.3 1.8 5 1.6 61 1.6 4.7 1.4 8.8 1.8 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.6 1.1 1.6 8.2 8.4 8.6 10 9.9 10 2.3 2.9 8.1 5.3 1.4 7.4 1.8 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 5.5 1.3 4.8 19 8.1 8.3 8.5 10 10 10 10 1.8 2.8 7.7 1.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 1.5 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 7.7 1.5 1.3 4.8 4.5 2.9 8.3 8.8 10 10 9.9 7.1 2.3 8.1 3.7 1.8 4.5 2.9 8.3 1.4 7.4 4.5 2.9 8.9 8.9 11 9.9 10 6.8 2.4 7.0 3.6 3.7 4.5 2.9 8.3 1.5 3.0 1.3 4.7 4.5 2.9 8.2 8.8 8.0 10 10 10 10 1.8 2.8 7.0 3.8 8.8 3.9 1.1 1.5 4.3 11 1.5 4.5 11 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.	DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3 7.3 8.3 8.8 9.8 e8.5 e7.5 8.9 3.7 2.7 .45 4.3 2.1 5 5.7 8.1 9.0 9.8 e7.0 e7.5 8.6 3.6 2.9 .47 4.1 2.1 5 5.7 8.1 9.2 9.8 e6.0 e6.5 8.8 3.2 2.6 .37 4.1 2.1 6 5.6 8.2 9.2 9.8 e6.0 e6.5 8.8 3.2 2.6 .37 4.1 2.1 6 5.6 8.2 9.2 9.8 e6.0 e6.5 8.8 3.2 2.6 .37 4.1 2.1 6 5.6 8.1 8.5 10 e6.0 e8.0 8.9 3.0 2.3 .32 4.3 2.1 7 5.6 8.1 8.5 10 e6.0 e8.0 8.9 3.0 2.3 .32 4.3 2.1 8 5.8 8.2 8.4 e8.5 e7.0 e8.0 8.9 3.0 2.3 .32 4.3 2.1 8 5.8 8.2 8.4 e8.5 e7.0 e8.0 8.7 3.1 2.5 .29 4.1 4.4 9 5.6 8.2 8.5 e6.0 e8.5 11 9.5 3.2 2.5 .24 4.1 8.6 10 5.5 8.3 8.9 e9.0 e10 10 9.5 3.2 2.5 .24 4.1 9.3 11 5.6 8.3 8.9 e9.0 e10 9.8 5.6 3.0 2.3 .23 4.1 9.3 11 5.6 8.3 8.8 9.9 e10 9.8 5.6 3.0 1.9 2.4 2.2 8.3 13 7.6 8.1 8.8 9.8 9.9 10 2.5 3.2 2.0 3.8 2.9 8.3 14 7.6 8.2 8.7 10 10 10 2.4 3.3 1.6 6.61 1.6 4.7 15 8.0 8.5 8.6 10 10 10 2.4 3.3 1.6 6.61 1.6 4.7 15 8.0 8.5 8.6 10 10 10 2.4 3.3 1.6 6.61 1.6 4.7 1.1 16 8.2 8.4 8.8 10 e9.0 10 2.5 3.2 2.0 3.8 2.9 8.3 17 8.6 8.3 8.8 10 e9.0 10 2.5 3.2 2.8 77 5.50 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 77 5.50 1.3 4.8 19 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 77 5.50 1.3 4.8 19 8.1 8.3 8.7 10 10 10 10 1.9 2.8 7.7 5.50 1.3 4.8 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.7 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.1 8.3 8.5 10 10 10 10 1.8 2.8 67 41 1.5 4.3 19 8.9 8.9 11 9.9 10 6.8 2.4 7.7 3.6 3.7 2.0 4.9 2.2 7.9 8.8 8.8 8.0 10 9.9 7.2 2.3 8.1 3.7 1.8 4.5 2.9 8.8 8.1 8.0 9.9 10 9.8 7.2 2.3 5.6 4.5 4.5 1.4 4.5 2.9 8.8 8.1 8.0 9.9 10 9.9 7.2 2.3 5.6 4.5 4.5 1.4 4.5 2.9 8.8 8.1 8.0 9.9 10 9.9 7.2 2.3 5.6 4.5 4.5 1.4 4.5 3.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1													
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13													
14 7.6 8.2 8.7 10 10 10 10 2.4 3.3 1.6 61 1.6 4.7 15 8.0 8.5 8.6 10 10 10 10 2.4 3.3 1.6 .59 1.6 1.1 16 8.2 8.4 8.6 10 9.9 10 2.1 3.3 8.2 .57 1.4 4.3 17 8.6 8.3 8.8 10 e9.0 10 2.3 2.9 81 .53 1.4 7.4 18 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 .77 .50 1.3 4.8 19 8.1 8.3 8.7 10 10 10 10 1.9 2.8 .72 .45 1.4 2.9 20 8.1 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3 21 7.9 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3 21 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5 24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 8.1 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.1 2.3 8.1 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 81 4.0 .69 4.5 28 8.1 9.0 e7.0 10 10 9.9 7.2 2.3 81 4.0 .69 4.5 28 8.1 9.0 e7.0 10 10 9.9 7.2 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 4.6 1.1 4.8 31 8.3 e9.0 10 8.8 8.7 2.3 .56 4.5 4.6 1.1 4.8 31 8.3 e9.0 10 8.8 8.2 2.3 .56 4.5 4.6 1.1 4.8 31 8.3 8.5 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 e8.0 10 8.9 2.6 4.4 1.5							9.8						
15 8.0 8.5 8.6 10 10 10 2.4 3.3 .87 .59 1.6 1.1  16 8.2 8.4 8.6 10 9.9 10 2.1 3.3 .82 .57 1.4 4.3  17 8.6 8.3 8.8 10 e9.0 10 2.3 2.9 .81 .53 1.4 7.4  18 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 .77 .50 1.3 4.8  19 8.1 8.3 8.7 10 10 10 1.9 2.8 .72 .45 1.4 2.9  20 8.1 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3  21 7.9 8.3 8.5 10 10 10 10 1.6 2.9 .68 .37 2.0 4.9  22 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6  23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5  24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5  25 7.9 8.8 e8.0 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5  25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5  26 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5  26 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5  27 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5  28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5  29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5  30 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5  31 8.3 e9.0 10 8.9 2.6 4.4 1.5  TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3  MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58  MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3  MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1			8.1	8.8	9.8	9.9	10	2.5	3.2	2.0	.38	2.9	
16 8.2 8.4 8.6 10 9.9 10 2.1 3.3 82 .57 1.4 4.3 17 8.6 8.3 8.8 10 e9.0 10 2.3 2.9 81 .53 1.4 7.4 18 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 .77 .50 1.3 4.8 19 8.1 8.3 8.7 10 10 10 10 1.9 2.8 .72 .45 1.4 2.9 20 8.1 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3 21 7.9 8.9 8.9 8.9 11 9.9 10 4.3 2.8 .67 .41 1.5 4.3 22 7.9 8.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 4.3 2.8 .70 1.3 4.7 4.5 24 8.1 8.8 8.8 10 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5 28 8.1 9.0 e7.0 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 29 8.2 9.2 e7.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5		7.6	8.2	8.7	10	10	10	2.4	3.3	1.6	.61	1.6	4.7
17 8.6 8.3 8.8 10 e9.0 10 2.3 2.9 .81 .53 1.4 7.4 18 8.1 8.3 8.7 10 10 e9.8 2.2 2.8 .77 .50 1.3 4.8 19 8.1 8.3 8.7 10 10 10 10 1.9 2.8 .72 .45 1.4 2.9 2.0 8.1 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3 2.9 2.9 8.9 8.9 11 9.9 10 1.8 2.8 .67 .41 1.5 4.3 2.3 7.9 8.6 8.7 10 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5 24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 2.5 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5 2.5 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 2.5 7.9 8.9 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 2.8 8.1 9.0 e7.0 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 2.9 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 3.0 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5 3.0 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5 3.0 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 3.1 8.3 e9.0 10 8.9 2.6 4.4 1.5 4.4 1.5 4.8 MAX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMAX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMAX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 3.1 1	15	8.0	8.5	8.6	10	10	10	2.4	3.3	. 87	. 59	1.6	1.1
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19 8.1 8.3 8.7 10 10 10 1.9 2.8 .72 .45 1.4 2.9 20 8.1 8.3 8.5 10 10 10 10 1.8 2.8 .67 .41 1.5 4.3    21 7.9 8.3 8.5 10 10 10 1.6 2.9 .68 .37 2.0 4.9 22 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5 24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 26 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 28 8.1 9.0 e7.0 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 11 9.5 7.8 2.9 4.8 1.53 2.5 2.4 5.58 MAX 8.6 9.2 9.2 11 11 9.5 7.8 2.9 4.8 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 11 9.5 7.8 2.9 4.8 7.9 3.3 1.1	17	8.6		8.8	10	e9.0	10	2.3	2.9	.81	. 53	1.4	
20 8.1 8.3 8.5 10 10 10 1.8 2.8 .67 .41 1.5 4.3  21 7.9 8.3 8.5 10 10 10 1.6 2.9 .68 .37 2.0 4.9  22 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6  23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5  24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5  25 7.9 8.8 e8.0 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5  26 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5  27 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5  28 8.1 9.0 e7.0 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5  29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5  30 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5  30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8  31 8.3 e9.0 10 8.9 2.6 4.4 1.5  TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3  MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58  MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3  MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1					10	10	e9.8	2.2	2.8				
21 7.9 8.3 8.5 10 10 10 1.6 2.9 .68 .37 2.0 4.9 22 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5 24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 26 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 1.5 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 1.5 1.5 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MMX 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1	19	8.1	8.3	8.7	10	10	10	1.9	2.8				
22 7.9 8.9 8.9 11 9.9 10 4.3 2.8 .70 1.3 4.7 4.6 23 7.9 8.6 8.7 10 9.9 10 6.8 2.4 .70 3.6 3.7 4.5 24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 3.7 1.8 4.5 25 7.9 8.8 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 26 7.9 8.9 e6.5 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5 28 8.1 9.0 e7.0 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5 31 8.3 e9.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1	20	8.1	8.3	8.5	10	10	10	1.8	2.8	. 67	.41	1.5	4.3
23					10								4.9
24 8.1 8.8 8.8 10 10 9.9 7.1 2.3 .81 3.7 1.8 4.5 2.5 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5    26 7.9 8.8 e6.5 10 10 9.8 7.5 2.2 .77 3.9 .52 4.5 2.7 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 2.8 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 2.9 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 1.5    TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1													
25 7.9 8.8 e8.0 10 10 9.9 7.2 2.3 .81 4.0 .69 4.5  26 7.9 8.8 e6.5 10 10 9.8 7.5 2.2 .77 3.9 .52 4.5  27 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5  28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5  29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5  30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8  31 8.3 e9.0 10 8.9 2.6 4.4 1.5  TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3  MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58  MMAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3  MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1													
26 7.9 8.8 e6.5 10 10 9.8 7.5 2.2 .77 3.9 .52 4.5 27 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 8.2 2.3 .56 4.5 .40 4.5 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1													
27 7.9 8.9 e6.5 10 10 9.7 8.3 2.5 .69 4.1 .44 4.5 28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1	25	7.9	8.8	e8.0	10	10	9.9	7.2	2.3	.81	4.0	.69	4.5
28 8.1 9.0 e7.0 10 10 9.6 8.7 2.3 .63 4.8 .39 4.5 29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1													4.5
29 8.2 9.2 e7.5 10 8.8 8.2 2.3 .56 4.5 .40 4.5 30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5 TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1					10	10							4.5
30 8.2 9.2 e8.0 10 8.8 7.9 2.6 .54 4.6 1.1 4.8 31 8.3 e9.0 10 8.9 2.6 4.4 1.5   TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3  MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58  MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3  MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1					10	10			2.3				
31 8.3 e9.0 10 8.9 2.6 4.4 1.5  TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3  MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58  MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3  MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1			9.2	e7.5	10								
TOTAL 227.1 253.6 263.1 304.3 256.5 288.4 188.8 97.3 44.45 47.55 78.24 137.3 MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1			9.2					7.9					
MEAN 7.33 8.45 8.49 9.82 9.16 9.30 6.29 3.14 1.48 1.53 2.52 4.58 MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1	31	8.3		e9.0	10		8.9		2.6		4.4	1.5	
MAX 8.6 9.2 9.2 11 10 11 9.5 7.8 2.9 4.8 4.7 9.3 MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1													
MIN 5.5 8.1 6.5 8.0 5.5 6.5 1.6 2.2 .54 .23 .39 1.1					9.82	9.16							
			9.2										
AC-FT 450 503 522 604 509 572 374 193 88 94 155 272	MIN	5.5	8.1	6.5	8.0	5.5	6.5	1.6	2.2	. 54			
	AC-FT	450	503	522	604	509	572	374	193	88	94	155	272

CAL YR 1988 TOTAL 2058.98 MEAN 5.63 MAX 17 MIN .11 AC-FT 4080 WTR YR 1989 TOTAL 2186.64 MEAN 5.99 MAX 11 MIN .23 AC-FT 4340

e Estimated

57

### 06403300 FRENCH CREEK ABOVE FAIRBURN, SD

LOCATION.--Lat 43°43'02", long 103°22'03", in SWkSWkNEk sec.11, T.4 S., R.6 E., Custer County, Hydrologic Unit 10120109, on right bank 500 ft upstream from concrete diversion dam, 1.0 mi southwest of landing strip in Custer State Park, 1.5 mi west of east boundary of Custer State Park, 2.6 mi southwest of abandoned Fairview School, and 3.5 mi southeast of Custer State Park Headquarters.

DRAINAGE AREA. -- 105 mi<sup>2</sup>, approximately.

PERIOD OF RECORD . -- April 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,850 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by dam forming Stockade Reservoir, capacity, 1,820 acre-ft, 21 mi upstream. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 7 years, 5.18 ft 3/s, 3.750 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 329 ft<sup>3</sup>/s, Mar. 7, 1987, gage height, 2.73 ft; minimum daily discharge, 0.02 ft<sup>3</sup>/s, Feb. 3-5, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4.6 ft<sup>3</sup>/s at 1945 hours, Aug. 14, gage height, 0.79 ft; maximum gage height, 2.13 ft, Mar. 8, backwater from ice; minimum daily discharge, 0.02 ft<sup>3</sup>/s, Feb. 3-5.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT · NOV DEC FEB JUN JUL AUG SEP JAN APR MAY 2.2 .25 .40 .56 1.3 e.90 e.10 e.15 2.4 1.1 .62 1.1 e.03 .56 1.8 1.4 e1.0 e.10 2.3 1.1 .52 .25 .34 .91 e.02 . 57 .23 3 . 56 1.6 1.4 e1.0 e.10 2.2 1.0 .33 .67 .56 2.5 1.3 e.90 e.02 2.3 62 .23 .29 .66 e.10 1.1 5 51 2. 5 1.2 e.50 e.02 58 21 .26 .72 e.15 2.2 1.3 6 .51 2.3 .17 30 82 1.2 e.40 e.03 e.30 2.1 1.4 46 .37 .73 .47 2.0 e.90 e.30 e.04 e.60 2.0 1.3 . 47 .16 .31 .99 8 .48 1.6 e.80 e.30 e.05 e2.0 1.9 1.2 .62 .16 9 .56 1.3 e.70 e.40 e.10 e2.5 1.8 1.0 .57 .14 .24 1.6 10 .54 1.2 e.80 e.50 .55 .12 .32 2.8 e.10 e2.5 1.9 . 88 .51 1.3 .89 .50 .36 2.7 e3.0 12 . 56 .92 .36 2.0 1.6 e.40 e.15 5.7 1.6 .82 . 46 . 16 .65 13 1.5 .97 e.40 e.20 3.4 1.5 1.1 .43 .32 1.3 e.50 1.5 1.2 .70 .68 1.6 e.80 e.25 .42 .82 4.4 1.2 .79 1.6 e.60 e.50 e.20 .38 .97 4.3 1.4 .58 16 .99 e.40 e.20 .37 .42 .85 1.3 e.50 4.1 1.4 1.3 .76 17 1.2 e.60 e.30 . 57 .46 .76 e.25 2.1 1.5 1.3 1.1 1.3 .71 18 e.60 e.40 1.5 45 . 86 .38 1.1 e.20 2.4 1.3 .77 . 84 32 .62 19 1.3 1.0 e.30 e.20 2.2 1.6 1.2 34 20 1.4 .78 .77 e.20 e.25 e2.0 1.6 1.2 .29 .72 .28 .77 21 2.0 .86 .96 e.20 e.30 e2.0 1.5 1.1 .29 .89 .29 2.1 .97 22 2.4 .78 .68 e.25 e.30 1.9 1.3 .37 .89 .27 2.7 23 2.4 e.70 e.60 e.25 e.30 2.1 1.2 .80 . 44 1.1 .31 2.3 2.7 e8.0 e.50 e.25 e.40 1.1 .78 .51 .40 1.8 2.2 2.2 e.80 e.50 e.20 e.50 .56 .82 1.5 1.4 .72 2.4 1.1 26 1.7 e.70 e.18 e.50 . 62 . 52 .66 2.2 A 40 3 0 1.1 1.1 e.70 2.1 2.7 1.4 40 1.3 e.30 e.18 e.45 3.5 1.2 .64 . 53 28 e.80 e.35 62 33 42 1.7 1.5 2.2 e.20 e.20 3.7 1.4 29 3.2 e.80 e.40 e.15 ---3.4 1.3 .62 .27 .40 1.2 1 4 .93 ---30 3.4 e.80 e.60 e.18 3.0 1.3 .62 .27 .50 1.3 31 2.8 e.80 e.20 ---2.5 .62 . 47 .80 TOTAL 41.09 46.82 24.51 12.24 5.45 48.9 30.92 13.75 15.39 19.60 39.65 71.80 MEAN .19 1.33 1.56 .79 .39 2.32 1.63 1.00 .46 .50 .63 1.32 MAX 3.4 1.4 1.0 .62 1.1 2.2 8.0 .50 5.7 2.4 1.4 2.8 MIN .47 .70 .30 .02 .27 .12 .24 .62 .15 . 10 1.1 . 62 39 AC-FT 82 93 49 61 27 31 24 11 142 97

CAL YR 1988 TOTAL 1138.87 MEAN 3.11 MAX 52 MIN .15 AC-FT 2260 WTR YR 1989 TOTAL 370.12 MEAN 1.01 MAX 8.0 MIN .02 AC-FT 734

e Estimated

#### 06404000 BATTLE CREEK NEAR KEYSTONE, SD

LOCATION.--Lat 43°52'21", long 103°20'10", in SW\sW\sec.18, T.2 S., R.7 E., Pennington County, Hydrologic Unit 10120109, at right downstream end county highway bridge, 0.6 mi downstream from Iron Creek, and 4.5 mi southeast of Keystone.

DRAINAGE AREA. -- 66 mi 2.

### WATER-DISCHARGE RECORDS

PERIOD OF RECORD .-- July 1945 to July 1947, October 1961 to current year.

GAGE. --Water-stage recorder. Elevation of gage is 3,800 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Nov. 13, 1961, nonrecording gage at site 250 ft downstream at different datum and Nov. 13 to Dec. 5, 1961, at same site at present datum. Dec. 6, 1961, to June 9, 1972, water-stage recorder at site 210 ft downstream at present datum (destroyed by flood); June 10 to Nov. 20, 1972, nonrecording gage 180 ft downstream at present datum; Nov. 21, 1972, to Nov. 27, 1973, water-stage recorder at present site and datum; Nov. 28, 1973, to Nov. 7, 1974, nonrecording gage 180 ft downstream at present datum.

REMARKS. -- Records good. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--29 years (water years 1946, 1962-89), 8.09 ft<sup>3</sup>/s, 5,860 acre-ft/yr; median of yearly mean discharges, 6.4 ft<sup>3</sup>/s, 4,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,200 ft<sup>3</sup>/s, June 9, 1972, gage height, 14.5 ft, from floodmarks, site then in use, from rating curve extended above 550 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow for some days in 1961, 1962, 1970, 1974, 1976, 1980-89.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date Time	Discharge (ft 3/s)	Gage height (ft)
Sept. 21	1245	*166	*4.52	No other peak greate	r than base	discharge.

No flow for many days.

		DISCHARGE,	IN CUI	BIC FEET		O, WATER S		1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	2.7	1.9	1.0	.42	.00	.00
2	.00	.00	.00	.00	.00	.00	2.3	1.8	.81	.25	.00	.00
3	.00	.00	.00	.00	.00	.00	2.3	1.8	1.4	.04	.00	.00
4	.00	.00	.00	.00	.00	.00	2.2	2.0	1.1	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	1.7	2.2	.77	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	2.1	2.2	.68	.00	.00	.00
7	.00	.00	.00	.00	.00		2.4	2.2	. 57	.00	.00	.00
						.00						
8	.00	.00	.00	.00	.00	1.3	2.4	2.1	. 58	.00	.00	.00
9	.00	.00	.00	.00	.00	3.6	2.2	2.2	. 52	.00	.00	.00
10	.00	.00	.00	.00	.00	3.2	1.9	2.1	.34	.00	.00	.00
11	.00	.00	.00	.00	.00	3.2	1.4	1.6	.30	.00	.00	1.1
12	.00	.00	.00	.00	.00	2.7	1.3	1.4	. 23	.00	.00	3.3
13	.00	.00	.00	.00	.00	3.8	1.3	2.0	. 16	.00	.00	3.2
14	.00	.00	.00	.00	.00	2.1	1.1	2.4	.20	.00	.00	2.9
15	.00	.00	.00	.00	.00	3.7	1.1	2.6	.17	.00	.00	2.5
16	.00	.00	.00	.00	.00	2.6	1.2	2.7	.14	.00	.00	2.3
17	.00	.00	.00	.00	.00	2.6	1.6	2.3	.72	.08	.00	1.9
18	.00	.00	.00	.00	.00	1.3	1.6	2.3	.78	.38	.00	1.7
19	.00	.00	.00	.00	.00	1.3	1.6	2.0	.39	.03	.00	1.5
20	.00	.00	.00	.00	.00	1.6	1.6	1.7	.22	.00	.00	2.0
21	.00	.00	.00	.00	.00	1.6	1.5	1.5	. 26	.00	.00	64
22	.00	.00	.00	.00	.00	1.4	1.4	1.2	.20	.00	.00	33
23	.00	.00	.00	.00	.00	1.6	1.3	1.0	. 17	.00	.00	16
24	.00	.00	.00	.00	.00	1.9	1.3	.86	.81	.00	.00	12
25	.00	.00	.00	.00	.00	2.2	1.1	.78	1.2	.00	.00	8.8
	.00	.00	.00	.00	.00	2.2						
26	.00	.00	.00	.00	.00	2.9	1.2	.68	1.5	.00	.00	7.4
27	.00	.00	.00	.00	.00	3.1	1.9	.62	1.3	.00	.00	6.6
28	.00	.00	.00	.00	.00	3.4	2.8	. 57	1.2	.00	.00	6.1
29	.00	.00	.00	.00		3.4	2.5	.49	. 87	.00	.00	5.0
30	.00	.00	.00	.00		3.0	2.2	.77	.57	.00	.00	4.7
31		.00	.00	.00	- 10			1.0	.5/	.00	.00	7./
31	.00		.00	.00		2.8		1.0		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	60.30	53.2	50.97	19.16	1.20	0.00	186.00
MEAN	.00	.00	.00	.00	.00	1.95	1.77	1.64		.039	.00	6.20
MAX	.00	.00	.00	.00	.00	3.8	2.8	2.7	1.5	.42	.00	64
MIN	.00	.00	.00		.00	.00	1.1	.49	.14	.00	.00	.00
				.00					38	2.4	.00	369
AC-FT	.0	.0	.0	.0	.0	120	106	101	30	2.4	.0	309

CAL YR 1988 TOTAL 211.43 MEAN .58 MAX 7.0 MIN .00 AC-FT 419 WTR YR 1989 TOTAL 370.83 MEAN 1.02 MAX 64 MIN .00 AC-FT 736

### 06404000 BATTLE CREEK NEAR KEYSTONE, SD--Continued

### PRECIPITATION RECORDS

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION.--Shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 3,815 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

REMARKS.--Records fair except those for estimated periods, which are poor. Gage is located 0.1 mi east of streamflow gaging station, and is read daily by observer.

					SUM	MATION VA	LUES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.13	.10	e.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	e.07	.06	e.04	.00	.02	.00	.00	.00
3	.00	.00	.00	.00	e.13	.38	e.00	.12	.15	.00	.00	.04
4	.00	.00	.00	.00	e.01	.00	.00	. 16	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.35	.00
6	.00	.08	.00	.00	.00	.00	.00	.00	.05	.00	.00	. 52
7	.00	.00	.18	.00	.00	.00	.00	.00	.04	.00	.00	e.92
8	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00	e.70
9	.00	.15	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.27
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.48
11	.00	.55	.00	.00	.00	.00	.00	.00	.00	.00	.22	.00
12	.00	.00	.00	.00	.00	.01	.00	.39	.00	.06	.00	.00
13	.00	.18	.00	.00	.00	.20	.00	.30	.10	.75	.00	.00
14	.00	.00	.00	.00	.00	.07	.00	.10	.00	.35	.10	.00
15	.06	.00	.01	.00	.02	.00	.00	. 26	.00	.00	.00	.00
16	.43	.00	.00	.00	.06	e.10	.16	.00	. 62	.30	.55	.00
17	.00	e.00	.00	.00	.00	e.31	.00	. 11	.00	.32	.00	.03
18	.00	e.00	.00	.00	.08	.00	.00	.00	.00	.00	.00	e.25
19	.04	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.20	e1.75
20	.00	e.00	.00	.00	.00	.00	.00	.00	.20	.00	.10	.00
21	.00	e.00	.00	.02	.00	.00	.00	.00	.00	.00	.00	.03
22	.00	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	e.00	.00	.00	.00	.00	.00	.00	. 65	.00	.75	.00
25	.00	e.00	e.05	.00	.00	.00	.08	.00	.35	.00	.00	.00
26	.00	.00	e.30	.00	.10	.00	.20	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.18	e.00	.00	.00	.00	.00	.00
28	.00	.10	.00	.00	.02	.00	e.45	.00	.00	. 14	.00	.00
29	.00	.00	.00	.00		.00	.05	.00	.00	.00	.00	.00
30	.00	.00	.00	.00		.02	.00	.33	.00	.00	.00	.00
31	.00		.00	.00		.00		. 22		.00	.00	
TOTAL	0.53	1.10	0.54	0.02	0.62	1.43	1.16	1.99	2.18	1.92	2.27	4.99

e Estimated

### 06404800 GRACE COOLIDGE CREEK NEAR HAYWARD, SD

DRAINAGE AREA. -- 7.48 mi 2.

PERIOD OF RECORD. -- January to September 1989.

GAGE.--Water-stage recorder and compound V-notch weir. Elevation of gage is 4,780 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for daily discharges less than 0.20 ft<sup>3</sup>/s, which are fair. Several observations of water quality and sediment were made during the year. Results of discharge measurements, in cubic feet per second, outside period of record are given herewith:

 July 22, 1988
 0.14
 Dec. 1, 1988
 0.16

 Aug. 3, 1988
 0.97
 Jan. 5, 1989
 0.14

 Oct. 22, 1988
 0.70

EXTREMES FOR CURRENT PERIOD. -- Peak discharges greater than base discharge of 15 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 21	0645	*25	*6.22	No other	peak great	er than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 0.04 ft<sup>3</sup>/s, Feb. 3-5, 8, 9, Sept. 5, 6.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					.05	.06	.33	.31	.28	.12	.05	.05
2					.05	.06	.29	.28	.21	.12	.05	.05
3					.04	.06	.26	.31	.27	.11	.05	.05
4					.04	.06	. 23	.35	.32	.10	.05	.05
5					.04	.06	. 22	.35	.22	.09	.05	.04
6					.05	.06	.32	.30	. 17	.09	.07	.04
7					.05	.08	.37	.27	. 47	.09	.05	. 12
8					.04	.08	.30	.26	. 53	.09	.05	.45
9					.04	. 17	.22	.25	.31	.08	.05	. 56
10					.05	.36	.21	.22	.21	.08	.06	.72
11					.05	.29	.23	.21	.17	.08	.06	1.1
12					.05	.30	.25	. 26	.14	.08	.05	.99
13					.05	.34	.28	. 57	.13	.10	.05	.80
14					.06	.24	. 28	. 52	.14	.17	.07	. 65
15					.06	. 18	. 29	.39	. 13	.24	.06	. 54
16					.06	.15	.33	.36	.11	.18	.07	.46
17					.06	. 12	.35	.33	.34	.15	.11	.41
18					.06	.11	.33	.29	.19	. 13	.11	.37
19					.07	.11	.30	.24	.13	.11	.08	.35
20					.07	. 12	.31	. 20	.11	.09	.07	.60
21					.07	. 13	.30	.20	.12	.08	.07	13
22					.07	.15	. 29	.20	. 15	. 07	.06	6.4
23					.07	. 20	. 27	.19	.18	.06	.06	4.2
24					.07	. 26	. 25	. 17	.48	.06	.06	3.2
25					.07	. 33	. 24	. 15	. 46	.06	.06	2.5
26				e.06	.06	. 43	.28	.15	.43	.05	.05	2.2
27				.06	.06	. 44	. 52	.16	.26	.05	.05	2.0
28				.06	.06	. 44	. 43	.16	.18	.06	.05	1.8
29				.06		.37	.35	.15	.14	.06	.05	1.8
30				.06		.28	.39	.30	.12	.06	.05	1.7
31				.07		. 29		.31		.06	.05	
TOTAL					1.57	6.33	9.02	8.41	7.10	2.97	1.87	47.20
MEAN					.056	. 20	.30	.27	.24	.096	.060	1.57
MAX					.07	. 44	. 52	. 57	. 53	.24	.11	13
MIN					.04	.06	.21	.15	.11	.05	.05	.04
AC-FT					3.1	13	18	17	14	5.9	3.7	94

e Estimated

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#### CHEYENNE RIVER BASIN

## 06404998 GRACE COOLIDGE CREEK NEAR GAME LODGE, NEAR CUSTER, SD

LOCATION.--Lat 43°45'40" long 103°21'49", in SWkNEk sec.26, T.3 S., R.6 E., Custer County, Hydrologic Unit 10120109, on right bank 0.3 mi downstream from bridge on U.S. Highway 16A, 0.9 mi east of Game Lodge, 1.5 mi southwest of junction of State Highway 36 and U.S. Highway 16A, and 11.5 mi east of Custer.

DRAINAGE AREA. -- 25.2 mi 2.

PERIOD OF RECORD . -- October 1976 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,100 ft above National Geodetic Vertical Datum of 1929, from topographic map. From July 17, 1945, to July 31, 1947, nonrecording gage at site 1,800 ft upstream and different datum. June 1967 to June 13, 1976, at site 500 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Considerable losses in sinkholes downstream from gage. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 13 years, 2.71 ft3/s, 1,960 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 1,030 ft<sup>3</sup>/s, Sept. 7, 1989, gage height, 10.84 ft, from floodmarks, from rating curve extended above 709 ft<sup>3</sup>/s based on slope-area measurement of peak flow; maximum gage height, 12.76 ft, Feb. 9, 1979, backwater from ice; no flow June 5-9, July 6, 8, 11, 19, 1977, for part of June 14, 1979, July 8, 28, 1985, July 6, 7, Sept. 1-7, 1988, Feb. 2 to Mar. 3, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 10, 1972, reached a stage of 10.35 ft, from floodmarks, discharge, 709 ft<sup>3</sup>/s from slope-area measurement of peak flow.

Flood of June 15, 1976, reached a stage of 10.90 ft, from floodmarks, discharge, 980 ft<sup>3</sup>/s on basis of slope-area measurement of 10.35 ft.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 14 Aug. 16	1930 2315	52 34	7.95 7.79	Sept. 7	0400	b*1,030	a*10.84

- a From floodmarks.
- b From rating curve extended above 709 ft<sup>3</sup>/s based on slope-area measurement of peak flow. No flow Feb. 2 to Mar. 3.

REVISIONS.--The maximum discharge for water year 1988 has been revised to 621 ft<sup>3</sup>/s, Aug. 3, 1988, gage height, 10.21 ft.

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CHEYENNE RIVER BASIN

# 06404998 GRACE COOLIDGE CREEK NEAR GAME LODGE, NEAR CUSTER, SD--Continued DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.19	.41	1.3	e.60	e.10	e.00	1.0	.82	.69	.55	.23	.20
2	.16	.39	1.3	e.65	e.00	e.00	1.0	. 83	.60	. 52	.23	.20
3	.29	.40	1.3	e.80	e.00	e.00	.94	.85	.62	.43	.22	. 23
4	1.2	.44	1.4	e.90	e.00	e.10	.96	.82	.64	.39	.19	. 22
5	.45	.47	1.4	e.80	e.00	e.30	1.0	.82	.62	.30	. 16	.19
6	.29	.51	1.4	e.45	e.00	e1.0	1.3	.78	.58	.27	.20	.18
7	.18	. 67	1.4	e.30	e.00	e2.0	1.1	.76	.77	.25	.22	67
8	. 17	. 68	1.6	e.40	e.00	e8.0	1.2	.76	1.2	.22	.23	5.4
9	.18	.73	1.8	e.50	e.00	e50	1.2	.78	.78	.21	.23	3.7
10	.20	.77	1.6	e.60	e.00	e10	1.2	.79	.64	.20	.24	3.0
11	.22	1.0	1.6	e.50	e.00	e8.0	1.2	.75	.60	.20	.25	3.9
12	.25	1.2	1.6	e.50	e.00	e7.0	1.2	.76	. 56	. 20	.28	2.9
13	. 29	. 92	1.8	e.55	e.00	e7.0	1.1	.89	. 56	.21	.33	1.7
14	. 27	1.0	1.7	e.50	e.00	e6.0	1.2	. 87	.64	1.3	5.5	1.4
15	.29	.86	e1.5	e.50	e.00	e7.0	1.2	. 85	.61	2.9	2.7	1.1
16	.34	.50	e1.5	e.55	e.00	e7.0	1.2	.86	. 54	1.1	3.9	1.1
17	.36	.61	e1.5	e.55	e.00	e6.0	1.2	1.2	1.2	1.2	3.9	. 96
18	.37	.73	1.8	e.55	e.00	e3.0	1.2	1.0	.91	1.0	.74	. 43
19	.37	.76	1.8	e.50	e.00	e5.0	1.2	.86	.64	.81	.55	.34
20	.38	.76	e1.5	e.50	e.00	e5.0	.94	.82	. 56	.74	. 55	.81
21	.34	.78	e1.0	e.55	e.00	e4.5	.73	.80	. 53	.66	.48	11
22	.35	.81	e1.0	e.60	e.00	e5.0	.71	.74	.51	. 59	.44	5.0
23	. 40	. 89	e.90	e.60	e.00	e6.0	. 67	.71	.49	. 54	.39	3.7
24	. 45	. 96	e.80	e.50	e.00	e6.0	.66	. 67	.75	. 46	.37	3.1
25	.45	1.0	e.70	e.50	e.00	e5.0	. 62	.64	.68	. 42	.35	3.3
26	.45	1.1	e.50	e.50	e.00	e4.0	.67	.61	1.1	.36	.35	2.7
27	. 44	1.3	e.35	e.50	e.00	e3.0	.84	. 59	.82	.33	.34	2.4
28	.42	1.5	e.30	e.45	e.00	e2.1	.91	. 58	.76	.31	.34	2.2
29	. 42	1.4	e.40	e.50		1.4	.89	. 57	.69	.30	.31	2.2
30	. 46	1.4	e.40	e.40		1.2	. 85	.60	.60	.30	.27	1.9
31	. 44		e.50	e.30		1.0		.75		.25	.24	
TOTAL	11.07	24.95	37.65	16.60	0.10	171.60	30.09	24.13	20.89	17.52	24.73	132.46
MEAN	.36	. 83	1.21	. 54	.004	5.54	1.00	.78	.70	. 57	.80	4.42
MAX	1.2	1.5	1.8	. 90	.10	50	1.3	1.2	1.2	2.9	5.5	67
MIN	.16	.39	.30	.30	.00	.00	.62	. 57	.49	.20	.16	.18
AC-FT	22	49	75	33	.2	340	60	48	41	35	49	263

CAL YR 1988 TOTAL 225.96 MEAN .62 MAX 22 MIN .00 AC-FT 448 WTR YR 1989 TOTAL 511.79 MEAN 1.40 MAX 67 MIN .00 AC-FT 1020

e Estimated

## 06405800 BEAR GULCH NEAR HAYWARD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°47'31", long 103°20'49", in NWASWANEA sec.13, T.3 S., R.6 E., Custer County, Hydrologic Unit 10120109, in Custer State Park, on right bank 3.5 mi upstream from mouth, 2.1 mi north on Alt. 16, from intersection of Alt. 16 and Highway 36, and 5.5 mi south of Hayward.

PERIOD OF RECORD. -- April to September 1989 (seasonal record).

INSTRUMENTATION .-- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 4,110 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

REMARKS . -- Records good except those for estimated period, which are poor.

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SUMMATION VALUES SEP AUG DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL .00 .03 .05 .00 .00 1 .07 .00 .00 2 .00 .00 .00 .00 .00 3 ------.14 .18 .12 .00 .00 .00 .00 ---.00 00 .00 .04 .00 5 ------.11 .00 6 .00 .00 .00 .22 ------------------.00 7 ------------------.05 .00 .07 .00 .00 1.84 ------------------.05 .00 .02 .00 .00 1.15 9 ---------------.00 .00 .00 .00 .03 e.33 10 ------------------.00 .00 .00 .02 .01 e.51 .05 ------.00 .02 .00 .00 .00 12 ------------------.00 .49 .00 .20 .00 .00 13 ---------.23 .00 . 52 .00 .00 .00 .01 .00 .67 .68 .00 .00 14 .02 .00 15 .30 .00 .22 .00 .55 .05 .36 .00 .18 .02 16 .03 .07 .00 ---------------.37 17 .06 .10 .00 .00 .00 .00 .00 ------------------.00 18 .01 .00 ------------------00 .00 .00 19 .00 ---------.00 1.66 20 ---------.00 .00 .02 .00 .00 21 ---.00 .00 .05 .00 .45 ------------------.00 .02 .00 .00 .00 .00 23 \_\_\_ ---------------.00 .00 .00 .00 .00 .00 24 .00 .00 .51 .00 .24 .00 25 .08 .00 .31 .00 .02 .00 26 .17 .00 .00 .00 .00 .00 ---------.00 .00 .01 .00 2.7 ------.69 .04 ------.02 .00 .00 .00 .00 .00 ------------2.8 .00 .00 ------00 .03 29 ------------.00 .05 .00 .00 ------------.00 .00 30 ------.00 08 ------.00 31 ------------. 22 .00 5.94

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1.95

1.84

2.13

1.76

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TOTAL

e Estimated

## 06406000 BATTLE CREEK AT HERMOSA, SD

LOCATION.--Lat 43°49'41", long 103°11'44", in NEkSWkSWk sec.32, T.2 S., R.8 E., Custer County, Hydrologic Unit 10120109, on right bank 50 ft downstream from Chicago and North Western Transportation Company bridge, 0.8 mi south of Hermosa, and 2.9 mi downstream from Grace Coolidge Creek.

DRAINAGE AREA. -- 178 mi 2.

PERIOD OF RECORD. -- August to December 1903 (gage heights only), July 1949 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,290 ft above National Geodetic Vertical Datum of 1929, from topographic map. Nonrecording gage, August to December 1903, at site 50 ft upstream, July 7, 1949, to Nov. 2, 1950, at site 0.5 mi upstream, Nov. 3, 1950, to Dec. 6, 1961, at site 170 ft downstream, all at different datum. Dec. 7, 1961, to June 10, 1972, water-stage recorder (destroyed by flood), and June 11, 1972, to Aug. 28, 1972, nonrecording gage at site 80 ft downstream at present datum.

REMARKS.--Records good. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--40 years, 8.58 ft<sup>3</sup>/s, 6,220 acre-ft/yr; median of yearly mean discharges, 5.9 ft<sup>3</sup>/s, 4,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,400 ft<sup>3</sup>/s, June 10, 1972, gage height, 17.72 ft, from floodmarks, from rating curve extended above 2,800 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-railroad embankment measurement of peak flow; no flow at times in 1954-57, 1959, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date T	ime	Discharge (ft 3/s)	Gage height (ft)
Sept. 7	1230	*205	*5.75	No other peak	greater	than base	discharge.

No flow July 24-26.

		DISCHARGE,	IN CUBIC	FEET PER	SECOND, MEA	WATER YEAR	R OCTOBER	1988 TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	2.5	2.1	2.0	2.1	1.4	1.6	1.6	1.4	. 52	.34	.12
2	1.4	2.4	2.1	2.0	1.8	1.7	1.5	1.6	1.4	.33	.34	.03
3	1.4	2.4	2.1	2.0	1.7	1.6	1.5	1.6	1.4	.19	.41	.05
4	1.4	2.1	2.1	2.0	1.7	1.7		1.6	1.3	.20	.35	.03
							1.6					
5	1.7	2.1	2.1	2.0	1.4	1.8	1.7	1.6	1.2	.20	.27	.06
6	1.2	2.0	2.1	2.0	1.5	1.8	1.7	1.5	1.1	.12	.39	.05
7	1.2	2.1	2.1	2.0	1.6	2.1	1.7	1.5	. 98	.19	.41	43
8	1.2	2.0	2.0	1.8	1.6	4.4	1.6	1.5	1.1	.26	.36	9.9
9	1.2	2.1	2.0	1.5	1.3	4.6	1.6	1.5	1.1	.21	.34	3.4
10	1.2	2.2	2.0	1.4	1.3	2.8	1.7	1.5	1.1	.15	.35	1.8
10	1.2	2.2	2.0	1.4	1.3	2.0	1.7	1.3	1.1	.13	.55	1.0
11	1.3	2.4	2.0	1.5	1.5	2.4	1.7	1.4	1.0	.24	.24	1.2
12	1.4	2.7	2.0	1.6	1.7	2.2	1.7	1.4	. 96	.26	.31	.74
13	1.3	2.5	2.0	1.6	2.0	2.0	1.6	1.4	.96	.20	.22	.63
14	1.3	2.3	2.0	1.7	2.0	2.1	1.6	1.5	1.0	.36	.08	1.3
15	1.3											1.4
15	1.3	2.3	2.0	1.8	2.0	2.0	1.6	1.5	1.1	.35	.12	1.4
16	1.4	2.2	1.9	1.8	2.0	2.0	1.6	1.5	1.0	.34	.23	1.3
17	1.8	2.1	2.0	1.9	1.8	1.9	1.6	1.5	1.1	. 47	.37	1.3
18	1.8	2.1	2.0	2.0	1.8	1.8	1.6	1.4	. 96	.68	.12	1.2
19	1.8	2.2	2.1	2.0	1.8	2.0	1.5	1.4	.75	. 57	.07	.98
20	1.8	2.4	2.0	2.0	1.8	1.9	1.5	1.4	.68	.30	.26	1.8
20	1.0	2.7	2.0	2.0	1.0	1.5	1.5	1.4	.00	.50	.20	1.0
21	1.7	2.1	2.0	2.0	1.8	1.8	1.4	1.4	.69	.10	.30	3.3
22	1.8	2.2	2.0	2.0	1.8	1.8	1.4	1.3	.81	.05	. 20	3.7
23	1.9	2.1	1.9	2.0	1.8	1.8	1.4	1.3	1.0	.01	.23	4.4
24	2.0	2.1	1.9	2.0	2.0	1.8	1.4	1.3	1.2	.00	. 52	2.7
25	2.0	2.1	2.0	1.8	2.0	1.8	1.4	1.3	1.3	.00	1.8	1.9
	2.0	2.1	2.0	1.0	2.0	1.0			1.0			
26	2.0	2.1	1.8	1.7	1.6	1.7	1.4	1.2	1.3	.00	.85	1.4
27	2.2	2.1	1.8	1.7	1.5	1.6	1.6	1.2	1.2	.04	. 57	1.2
28	2.1	2.1	1.8	1.7	1.5	1.6	1.7	1.1	1.1	.17	. 57	1.1
29	2.3	2.1	1.9	1.9		1.6	1.7	1.2	.71	.20	.30	1.2
30	2.4	2.1	2.0	2.0		1.7	1.6	1.2	.60	.25	.34	1.1
31	2.5		2.0	1.9		1.7		1.3		.28	.22	
31	2.3		2.0	1.9		1.7		1.3		.20	. 22	
TOTAL	51.4	66.2	61.8	57.3	48.4	63.1	47.2	43.7	31.50	7.24	11.48	92.29
MEAN	1.66	2.21	1.99	1.85	1.73	2.04	1.57	1.41	1.05	.23	.37	3.08
MAX	2.5	2.7	2.1	2.0	2.1	4.6	1.7	1.6	1.4	.68	1.8	43
MIN	1.2	2.0	1.8	1.4	1.3	1.4	1.4	1.1	.60	.00	.07	.03
AC-FT	102	131	123	114	96	125	94	87	62	14	23	183
							-,	200		-	125	

CAL YR 1988 TOTAL 757.83 MEAN 2.07 MAX 4.3 MIN .61 AC-FT 1500 WTR YR 1989 TOTAL 581.61 MEAN 1.59 MAX 4.3 MIN .00 AC-FT 1150

65

## 06406500 BATTLE CREEK BELOW HERMOSA, SD

LOCATION.--Lat 43°43'30", long 102°54'15", in NE\SW\SE\ sec.3, T.4 S., R.10 E., Pennington County, Hydrologic Unit 10120109, at left downstream side of bridge on State Highway 40, approximately 9 mi upstream from mouth, and 18.0 mi southeast of Hermosa.

DRAINAGE AREA. -- 285 mi 2.

PERIOD OF RECORD. --October 1950 to September 1953, October 1988 to current year.

GAGE.--Water-stage recorder and rectangular weir. Elevation of gage is 2,810 ft above National Geodetic Vertical Datum of 1929, from topographic map. Oct. 1, 1950, to Sept. 30, 1953, nonrecording gage at same site and different datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Most of the flow is diverted, except after large storm events, for irrigation of about 1,000 acres upstream from station during irrigation season. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge observed, 2,060 ft<sup>3</sup>/s, May 23, 1952, gage height, 8.13 ft, from rating curve extended above 110 ft<sup>3</sup>/s, site and datum then in use; no flow for many days most years.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood in June 1972 reached a stage of about 4 ft (present datum) higher than that of May 23, 1952, from information by local resident.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 50 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 14	1545	*11	*3.11				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

					N	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	1.7	1.4	. 13	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	1.6	1.4	.10	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	1.5	1.4	.10	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	1.2	1.4	.10	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	1.2	1.2	.10	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	1.2	1.2	.10	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	1.3	1.1	.07	.00	.00	.00
7	.00	.00	.00	.00	.00	e4.2	1.3	1.0	.07	.00	.00	.00
8	.00	.00	.00	.00	.00	e3.9	1.2	1.0	.10	.00	.00	.00
9	.00	.00	.00	.00	.00	3.8	1.2	. 94	.10	.00	.00	.00
10	.00	.00	.00	.00	.00	4.6	1.2	.90	.07	.00	.00	.00
11	.00	.00	.00	.00	.00	5.5	1.2	.75	.03	.00	.00	.00
12	.00	.00	.00	.00	.00	6.2	1.2	.62	.00	.00	.00	.00
13	.00	.00	.00	.00	.00		1.1	.76	.00	.00	.00	.00
14	.00	.00				5.1		.83	.00	.00	.00	.00
			.00	.00	.00	5.3	. 98					
15	.00	.00	.00	.00	.00	3.9	. 93	.89	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	3.3	.98	1.0	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	3.2	1.3	.98	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	3.0	1.3	. 85	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	3.1	1.2	. 68	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	2.7	1.1	. 58	.00	.00	.00	.98
20		.00	.00	.00	.00	2.7		.50				
21	.00	.00	.00	.00	.00	3.0	1.0	. 51	.00	.00	.00	. 56
22	.00	.00	.00	.00	.00	2.6	.89	.37	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	2.6	.78	.29	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	2.7	.71	.18	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	2.8	.69	. 12	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	2.8	.77	.16	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	2.6	1.2	. 13	.00	.00	.00	.00
										.00	.00	.00
28	.00	.00	.00	.00	.00	2.4	1.5	. 10	.00			
29	.00	.00	.00	.00		2.4	1.4	. 15	.00	.00	.00	.00
30	.00	.00	.00	.00		2.1	1.4	. 16	.00	.00	.00	.00
31	.00		.00	.00		1.8		.16		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	85.60	35.03	22.01	0.97	0.00	0.00	1.54
MEAN	.00	.00	.00	.00	.00	2.76	1.17	.71	.032	.00	.00	.051
MAX	.00	.00	.00	.00	.00	6.2	1.7	1.4	. 13	.00	.00	. 98
MIN	.00	.00	.00	.00	.00	.00	.69	.10	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	170	69	44	1.9	.0	.0	3.1
no ri		. 0		. 0	. 0	1/0	Ua	7.7	1.0			

WTR YR 1989 TOTAL 145.15 MEAN .40 MAX 6.2 MIN .00 AC-FT 288

e Estimated

## 06407900 SPRING CREEK NEAR ROCKERVILLE, SD

LOCATION.--Lat 43°58'45", long 103°20'46", in SWkNEk sec.12, T.1 S., R.6 E., Pennington County, Hydrologic Unit 10120109, on right bank 0.5 mi upstream from Deadman Creek tributary at bottom of Stratosphere Bowl.

DRAINAGE AREA. -- 163 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- October 1986 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,885 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Considerable loss in sinkholes in reach approximately 1 to 5 mi downstream from station. Flow regulated by dam forming Sheridan Lake, capacity, 12,657 acre-ft, 11.2 mi upstream from station. Several observations of water temperature and specific conductance were made during the year. Recording rain gage at station.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 120 ft<sup>3</sup>/s, Apr. 29, 1987, gage height, 6.08 ft; minimum daily discharge, no flow for many days in 1988-89.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of June 10, 1972, reached a stage of about 14 ft, present datum.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 31 ft<sup>3</sup>/s at 0100 hours, May 20, gage height, 4.91 ft, from crest-stage gage; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			,		M	EAN VALU	ES					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.03	.10	e.20	e.00	2.2	6.8	2.8	.84	.00	.00
2	.00	.00	.03	.10	e.08	e.00	1.6	6.1	2.4	.77	.00	.00
3	.00	.00	.03	.10	e.00	e.00	1.4	5.3	2.4	.50	.00	.00
4	.00	.00	.03	.11	e.00	e.00	3.6	4.8	2.2	.50	.00	.00
5	.00	.00	.02	.12	e.00	e.00	2.6	3.9	2.1	.42	.00	.00
6	.00	.00	.02	.12	e.00	e.00	2.9	2.6	2.1	.34	.00	.00
7	.00	.00	.02	.11	e.00	e.00	2.6	2.5	3.3	. 27	.00	.00
8	.00	.00	.02	.08	e.00	e.03	2.8	2.1	3.9	.19	.00	.02
9	.00	.00	.01	.10	e.00	e.05	2.5	1.2	3.0	.14	.00	.02
10	.00	.00	.0	.09	e.00	e.10	2.3	. 90	2.4	.11	.00	.0
11	.00	.00	.00	.08	e.00	e.25	2.4	. 82	2.1	. 13	.00	.01
12	.00	.00	.0	e.08	e.00	e.20	2.2	. 82	1.8	.12	.00	.02
13	.00	.00	.00	e.08	e.00	e.15	2.1	1.0	1.7	.12	.00	.01
14	.00	.00	.00	e.10	e.00	e.15	2.0	1.0	1.4	.17	.00	.0
15	.00	.00	.02	e.08	e.00	e.10	1.8	.98	1.1	.18	.00	.00
16	.00	.00	.11	e.08	e.00	e.10	1.8	. 93	. 93	.09	.00	.00
17	.00	.00	.18	e.10	e.00	e.10	2.3	. 87	. 80	.03	.00	.00
18	.00	.00	.16	e.10	e.00	e.15	1.5	1.1	. 66	.01	.00	.00
19	.00	.00	.17	e.10	e.00	e.25	. 87	.88	. 54	.03	.00	.00
20	.00	.00	.16	e.09	e.00	e.25	1.2	24	.63	.01	.00	.04
21	.00	.0	.15	e.08	e.00	e.30	1.1	20	. 55	.01	.00	4.4
22	.00	.01	.15	e.10	e.00	e.30	.81	16	.48	.00	.00	4.1
23	.00	.02	.15	e.10	e.00	e.40	2.3	13	.39	.00	.00	1.8
24	.00	.02	.16	e.07	e.00	e.70	7.9	10	. 52	.00	.0	1.1
25	.00	.02	.16	e.07	e.00	e1.0	7.3	8.2	.72	.00	.02	.81
26	.00	.02	.14	e.09	e.00	e3.0	7.0	6.6	1.3	.00	.01	.61
27	.00	.02	.08	e.10	e.00	e6.0	8.3	4.2	1.8	.00	.0	.50
28	.00	.02	.08	e.15	e.00	e3.0	10	3.4	1.6	.0	.00	. 43
29	.00	.02	.09	e.15		e2.5	8.7	2.7	1.4	.01	.00	.39
30	.00	.03	.09	e.15		2.0	8.0	2.7	1.2	.00	.00	.32
31	.00		.10	e.20		1.8		2.9		.00	.00	
TOTAL	0.00	0.18	2.36	3.18	0.28	22.88	104.08	158.30	48.22	4.99	0.03	14.58
MEAN	.00	.006	.076	.10	.010	.74	3.47	5.11	1.61	.16	.001	.49
MAX	.00	.03	.18	.20	.20	6.0	10	24	3.9	.84	.02	4.4
MIN	.00	.00	.00	.07	.00	.00	.81	.82	.39	.00	.00	.00
AC-FT	.00	. 4	4.7			45	206	314	96	9.9	.06	29
AC-FI	.0	. 4	4.7	6.3	.6	45	200	314	90	9.9	.00	29

CAL YR 1988 TOTAL 633.54 MEAN 1.73 MAX 12 MIN .00 AC-FT 1260 WTR YR 1989 TOTAL 359.08 MEAN .98 MAX 24 MIN .00 AC-FT 712

e Estimated

## 06407900 SPRING CREEK NEAR ROCKERVILLE, SD--Continued

## PRECIPITATION RECORDS

PERIOD OF RECORD. -- March 1987 to current year.

INSTRUMENTATION.--Precipitation recorder. Elevation of gage is 3,885 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair.

		ACCUMULATED	PRECI	PITATION,	IN		WATER TION V		OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOA	DEC	JAN		FEB	MAR	1	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00		.00	.00		.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00		.00	.00		04	.00	.02	.00	.00	.00
3	.00	.00	.00	.00		.00	.22		.00	.04	.04	.00	.00	.03
4	.00	.00	.00	.00		.00	.02		04	.08	.00	.00	.00	.00
5	.00	.00	.00	.00		.00	.00		.08	. 13	.00	.00	.02	.00
6	.00	.02	.10	.00		.00	.00		.01	.00	.01	.00	.09	.00
7	.00	.00	.02	.00		.00	.00		.03	.00	.75	.00	.00	.33
8	.00	.00	.00	.00		.00	.00		.00	.02	.00	.00	.00	1.01
9	.00	.05	.00	.00		.00	.00		.00	.00	.00	.00	.01	.05
10	.00	.00	.00	.00		.00	.00		.00	.00	.00	.08	.00	.36
11	.00	.43	.00	.00		.00	.00		.00	.00	.00	.02	.06	.00
12	.00	.00	.00	.00		.00	.00		.00	. 52	.00	.09	.00	.00
13	.00	.10	.00	.00		.00	.19		.00	.22	.00	.06	.00	.00
14	.00	.07	.00	.00		.00	.02		.00	.03		.37	.00	.00
15	.02	.00	.00	.00		.00	.00		.00	. 17	.00	.18	.00	.00
16	.02	.00	.00	.00		.00	.00		.16	.06	.04	.01	.94	.00
17	. 42	.02	.00	.00		.00	.09		.02	.00	.18	.01	.00	.00
18	.00	.02	.00	.00		.00	.00		.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00		.00	.00		.00	.00	.00	.00	.49	.02
20	.00	.00	.00	.00		.00	.00		.00	.00	.00	.00	.01	1.16
21	.00	.00	.00	.00		.00	.00		.00	.00	.10	.00	.04	1.25
22	.00	.00	.00	.00		.00	.00		.00	.00	.19	.00	.00.	.00
23	.00	.00	.00	.00		.00	.00		.00	.00	. 13	.00	.00	.00
24	.00	.00	.00	.02		.00	.00		.00	.00	.68	.00	1.04	.00
25	.00	.00	.03	.00		.00	.00		.02	.00	.30	.02	.00	.00
26	.00	.01	.11	.00		.00	.00		25	.00	.00	.00	.00	.00
27	.00	.00	.00	.00		.00	.08		. 57	.00	.00	.00	. 20	.00
28	.00	. 11	.00	.00		.00	.02		.00	.00	.00	. 82	.00	.00
29	.00	.00	.00	.00			.00		.00	.08	.00	.02	.00	.00
30	.00	.00	.00	.00			.00		.00	.11	.00	.00	.00	.00
31	.00		.00	.00			.00			. 13		.00	.00	
TOTAL	0.46	0.83	0.26	0.02	0	.00	0.64	1	.22	1.59		1.68	2.90	4.21

#### 06408500 SPRING CREEK NEAR HERMOSA, SD

LOCATION.--Lat 43°56'31", long 103°09'32", in SE\SE\SE\sec.21, T.1 S., R.8 E., Pennington County, Hydrologic Unit 10120109, at left upstream end of county highway bridge, 0.3 mi upstream from Chicago and North Western Transportation Company bridge, and 7.5 mi north of Hermosa.

DRAINAGE AREA. -- 199 mi 2.

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

REVISED RECORDS .-- WSP 1729: 1950.

GAGE.--Water-stage recorder. Datum of gage is 3,265.30 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 30, 1973, nonrecording gage and crest-stage gage 210 ft upstream, and Mar. 30 to Sept. 30, 1973, water-stage recorder at present site, both at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Considerable loss in sinkholes in reach 10 to 15 mi upstream from station. Flow slightly regulated by dam forming Sheridan Lake, capacity, 12,657 acre-ft, 24 mi upstream from station. One observation of water temperature and specific conductance was made during the year.

AVERAGE DISCHARGE.--40 years, 4.53 ft<sup>3</sup>/s, 3,280 acre-ft/yr; median of yearly mean discharges, 1.5 ft<sup>3</sup>/s, 1,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 13,400 ft<sup>3</sup>/s, June 10, 1972, gage height, 13.12 ft, site and datum then in use, from floodmarks, from rating curve extended above 350 ft<sup>3</sup>/s on basis of contracted-opening measurement of peak flow; no flow for many days most years.

EXTREMES FOR CURRENT YEAR .-- Maximum daily discharge, 0.35 ft3/s, Mar. 27; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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
	.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	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	e.05	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	e.15	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	e.20	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	e.25	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e.25	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	e.25	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	e.25	.00	.00	.00	.00	.00	.00
27									.00		.00	.00
	.00	.00	.00	.00	.00	e.35	.00	.00		.00		
28	.00	.00	.00	.00	.00	e.25	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00		e.10	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00		e.05	.00	.00	.00	.00	.00	.00
31	.00		.00	.00		.00		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	2.15	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.069	.00	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.35	.00	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	4.3	.0	.0	.0	.0	.0	.0
								, -			7.7	111

CAL YR 1988 TOTAL 111.60 MEAN .30 MAX 23 MIN .00 AC-FT 221 WTR YR 1989 TOTAL 2.15 MEAN .006 MAX .35 MIN .00 AC-FT 4.3

e Estimated

69 06408700 RHOADS FORK NEAR ROCHFORD, SD

LOCATION.--Lat 44°08'12", long 103°51'29", in NW\SE\NE\ sec.15, T.2 N., R.2 E., Pennington County, Hydrologic Unit 10120110, on left bank 1.1 mi upstream from South Fork Rapid Creek and 8.7 mi west of Rochford.

DRAINAGE AREA. -- 7.95 mi<sup>2</sup>, approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD, -- November 1981 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 5,965 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good except that for estimated daily discharge, which is fair. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 7 years, 5.63 ft3/s, 4,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 9.7 ft<sup>3</sup>/s, Mar. 16, 1985, gage height, 2.00 ft; maximum gage height, 2.19 ft, July 23, 1982, backwater from vegetation; minimum daily discharge, 3.5 ft<sup>3</sup>/s, Jan. 10, 1982.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5.5 ft<sup>3</sup>/s, Oct. 17-25, Nov. 6-12, gage height, 1.75 ft; maximum gage height, 1.98 ft, Aug. 16, backwater from vegetation; minimum daily discharge, 4.2 ft<sup>3</sup>/s on many days.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JUN JUL AUG SEP JAN FEB MAR APR MAY 4.6 1 5.1 5.4 4.5 4.3 4.2 4.3 4.3 4 3 4 4 5.1 2 4.3 5.4 4.6 4.5 4.4 4.3 4.2 4.3 4.3 4.4 4.3 3 5.1 5.4 4.6 4.5 4.3 4.3 4.3 4.3 4.3 4.4 4.3 4.4 5.1 5.4 4.5 4.5 4.3 4.3 4.3 4.3 4.3 4.4 4.3 4.4 5 5.1 5.4 4.5 4.4 4.2 4.3 4.3 4.3 4.3 4.3 6 5.1 5.5 4.5 4.2 4.3 4.3 4.3 4.3 4.3 4.3 5.1 5.5 4.5 e4.4 4.2 4.3 4.3 4.3 4.3 4.4 4.3 4.3 8 5.1 5.5 4.5 4.2 4.2 4.3 9 5.1 5.5 4.6 4.3 4.2 4.2 4.2 4.3 4.4 4.4 4.4 10 5.5 4.6 4.3 4.2 4.3 4.2 4.3 5.1 5.5 4.6 4.5 4.3 4.2 4.3 4.3 4.4 12 5.1 5.5 4.6 4.4 4.4 4.3 4.3 4.3 4.4 4.3 4.3 4.3 5.1 4.3 13 5.4 4.3 4.4 4.7 4.4 4.3 4.3 4.4 4.3 4.3 4.4 4.3 14 5.3 5.4 4.7 4.4 4.3 4.3 4.4 4.3 4.3 4.3 15 5.4 5.3 4.4 4.3 4.3 4.7 4.4 4.3 4.3 4.4 4.3 4.3 4.4 16 5.4 5.2 4.7 4.4 4.3 4.3 4.3 4.3 4.3 4.4 4.3 17 5.5 5.1 4.6 4.4 4.3 4.2 4.2 4.3 4.3 4.4 4.4 4.3 18 5.5 5.1 4.6 4.4 4.3 4.2 4.2 4.3 4.3 4.4 4.4 4.3 19 5.5 4.7 4.6 4.3 4.2 4.3 4.3 4.3 4.3 20 5.5 4.7 4.6 4.3 4.3 4.2 4.3 4.3 4.3 4.4 4.5 21 5.5 4.7 4.4 4.4 4.6 4.5 4.3 4.3 4.2 4.3 4.3 4.3 22 5.5 4.9 4.5 4.3 4.3 4.4 4.4 4.3 4.4 4.2 4.3 4.4 23 5.5 4.3 5.1 4.5 4.2 4.2 4.3 4.4 4.4 4.3 4.4 4.2 24 5.5 5.1 4.5 4.2 4.2 4.3 4.4 4.3 4.3 4.2 4.4 4.2 25 5.5 4.7 4.5 4.2 4.3 4.4 4.3 4.2 4.3 4.2 4.2 4.3 26 4 4 4.3 5.3 4.7 4.5 4.2 4.3 4.2 4.2 4.3 4.3 4.3 27 5.3 4.7 4.5 4.2 4.3 4.2 4.3 4.3 4.3 4.3 4.4 4.3 28 5.2 4.7 4.5 4.2 4.3 4.2 4.3 4.3 4.3 4.3 4.4 4.3 29 5.4 4.6 4.6 4.2 4.2 4.3 4.3 4.4 4.3 4.4 4.3 4.3 30 4.6 4.6 4.2 ---4.3 4.3 4.3 4.3 31 4.6 4.3 ---4.3 4.3 4.3 4.4 TOTAL 163.9 154.2 141.7 135.2 120.5 132.6 129.0 135.4 135.5 130.4 131.8 128.5 MEAN 4.37 4.37 4.35 5.29 5.14 4.57 4.30 4.36 4.30 4.25 4.28 4.28 MAX 5.5 4.4 4.4 4.6 5.5 4.7 4.5 4.4 4.3 4.4 4.3 4.4 MIN 4.2 4.3 4.3 4.3 4.6 4.5 4 2 4.2 4 2 4 2 4 . 2 AC-FT 259 325 306 281 268 239 261 255 263 256 269 269

TOTAL 1877.0 MEAN 5.13 MAX 6.4 MIN 4.5 AC-FT 3720 TOTAL 1638.7 MEAN 4.49 MAX 5.5 MIN 4.2 AC-FT 3250 **CAL YR 1988** WTR YR 1989

e Estimated

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## CHEYENNE RIVER BASIN

## 06408700 RHOADS FORK NEAR ROCHFORD, SD--Continued

## PRECIPITATION RECORDS

PERIOD OF RECORD . -- April 1982 to current year.

INSTRUMENTATION. -- Shielded weighing-type precipitation recorder. Elevation of gage is 5,965 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

REMARKS. -- Records poor for water years 1988 and 1989.

					SUM	MATION VA	LUES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	e.04	e.06	e.00	e.00	e.10	.00	.00	.18	e.00
2	.00	.32	.00	e.00	e.00	e.00	e.00	e.51	.00	.00	.70	e.00
3	.00	.00	.00	e.12	e.12	e.00	e.00	e.00	.00	.10	.15	e.00
4	.00	.00	.00	e.02	e.00	e.26	e.03	e.00	.00	.00	.15	e.00
5	.00	.00	.00	e.12	e.00	e.00	e.04	e.00	.00	.00	.00	e.00
6	.00	.00	.00	e.00	e.00	e.00	e.00	e.12	.00	.00	.00	e.00
7	.00	.00	.00	e.00	e.02	e.00	e.00	.70	.00	.00	.08	e.00
8	.00	.00	.00	e.00	e.06	e.10	e.00	. 90	.00	.00	.00	e.00
9	.00	.00	.00	e.00	e.04	e.10	e.00	.00	.00	.06	.00	e.00
10	.00	.00	.02	e.00	e.04	e.00	e.00	.00	.00	.00	.00	e.00
11	.00	.00	.00	e.00	e.12	e.07	e.00	.00	.00	.16	.00	e.04
12	.00	.00	.00	e.00	e.00	e.72	e.00	.00	. 16	.00	.08	e.08
13	.00	.00	.00	e.00	e.00	e.00	e.00	.00	.34	.00	.00	e.00
14	.00	.10	.20	e.04	e.03	e.00	e.00	.00	.00	.03	.00	e.00
15	.30	.00	.02	e.00	e.10	e.06	e.00	.00	.00	.04	.00	e.00
16	.02	.00	e.00	e.26	e.02	e.00	e.00	.00	.00	.00	.00	e.00
17	.03	.00	e.00	e.14	e.08	e.00	e.00	.18	.00	. 12	.00	e.00
18	.26	.00	e.00	e.08	e.00	e.00	e.00	.36	.00	.36	.03	e.00
19	.04	.00	e.00	e.10	e.36	e.00	e.02	. 50	.00	.00	.14	e.00
20	.00	.00	e.00	e.10	e.20	e.00	e.01	.00	.00	.00	.00	e.00
21	.00	.00	e.00	e.00	e.01	e.00	e.00	.00	.00	.00	.36	e.00
22	.00	.00	e.00	e.00	e.10	e.00	e.03	.00	.00	.00	.00	e.00
23	.00	.00	e.00	e.00	e.00	e.00	e.00	.00	.00	.00	.00	e.01
24	.00	.00	e.10	e.00	e.00	e.00	e.03	.00	.00	.00	.00	e.15
25	.00	.00	e.10	e.00	e.00	e.05	e.25	.14	.00	.00	.00	e.00
26	.00	.00	e.00	e.00	e.00	e.00	e.23	.00	.40	.00	.00	e.00
27	.00	.00	e.00	e.00	e.00	e.00	e.00	.00	.04	.00	.00	e.00
28	.00	.06	e.00	e.00	e.00	e.00	e.00	.00	.96	.00	.00	e.76
29	.00	.00	e.00	e.00	e.00	e.00	e.00	.00	.04	.00	.00	e.10
30	.00	.03	e.02	e.00		e.11	e.00	.36	.00	.00	.00	e.00
31	.00		e.02	e.02		e.00		.00		.00	.00	
TOTAL	0.65	0.51	0.48	1.04	1.36	1.47	0.64	3.87	1.94	0.87	1.87	1.14

e Estimated

## 06408700 RHOADS FORK NEAR ROCHFORD, SD--Continued

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SEP

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES DAY OCT NOV DEC MAR APR JUN JUL AUG JAN MAY

1	e.00	.00	e.00	e.01	e.15	e.08	.06	e.00	.00	.00	.00	.00
2	e.00	.00	e.00	e.02	e.12	e.01	.04	e.00	.04	.00	.00	.00
3	e.00	.04	e.00	e.07	e.00	e.20	.24	e.31	.04	.00	.00	.00
4	e.00	e.00	e.00	e.00	e.00	e.01	.10	e.24	.00	.00	.00	.00
5	e.00	e.00	e.00	e.00	e.04	e.00	.28	e.46	.00	.00	.16	.00
6	e.00	e.01	e.00	e.00	e.09	e.00	.10	e.00	.08	.00	.04	.00
7	e.00	e.34	e.08	e.00	e.05	e.00	.02	e.00	.00	.00	.00	.08
8	e.00	e.00	e.00	e.00	e.01	e.00	.11	e.13	.00	.00	.00	.38
9	e.00	e.16	e.01	e.05	e.00	e.00	.08	e.00	.00	.00	.00	.24
10	e.00	e.00	e.07	e.01	e.00	e.00	.00	e.00	.04	.14	.00	.10
11	e.00	e.16	e.07	e.00	e.00	e.00	.00	e.00	.02	.00	.00	.00
12	e.00	e.04	e.02	e.00	e.00	e.00	.00	e.06	.18	.06	.00	.00
13	e.00	e.01	e.04	e.00	e.04	e.01	.00	e.55	.06	.18	.00	.00
14	.00	e.08	e.29	e.01	e.02	e.54	.04	e.04	.00	.16	.00	.00
15	.09	e.17	e.05	e.00	e.00	e.00	.00	e.00	.00	.00	.06	.00
				0.00	0.00	0.00		0,00				
16	.04	e.00	e.00	e.00	e.00	e.01	.03	e.06	.34	.00	1.06	.00
17	.68	e.00	e.00	e.00	e.01	e.17	.07	e.06	. 12	.08	.06	.00
18	.00	e.12	e.00	e.00	e.00	e.00	.00	e.00	.00	.00	.00	.00
19	.00	e.01	e.00	e.05	e.00	e.00	.00	e.00	.00	.00	.22	.00
20	.00	e.00	e.00	e.00	e.01	e.06	.00	e.00	.00	.00	.00	.74
21	.00	e.00	e.00	e.00	e.02	e.00	.00	e.00	.12	.00	.00	.34
22	.00	e.00	e.08	e.00	e.05	e.00	.00	e.00	.04	.00	.00	.00
23	.00	e.00	e.01	e.00	e.00	e.00	.00	e.00	.28	.00	.00	.00
24	.00	e.07	e.00	e.01	e.00	e.00	e.02	e.01	. 64	.00	.16	.00
25	.00	e.00	e.01	e.00	e.00	e.00	e.05	e.01	. 14	.00	.00	.00
26	.00	e.22	e.05	e.00	e.06	e.00	e.51	e.02	.00	.00	.00	.00
27	.10	e.00	e.08	e.00	e.05	e.04	e1.09	e.00	.00	.00	.34	.06
28	.00	e.04	e.00	e.00	e.03	e.00	e.75	e.00	.00	.00	.00	.00
29	.00	e.11	e.00	e.00		.00	e.24	e.02	.00	.34	.00	.00
30	.00	e.00	e.00	e.00		.00	e.22	e.36	.00	.00	.00	.00
31	.00	9.00	e.00	e.02			6.22	.10	.00	.00	.00	
31	.00		e.00	e.02	455	.00	777	.10		.00	.00	
TOTAL	0.91	1.58	0.86	0.25	0.75	1.13	4.05	2.43	2.14	0.96	2.10	1.94

e Estimated

## 06408860 RAPID CREEK NEAR ROCHFORD, SD

LOCATION.--Lat 44°06'17", long 103°38'35", in SWkNEk sec.28, T.2 N., R.4 E., Pennington County, Hydrologic Unit 10120110, on left bank 0.2 mi below confluence of Gimlet Creek.

DRAINAGE AREA. -- 101 mi 2.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 5,000 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 40 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 24 Mar. 9	0730	a 50	*5.84	Mar. 21 May 13	0715 0530	*80 40	a5.46 4.90

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice.
Minimum daily discharge, 4.0 ft<sup>3</sup>/s. Feb. 3.

MEAN VALUES DAY OCT JUL. AUG SEP NOV DEC FFR APR TIIN JAN MAR MAY e10 9.1 10 9 9 15 9.4 1 e9 0 e8 0 e7.5 18 15 6 7 2 9 9 9.9 e10 e8.0 e5.5 e7.5 14 23 13 9.5 6.7 8.3 3 9.8 10 e10 e8.0 e4.0 e8.0 13 25 15 9.0 6.9 8.1 9.6 10 e9.0 e9.0 e4.5 e8.0 13 27 16 9.0 6.8 8.1 5 9.6 10 e9.8 e9.0 e5.5 e8.0 13 30 15 8.3 6.4 7.9 6 9.6 9.7 e10 e8.5 e7.0 e10 17 14 8.0 7.1 7.3 9.9 11 e9.0 e8.0 22 13 8.1 7.9 7.7 e7.5 e20 17 8 9.8 9.8 e7.0 17 21 12 7.6 9.5 e8.0 e25 e8.0 9 9.2 20 9.6 13 7.0 7.3 e8.0 e7.0 e40 11 e9.0 14 7.1 10 10 8.6 19 12 e9.0 e7.0 e9.0 e30 e15 11 11 12 13 7.4 10 10 7.6 e9.0 e8.0 e10 e25 e15 18 11 11 7.3 9.6 10 10 e8.5 e8.0 e10 e20 16 19 12 8.4 9.6 10 e8.0 e8.0 e9.5 e19 15 32 12 9.2 9.5 14 15 e19 9.9 11 e8.0 e9.0 e9.0 15 27 12 10 9.0 7.9 10 10 e8.0 e9.0 e9.0 e18 15 24 12 11 8.8 16 10 6.4 e8.0 e8.0 e8.5 e14 15 24 11 9.9 8.5 8.6 9.1 17 13 9.0 e8.0 e8.0 e8.0 e13 16 23 14 12 8.2 18 13 11 e9.0 e9.0 e7.5 e12 16 23 12 8.7 9.3 7.9 9.7 19 12 e11 e10 e8.0 20 8.3 7.9 e14 20 15 10 10 8.8 e8.0 e13 e10 e9.0 e15 18 7.9 21 11 7.7 15 7.2 9.5 16 e12 e10 e9.0 e25 18 11 22 9.7 11 15 12 6.7 8.3 13 e12 e10 e9.0 16 17 23 9.7 12 e11 e9.0 e10 15 14 16 13 6.8 8.3 10 24 9.6 12 e10 e8.5 e10 15 14 15 16 6.6 8.1 9.6 25 9.6 9.1 e9.0 e9.0 e9.0 15 14 15 16 6.8 8.4 8.7 26 9.6 8.3 e8.0 e9.0 e9.0 18 15 7.3 8.4 8.7 27 9.6 e8.0 e8.0 e10 e9.0 18 33 15 12 7.3 8.8 8.7 28 8.2 e9.0 e8.0 e10 e8.0 17 24 14 11 6.7 11 8.5 29 11 e9.9 e8.0 e10 16 20 14 10 7.3 9.2 8.7 30 10 e9.0 e8.0 15 19 15 9.9 8.7 8.4 8.6 e10 10 7.7 7.9 31 e9.0 e9.0 15 14 TOTAL 273.0 229.5 484 627 379.9 252.4 252.8 277.8 315.6 287.9 285.3 517.0 9.60 9.26 MEAN 10.2 9.20 16.1 20.2 12.7 8.14 8.15 8.81 8.20 16.7 16 MAX 13 12 13 12 10 10 40 33 32 16 11 6.6 6.4 MIN 8.2 6.4 7.0 7.0 4.0 7.5 13 14 9.9 AC-FT 626 571 566 541 455 1030 960 1240 754 501 501 551

WTR YR 1989 TOTAL 4182.2 MEAN 11.5 MAX 40 MIN 4.0 AC-FT 8300

e Estimated

## 06408860 RAPID CREEK NEAR ROCHFORD, SD--Continued

## PRECIPITATION RECORDS

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION. -- Shielded, 8.0-in. diameter plastic gage, 72 in. tall. Elevation of gage is 4,950 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated period, which are poor. Precipitation gage is located 0.2 mi east of streamflow gage and is read daily by observer.

		ACCUMULATED	PRECI	PITATION,		WATER TION V		1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.10	.00	.10	.00	.20	.00	.00	.00	.30
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.20	.20	.00	.40	.50	.00	.00	.00
5	.00	.20	.00	.00	.00	.20	.00	.40	.00	.00	.00	.00
6	.00	.10	.00	.00	.00	.20	.30	.00	.00	.00	.20	.00
7	.00	.00	.00	.00	.20	.00	. 20	.00	e.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.20	e.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	. 10	.00	e.10	.00	.00	.60
10	.00	.00	.00	.10	.00	.00	.00	.00	e.00	.00	.00	.20
11	.00	.00	.00	.00	.00	.00	.00	.00	e.01	.20	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	e.13	.00	.00	.00
13	.00	. 80	.00	.00	.00	.00	.00	1.00	e.04	.20	.00	.00
14	.00	.00	.00	.00	.20	.10	.00	.00	e.00	.30	.00	.30
15	.00	.00	.30	.00	.00	.00	.00	.05	e.00	.60	.00	.00
16	.10	.00	.00	.00	.00	.00	.20	.00	e.24	.00	. 50	.00
17	1.00	.00	.00	.00	.00	.10	.00	.00	e.08	.20	1.00	.00
18	.00	.10	.00	.00	.00	.20	. 10	.15	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00	. 50	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.40	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	. 80	.00	.00	.00
25	.00	.00	.00	. 10	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.10	.00	.00	.00	1.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	. 40	.00	.00	.00	.00	.00	.00	.00
29	.00	. 20	.00	.00		.00	. 20	.00	.00	.00	.80	.00
30	.00	.00	.00	.00		.00	. 10	. 40	.00	.20	.00	.00
31	.00		.00	.00	78-	.00		.10		.00	.00	
TOTAL	1.10	1.50	0.40	0.30	1.00	1.30	2.20	2.90	2.30	1.70	3.00	2.40

e Estimated

## 06409000 CASTLE CREEK ABOVE DEERFIELD RESERVOIR, NEAR HILL CITY, SD (Hydrologic bench-mark and radiochemical station)

LOCATION.--Lat 44°00'49", long 103°49'48", in NE½SW½SW½ sec.25, T.1 N., R.2 E., Pennington County, Hydrologic Unit 10120110, at downstream end of highway culvert, 330 ft downstream from South Fork Castle Creek, 500 ft upstream from high-water line of Deerfield Reservoir, 2.5 mi southwest of Deerfield Dam, and 14 mi northwest of Hill City.

DRAINAGE AREA. -- 79.2 mi<sup>2</sup>.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- June 1948 to current year. Prior to October 1953, published as "above Deerfield Reservoir, near Deerfield".

REVISED RECORDS. -- WSP 1917: 1952(M). WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 5,920 ft, from Highway Department bench mark. Prior to Aug. 31, 1948, nonrecording gage at site 130 ft upstream at datum 2.05 ft higher. Sept. 1, 1948, to May 17, 1983, at same location and datum. May 18, 1983, to Oct. 11, 1985, at site 300 ft upstream at same datum.

REMARKS. -- Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE. -- 41 years, 10.6 ft 3/s, 7,680 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 1,120 ft<sup>3</sup>/s, May 22, 1952, gage height, 5.81 ft, from rating curve extended above slope-area measurement of gage height, 5.67 ft; minimum, 1.2 ft<sup>3</sup>/s, Apr. 25, 1969; minimum gage height, 1.35 ft, Nov. 12, 1949, Feb. 19, 1954, Mar. 7, 1957, Mar. 29, 1961.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 16	0615	a	*3.80	Mar. 9	1415	*23	2.88

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 7.0 ft<sup>3</sup>/s, Dec. 11, 12.

		DISCHAR	GE, IN CU	BIC FEET		EAN VALUE	YEAR OCTOBE S	K 1988	TO SEPTEM	BEK 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.6	8.3	e9.0	e9.0	e9.0	e8.0	11	13	10	8.7	7.2	7.8
2	8.8	8.4	e10	e9.0	e8.0	e8.0	11	13	10	8.5	7.2	7.8
3	8.8	8.6	e10	e9.0	e8.0	e8.0	11	14	9.8	8.2	7.3	7.6
4	8.8	8.6	e10	9.5	e8.0	e8.0	11	14	9.7	8.2	7.1	7.7
5	8.8	8.6	e10	9.1	e7.5	8.1	12	14	10	7.9	7.3	7.7
6	8.8	e8.5	e9.0	9.3	e7.5	9.1	12	13	9.8	7.8	8.0	7.5
7	8.8	e8.5	e8.5	e9.0	e7.5	11	12	13	9.8	7.9	7.5	8.0
8	8.8	e8.5	e8.0	e8.5	e7.5	11	11	12	9.6	7.8	7.4	8.9
9	8.9	e8.5	e8.0	e9.0	e8.0	15	11	12	10	7.5	7.4	8.7
10	8.8	e8.5	e8.0	e9.0	e8.0	15	e11	12	9.6	7.2	7.5	8.3
11	8.9	e8.5	e7.0	e9.0	e8.0	13	e11	12	9.6	7.8	8.0	7.8
12	8.8	e8.5	e7.0	8.9	e8.0	13	11	12	9.5	7.8	7.5	7.8
13	8.8	e8.5	e8.0	8.7	e8.0	13	11	14	9.6	7.9	7.2	7.8
14	8.9	e8.5	e9.0	8.8	8.0	11	11	14	9.6	8.0	7.4	7.8
15	9.1	e8.0	e8.0	8.5	8.0	e13	11	13	9.5	8.0	7.7	7.8
16	9.1	e8.0	e9.0	8.4	e8.0	e13	11	13	9.5	8.0	8.7	7.8
17	9.5	e8.0	e10	8.3	e8.0	e12	11	13	10	7.9	9.4	8.1
18	8.6	e8.0	e12	8.2	e8.0	e11	11	13	9.3	7.8	8.2	8.0
19	7.6	e8.0	e11	8.6	e8.0	e11	11	12	9.0	7.8	7.9	7.9
20	7.6	e8.0	e10	8.6	8.0	e12	11	12	8.8	7.6	8.5	8.2
21	7.9	e8.5	e10	8.6	7.6	e12	11	12	8.8	7.5	8.2	11
22	8.0	e8.5	e9.0	8.6	7.8	12	11	11	9.2	7.5	7.9	8.7
23	8.0	e9.0	e9.0	8.5	8.4	12	11	11	9.1	7.5	8.0	8.3
24	8.0	e9.0	e9.0	8.4	8.7	12	11	11	11	7.5	8.0	8.2
25	8.2	e8.5	e9.0	8.3	8.5	12	11	11	9.7	7.9	7.8	8.1
26	8.4	e8.5	e8.5	8.8	8.0	12	12	11	9.5	7.9	7.8	8.3
27	8.4	e8.0	e8.5	8.8	8.1	12	16	11	9.1	7.6	7.5	8.3
28	e8.5	e7.5	e8.5	8.7	8.3	12	13	11	8.8	7.5	8.0	8.3
29	e8.5	e8.0	e8.5	8.6		11	12	10	8.8	7.5	7.7	8.3
30	8.4	e9.0	e9.0	8.9		11	12	11	8.7	7.8	7.8	8.0
31	8.3		e10	8.9		11		11		7.4	7.8	
TOTAL	265.4	251.5	280.5	271.5	224.4	352.2	343	379	285.4	241.9	240.9	244.5
MEAN	8.56	8.38	9.05	8.76	8.01	11.4	11.4	12.2	9.51	7.80	7.77	8.15
MAX	9.5	9.0	12	9.5	9.0	15	16	14	11	8.7	9.4	11
MIN	7.6	7.5	7.0	8.2	7.5	8.0	11	10	8.7	7.2	7.1	7.5
AC-FT	526	499	556	539	445	699	680	752	566	480	478	485

CAL YR 1988 TOTAL 3827.8 MEAN 10.5 MAX 31 MIN 7.0 AC-FT 7590 WTR YR 1989 TOTAL 3380.2 MEAN 9.26 MAX 16 MIN 7.0 AC-FT 6700

e Estimated

06409000 CASTLE CREEK ABOVE DEERFIELD RESERVOIR, NEAR HILL CITY, SD--Continued (Hydrologic bench-mark and radiochemical station)

## WATER-QUALITY RECORDS

PERIOD OF RECORD. -- October 1963 to current year.

PERIOD OF DAILY RECORD . --

WATER TEMPERATURE: May 1964 to September 1984.

REMARKS.--Periodic samples obtained for analysis of suspended-sediment concentration most years.

EXTREMES FOR PERIOD OF DAILY RECORD. -- WATER TEMPERATURE: Maximum, 22.0°C, July 17, 1969; minimum, 0.0°C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)
OCT 18	1345	8.6	460	8.70	261	8.0	6.0	1.2	620	10.4	103	K4
JAN 17	1300	8.4	466	8.40	269	3.0	0.5	3.0				кз
APR 18	1300	11	410	8.70	263	9.5	7.0	2.5	619	10.4	106	<1
JUL 03	1300	8.5	420	8.57	245	28.5	18.0	1.7	619	8.5	111	K22
DATE	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVEI (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO	SIUM, DIS- SOLVED (MG/L AS K)	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)
OCT 18 JAN	K17	270	56	32	1.3	1	0.0	1.3	236	6.0	0.80	0.10
17	K6	280	60	31	1.4	1	0.0	1.2	264	5.9	0.60	0.10
18 JUL	<1	270	57	30	1.5	1	0.0	1.1	247	8.0	0.90	0.20
03	68	240	49	29	1.3	1	0.0	1.0	220	5.0	0.60	0.10
DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)
OCT				1.2		2.351	53.511		2 101	1.1.		1 111
18 JAN 17	9.2	249 254	277 288	0.34	5.78	<0.010	<0.100	<0.010	0.010	0.01	0.20	0.010
APR					5.76	<0.010	1.00	0.020	0.010	0.01	0.30	
18 JUL 03	8.1	258 179	280 258	0.35	7.66 4.11	<0.010	<0.100	<0.010	<0.010	0.03	<0.20	0.010
03	0.0	1/9	430	0.24	4.11	~0.010	~0.100	~0.010	0.020	0.03	-0.20	-0.010

# 06409000 CASTLE CREEK ABOVE DEERFIELD RESERVOIR, NEAR HILL CITY, SD--Continued WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	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)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	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		-0.040								100	
18 JAN	0.010	<0.010	<10	1	61	<0.5	2	<1	<3	1	13
17 APR	0.010	<0.010	<10	<1	63	<0.5	<1	1	<3	<1	11
18 JUL	<0.010	<0.010	10	<1	59	<0.5	<1	1	<3	<1	11
03	<0.010	<0.010	<10	<1	57	<0.5	<1	<1	<3	1	23
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 18	<5	8	3	<0.1	<10	1	<1	1.0	65	<6	74
JAN 17	<5	7	4	<0.1	<10	<1	<1	<1.0	67	<6	22
APR 18	<5	8	8	<0.1	<10	2	<1	<1.0	66	<6	9
JUL 03	<1	6	5	0.1	<10	1	<1	<1.0	64	<6	6
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)	RADIUM 226, DIS- SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
OCT 18	2.5	<0.4	1.5	<0.4	1.1	<0.4	0.08	0.91	11	0.26	76
JAN 17									30	0.68	85
APR 18	1.3	<0.4	1.6	<0.4	1.2	<0.4	0.10	1.1	19	0.56	85
JUL 03									11	0.25	95

## 06409500 DEERFIELD RESERVOIR NEAR HILL CITY. SD

- LOCATION.--Lat 44°01'41", long 103°47'09", in NE±SWk sec.20, T.1 N., R.3 E., at dam on Castle Creek, Hydrologic Unit 10120110, 0.4 mi upstream from Dutchman Creek and 12.5 mi northwest of Hill City.
- DRAINAGE AREA. -- 95 mi<sup>2</sup>, approximately.
- PERIOD OF RECORD. -- May 1947 to current year (monthend contents only). Some elevations obtained during period of initial filling, December 1945 to May 1947, are available in Bureau of Reclamation files. Prior to October 1953, published as "near Deerfield."
- GAGE. -- Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (levels by Bureau of Reclamation). Prior to July 20, 1964, nonrecording gage at same site and datum.
- REMARKS.--Reservoir is formed by earthfill dam. Storage began Dec. 3, 1945; dam completed in 1947. Usable capacity, 15,504 acre-ft between elevations 5,839 ft (lowest outlet) and 5,908 ft (crest of spillway). Dead storage below elevation 5,839 ft, 151 acre-ft. Figures given herein represent usable contents. Water is used to supplement Rapid City water supply and for irrigation in Rapid Creek basin downstream from Rapid City.
- COOPERATION .-- Records of elevation and contents provided by Bureau of Reclamation.
- EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 15,357 acre-ft May 31, 1987 (elevation, 5,907.65 ft); minimum observed, 5 acre-ft Oct. 2, 1959 (elevation, 5,839.10 ft).
- EXTREMES FOR CURRENT YEAR.--Maximum contents, 15,275 acre-ft, Mar. 31, elevation, 5,907.45 ft; minimum, 13,429 acre-ft, Sept. 30, elevation, 5,902.87 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 Elevation Contents Change in contents Date (feet) (acre-feet) (acre-feet) 5,902,96 13,459 Sept. 30 Oct. 31 Nov. 30 13,490 +31 5,903.04 5,903.35 13,614 +124 Dec. 31 +418 5,904.40 14,032 +284 Jan. 5,905.39 14,443 +411 Feb. 28 5,906.22 14,772 +329 31 15,275 +503 Mar. 5,907.45 15,030 -245 Apr. 30 5.906.85 14,870 May 31 5.906.46 -160 June 30 5,906,13 14,735 -135 July 31 5.904.84 14.240 -495 Aug. 31 5,903.36 13,610 -630 Sept. 30 5.902.87 13.429 -181 -30

#### 06410000 CASTLE CREEK BELOW DEERFIELD DAM, SD

LOCATION.--Lat 44°01'45", long 103°46'53", in NW\sE\sec.20, T.1 N., R.3 E., Pennington County, Hydrologic Unit 10120110, on left bank 200 ft upstream from Dutchman Creek, 1,100 ft downstream from Deerfield Dam, and 12.5 mi northwest of Hill City.

DRAINAGE AREA. -- 96 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- July 1946 to current year, seasonal records only beginning October 1983.

GAGE.--Water-stage recorder. Datum of gage is 5,784.52 ft above National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark). Prior to Oct. 15, 1947, at site 400 ft downstream at datum 0.23 ft higher. Oct. 15, 1947, to Sept. 1, 1948, at site 550 ft downstream at datum 1.77 ft lower, and Sept. 2, 1948, to Nov. 2, 1971, at site 300 ft upstream at datum 4.0 ft higher.

REMARKS.--Records good. Flow completely regulated by Deerfield Dam, 1,100 ft upstream. Because of spillway reconstruction during 1986, water flowing over the spillway will bypass gage and is not included in daily values table. There was no flow over the spillway during the 1989 water year. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 37 years (water years 1946 to 1983), 11.1 ft3/s, 8,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum daily discharge, 200 ft<sup>3</sup>/s, May 22, 1952; maximum gage height, 4.99 ft, Sept. 24, 1982, backwater from culverts and heavy moss growth; no flow at times in 1948, 1950-60.

EXTREMES FOR CURRENT PERIOD. --Maximum discharge, 26 ft<sup>3</sup>/s at 1015 hours, Aug. 11, gage height, 3.85 ft; minimum daily discharge, 2.1 ft<sup>3</sup>/s, Mar. 1-6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						2.1	19	16	9.4	13	14	17
2						2.1	19	16	9.4	13	14	17
3						2.1	19	16	9.4	13	14	17
A						2.1	19	16	9.1	13	14	18
5						2.1	19	16	9.0	13	14	18
6						2.1	19	16	9.0	13	14	14
7						2.3	18	16	8.9	13	14	9.1
8						2.4	18	16	9.0	13	14	9.2
9						2.4	17	16	9.0	13	14	9.4
10						2.4	17	16	9.0	13	14	9.0
11						2.4	17	16	8.7	14	16	10
12						2.4	17	15	8.8	14	16	11
13						2.4	17	15	9.0	14	16	11
14						2.4	17	15	8.9	14	16	11
15						2.4	17	15	8.8	14	16	11
16						2.4	17	15	8.9	14	16	11
17						3.6	17	14	9.4	14	16	11
18						6.6	17	14	9.4	14	16	11
19						6.8	17	14	9.6	14	16	11
20						6.8	17	14	9.7	14	16	11
21						6.6	17	14	9.5	14	16	11
22						6.6	17	14	9.5	14	16	11
23						6.6	17	14	11	14	16	11
24						6.6	16	13	13	14	16	11
25						6.6	16	12	13	14	16	11
26						6.6	16	11	13	14	16	11
27						6.6	16	12	13	14	16	e11
28						10	16	11	13	14	16	e11
29						13	16	9.0	13	14	16	e11
30						13	16	9.0	13	14	17	e11
31						16		9.3		14	17	
TOTAL						158.5	517	435.3	303.4	424	478	356.7
MEAN						5.11	17.2	14.0	10.1	13.7	15.4	11.9
MAX						16	19	16	13	14	17	18
MIN						2.1	16	9.0	8.7	13	14	9.0
AC-FT						314	1030	863	602	841	948	708

e Estimated

79 06410500 RAPID CREEK ABOVE PACTOLA RESERVOIR, AT SILVER CITY, SD

LOCATION.--Lat 44°05'05", long 103°34'48", in SW\SE\sec.36, T.2 N., R.4 E., Pennington County, Hydrologic Unit 10120110, on right bank 0.8 mi west of Silver City and 3.0 mi downstream from Slate Creek.

DRAINAGE AREA. -- 292 mi 2.

PERIOD OF RECORD . -- October 1953 to current year.

GAGE. -- Water-stage recorder. Datum of gage is 4,620.00 ft above National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark).

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Flow regulated by Deerfield Dam on Castle Creek since December 1945. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 36 years, 39.5 ft3/s, 28,620 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,060 ft<sup>3</sup>/s, May 15, 1965, gage height, 10.44 ft, from rating curve extended above 1,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily discharge, 2.5 ft<sup>3</sup>/s, Dec. 2, 1985.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 55 ft<sup>3</sup>/s at 1715 hours, Mar. 21, gage height, 4.74 ft; maximum gage height, 5.20 ft, Dec. 8, backwater from ice; minimum daily discharge, 4.0 ft<sup>3</sup>/s, Feb. 3, 4.

Rating table (gage height, in feet, and discharge, in cubic feet per second) (Stage-discharge relation affected by ice Nov. 8 to Mar. 20)

4.4	14.8	4.8	51
4.5	22	4.9	63
4.6	31	5.0	76
4.7	40		

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	20	e11	e9.2	e9.0	e8.6	31	39	28	23	21	25
	18	20	e11	e9.4	e6.0	e8.4	34	35	26	23	21	25
2 3 4	17	20	e10	e9.8	e4.0	e8.4	34	35	26	21	21	24
4	17	20	e10	e10	e4.0	e8.6	32	41	29	21	20	24
5	17	20	e10	e9.8	e5.0	e9.0	31	43	28	22	18	23
6	17	19	e10	e9.4	e7.0	e10	31	44	27	23	18	23
7	17	19	e9.6	e9.0	e8.0	e17	31	43	27	23	19	23
8	17	e18	e9.0	e9.0	e8.0	e20	31	40	25	23	19	21
9	17	e17	e9.2	e9.2	e9.4	e28	32	40	25	22	19	20
10	17	e17	e9.2	e9.4	e9.8	e35	34	39	24	21	20	20
11	17	e18	e9.4	e9.4	e10	e30	42	38	24	22	21	20
12	17	e19	e9.4	e9.2	e10	e25	40	37	23	23	21	20
13	18	e20	e9.8	e9.6	e9.8	e20	36	50	23	26	21	20
14	18	e21	e9.4	e9.2	e9.4	e15	35	53	23	26	21	20
15	18	e19	e9.0	e9.0	e9.2	e13	34	50	23	28	23	20
16	18	e17	e9.0	e9.2	e9.0	e13	34	47	23	27	25	19
17	20	e16	e9.4	e9.4	e9.0	e12	34	45	25	27	31	19
18	23	e15	e10	e9.6	e9.4	e17	34	44	25	26	29	18
19	21	e14	e12	e10	e9.8	e24	33	41	23	25	26	18
20	21	e14	e15	e10	e10	e40	33	39	20	24	27	18
21	20	e14	e14	e10	e9.8	40	32	37	20	23	27	27
22	19	e15	e14	e10	e10	. 39	32	37	20	22	25	29
23	19	e23	e12	e9.6	e11	31	32	36	20	22	24	26
24	19	e24	e11	e9.4	e11	26	33	35	25	23	24	23
25	19	e22	e10	e9.4	e10	23	32	33	31	24	24	21
26	19	e15	e9.0	e9.8	e9.6	24	32	31	30	23	24	21
27	19	e13	e8.5	e10	e9.4	25	44	31	28	23	24	20
28	17	e12	e8.5	e10	e9.0		49	29	26	23	27	20
					e9.0	25		28		22	27	20
29	20	e11	e8.5	e10		25	45		25			
30	20	e11	e9.0	e10		26	43	28	24	23	26	20
31	20		e9.5	e10		27		28		23	24	
TOTAL	574	523	315.4	297.0	245.6	673.0	1050	1196	746	727	717	647
MEAN	18.5	17.4	10.2	9.58	8.77	21.7	35.0	38.6	24.9	23.5	23.1	21.6
MAX	23	24	15	10	11	40	49	53	31	28	31	29
MIN	17	11	8.5	9.0	4.0	8.4	31	28	20	21	18	18
AC-FT	1140	1040	626	589	487	1330	2080	2370	1480	1440	1420	1280

CAL YR 1988 TOTAL 8932.4 MEAN 24.4 MAX 68 MIN 6.0 AC-FT 17720 WTR YR 1989 TOTAL 7711.0 MEAN 21.1 MAX 53 MIN 4.0 AC-FT 15290

e Estimated

## 06411000 PACTOLA RESERVOIR NEAR SILVER CITY, SD

LOCATION.--Lat 44°04'20", long 103°29'17", in NE\SW\ sec.2, T.1 N., R.5 E., Pennington County, Hydrologic Unit 10120110, in outlet works of dam on Rapid Creek, 3.8 mi east of Silver City.

DRAINAGE AREA. -- 319 mi 2.

PERIOD OF RECORD. -- August 1956 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (Bureau of Reclamation datum). Prior to Feb. 18, 1970, nonrecording gage at same site and datum.

REMARKS.--Reservoir formed by an earthfill dam completed August 1956. Storage began Aug. 22, 1956. Conservation capacity, 54,955 acre-ft between elevations 4,456.1 ft and 4,580.2 ft. Combined dead and inactive storage below elevation 4,456.1 ft is 1,017 acre-ft. Flood storage capacity, 43,057 acre-ft between elevations 4,580.2 ft and 4,621.5 ft (crest of spillway). Surcharge capacity, 41,892 acre-ft between elevations 4,621.5 ft and 4,651.7 ft (maximum pool elevation). Figures given herein represent contents above elevation 4,456.1 ft. Reservoir provides flood control and water for municipal and irrigation uses.

COOPERATION .-- Records of elevation and contents provided by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 60,970 acre-ft, May 19, 1964, elevation, 4,585.87 ft; minimum observed since initial filling, 40,566 acre-ft, Oct. 2, 1981, elevation, 4,561.50 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 36,471 acre-ft, Apr. 30, elevation, 4,555.39 ft; minimum, 24,497 acre-ft, Aug. 31, elevation, 4,534.59 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

						Da	ato	е								Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept.	30															4.553.28	35,124	-
	31															4,553.20	35,080	-44
Nov.	30															4.553.27	35,117	-37
Dec.	31															4,552.77	34,810	-307
CAI	L YR	19	988							 						-	-	-14,635
Jan.	31															4,552.36	34,547	-263
Feb.	28															4.552.13	34,410	-137
Mar.	31															4.553.44	35,232	+822
Apr.	30															4,555,39	36,471	+1,239
May	31															4.554.40	35,842	-629
June	30															4,547.95	31,873	-3,969
July	31															4,539.94	27,310	-4,563
Aug.	31									 						4,534.59	24,497	-2,813
Sept.	30															4,534.68	24,547	+50
WTI	R YR	19	989													_		-10,651

#### 06411500 RAPID CREEK BELOW PACTOLA DAM, SD

LOCATION. --Lat 44°04'36", long 103°28'54", in SWANE's sec. 2, T.1 N., R.5 E., Pennington County, Hydrologic Unit 10120110, on right bank 2,000 ft downstream from Pactola Dam. 3.9 mi upstream from Deer Creek, and 13.0 mi west of Rapid City.

DRAINAGE AREA. -- 320 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1928 to September 1932 (combined records of Creek and Dakota Power and Light Co. flume), July 1946 to current year. Prior to October 1953, published as "near Pactola." Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS .-- WSP 1309: 1931(M)

GAGE. -- Water-stage recorder and concrete control since Oct. 16, 1962. Datum of gage is 4,406.00 ft above National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark). Apr. 19, 1929, to June 30, 1932, nonrecording gage at site 3,500 ft upstream at different datum. July 24, 1946, to Aug. 24, 1947, nonrecording gage and Aug. 25, 1947, to Nov. 18, 1953, water-stage recorder, at site 2.0 mi upstream at different datum.

REMARKS.--Records good. Flow regulated by dam on Castle Creek since Dec. 3, 1945 (see station 06409500), and completely regulated by Pactola Dam 2,000 ft upstream since Aug. 22, 1956 (see station 06411000). Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE, -- 47 years, 43.8 ft 3/s, 31.730 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 2,170 ft3/s, May 22, 1952, gage height, 6.74 ft, site and datum then in use; no flow Oct. 11-17, 1962.

EXTREMES FOR CURRENT YEAR, --Maximum discharge, 130 ft<sup>3</sup>/s at 1745 hours, July 12, gage height, 8.02 ft; minimum daily discharge, 12 ft<sup>3</sup>/s, Mar. 27 to Apr. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES JUL AUG SEP DAY OCT NOV DEC JAN FEB MAR APR MAY TUN. aa ---TOTAL 13,8 14.3 85.8 89.4 61.3 21.5 MEAN 16.5 13.8 15.9 14.4 16.3 49.4 MAX MTN AC-FT 

CAL YR 1988 TOTAL 15427 MEAN 42.2 MAX 123 MIN 13 AC-FT 30600 WTR YR 1989 TOTAL 12596 MEAN 34.5 MAX 123 MIN 12 AC-FT 24980

## 06412200 RAPID CREEK ABOVE VICTORIA CREEK, NEAR RAPID CITY, SD

LOCATION.--Lat 44°02'48", long 103°21'06", in SWkNWk sec.13, T.1 N., R.6 E., Pennington County, Hydrologic Unit 10120110, on left bank 0.5 mi above Victoria Creek, and 3.0 mi west of Canyon Lake.

DRAINAGE AREA. -- 355 mi 2.

PERIOD OF RECORD . -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 3,570 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Pactola Reservoir 18.0 mi upstream (see station 06411000). Several observations of water quality were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1972, reached a stage of about 13.0 ft, present datum, discharge not determined; information supplied by local resident.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 140 ft<sup>3</sup>/s at 0030 hours, Aug. 17, gage height, 5.91 ft; minimum daily discharge, 5.0 ft<sup>3</sup>/s, Feb. 3.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JAN FEB APR MAY JUN JUL AUG SEP MAR e7.0 e8.0 1 2 e15 e11 e15 e12 e6.0 e8.0 e14 e12 e5.0 e7.0 e14 e6.0 e7.0 e14 e13 e6.0 e8.0 2.7 e13 e12 e11 e12 e11 e8.0 e15 e11 e10 e7.0 e17 e12 e11 e9.0 e18 e12 e11 e9.0 e20 17 e12 e11 e9.0 e19 e13 e12 e10 e18 e9.0 e14 e13 e17 e13 e12 e9.0 e16 e11 e12 e8.0 e15 e12 e13 e14 e12 e13 e6.0 e13 e12 e16 e14 e7.0 e14 e11 e15 e13 e8.0 e16 e15 e9.0 e15 e11 e13 e15 e9.0 e19 e12 e13 e15 e9.0 e20 e14 e13 e13 e12 e14 e13 e10 e14 e14 e11 e10 e14 e9.5 e13 e11 e11 e12 e9.5 e13 e10 e12 e10 e12 e9.0 e13 e15 e10 ---e13 e11 e16 e12 e12 ---388.0 TOTAL 240.0 461.0 MEAN 14.9 13.4 49.8 85.6 88.0 67.9 22.8 12.5 12.5 8.57 14.9 18.4 MAX MIN 9.5 5.0 7.0 AC-FT 

WTR YR 1989 TOTAL 12522.0 MEAN 34.3 MAX 126 MIN 5.0 AC-FT 24840

e Estimated

## 06412500 RAPID CREEK ABOVE CANYON LAKE, NEAR RAPID CITY, SD

LOCATION.--Lat 44°03'04", long 103°18'47", in NE\ne\ sec.18, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right bank at bridge on State Highway 44, at city limits of Rapid City, and 2.8 mi downstream from Victoria Creek.

DRAINAGE AREA. -- 371 mi<sup>2</sup>.

#### WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 3,405.42 ft above National Geodetic Vertical Datum of 1929.
Prior to Oct. 6, 1947, nonrecording gage, Oct. 6, 1947, to Nov. 2, 1967, and Oct. 1, 1968, to Sept. 30, 1976,
water-stage recorder all at datum 2.0 ft higher. Nov. 3, 1967, to Sept. 30, 1968, nonrecording gage at site
0.2 mi downstream at datum 1.12 ft lower. Prior to Oct. 1, 1989, at datum 0.03 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by dam on Castle Creek since December 1945 (see station 06409500) and by Pactola Dam 21.0 mi upstream since August 1956 (see station 06411000). Several observations of water temperature and specific conductance were made during the year. National Weather Service telemeter and recording rain gage at station.

AVERAGE DISCHARGE.--43 years, 38.8 ft<sup>3</sup>/s, 28,110 acre-ft/yr; median of yearly mean discharges, 35 ft<sup>3</sup>/s, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,200 ft<sup>3</sup>/s, June 9, 1972, gage height, 17.77 ft, present datum, from floodmarks, from rating curve extended above 1,300 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in 1950-51, 1957-60, 1962-63, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 111 ft<sup>3</sup>/s at 1845 hours, July 12, and at 2130 hours, Aug. 16, gage height, 3.86 ft; maximum gage height, 4.33 ft, Feb. 18, backwater from ice; minimum daily discharge, 0.78 ft<sup>3</sup>/s, Apr. 2.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	4.9	e8.0	e5.0	e6.0	e4.0	.80	7.9	54	82	65	28
2	16	3.5	e8.0	e5.0	e5.0	e3.5	.78	11	75	84	73	28
2	15	3.5	e7.0	e4.5	e3.0	e3.5	.84	15	90	81	73	22
4	11	3.5	e7.0	e5.0	e2.0	e3.0	7.8	16	90	80	72	19
5	6.8	3,5	e8.0	e8.0	e2.0	e3.0	14	17	90	79	85	20
6	6.6	3.5	e8.0	e8.0	e3.5	e3.5	16	24	95	79	94	28
7	6.9	3.9	e7.0	e8.0	e3.5	e4.0	16	27	95	81	88	39
8	6.3	4.0	e6.0	e5.0	e4.0	e5.0	14	27	93	87	77	42
9	5.6	4.2	e7.0	e4.5	e4.5	e12	7.6	39	92	94	84	26
10	4.7	4.8	e9.0	e4.5	e7.0	11	6.4	43	91	95	85	22
11	4.5	6.7	e9.0	e5.0	e7.0	11	5.3	53	90	96	85	21
12	5.0	8.9	e8.0	e6.0	e7.0	10	5.1	51	88	104	84	18
13	5.0	6.6	e8.0	e7.0	e7.0	10	4.4	57	83	99	80	14
14	5.0	6.2	e6.5	e7.0	e6.5	8.1	4.5	54	74	88	78	9.5
15	5.0	6.2	e6.0	e7.0	e6.5	e8.0	4.6	52	71	65	83	3.5
16	5.0	e5.3	e5.5	e7.0	e6.5	e7.0	4.9	38	78	48	92	2.4
17	11	e5.0	e6.5	e8.0	e5.5	e5.0	6.1	36	87	45	64	1.7
18	9.6	e5.5	e9.0	e8.0	e4.0	e7.0	5.3	35	75	44	27	1.1
19	6.6	e5.0	e8.5	e8.0	e4.0	e10	4.5	42	73	46	21	1.3
20	5.3	e5.0	e7.5	e7.5	e4.5	8.9	4.1	50	85	69	23	3.5
			67.5		84.5							
21	4.3	e7.0	e7.0	e7.5	e5.0	12	3.8	51	85	74	16	20
22	4.0	e7.0	e8.0	e8.0	e6.0	7.6	5.5	52	81	76	14	12
23	4.0	e9.0	e9.0	e8.5	e7.0	6.4	12	64	72	76	21	8.1
24	4.0	e8.0	e9.0	e7.5	8.1	6.5	13	68	70	76	30	6.4
25	4.0	7.6	e5.0	e6.5	6.7	4.9	29	70	51	76	27	5.2
26	4.0	8.7	e4.0	e5.0	4.3	2.7	17	80	48	67	20	4.5
27	4.0	8.0	e3.0	e5.0	e4.0	2.0	14	80	44	64	32	4.3
28	4.0	9.2	e3.0	e5.5	e4.0	1.8	13	80	54	75	34	3.7
29	4.7	e8.0	e4.0	e6.0		1.4	10	88	70	72	30	4.3
30	5.0	e8.0	e4.5	e6.0		1.0	9.8	87	76	72	29	4.0
31	5.0		e5.0	e6.0		.87		59		65	29	
TOTAL	206.9	180.2	211.0	199.5	144.1	184.67	260.12	1473.9	2320	2339	1715	422.5
MEAN	6.67	6.01	6.81	6.44	5.15	5.96	8.67	47.5	77.3	75.5	55.3	14.1
MAX	19	9.2	9.0	8.5	8.1	12	29	88	95	104	94	42
MIN	4.0	3.5	3.0	4.5	2.0	. 87	.78	7.9	44	44	14	1.1
AC-FT	410	357	419	396	286	366	516	2920	4600	4640	3400	838
AC-FI	410	337	419	390	200	300	210	2520	4000	4040	3400	000

CAL YR 1988 TOTAL 12413.3 MEAN 33.9 MAX 121 MIN 2.0 AC-FT 24620 WTR YR 1989 TOTAL 9656.89 MEAN 26.5 MAX 104 MIN .78 AC-FT 19150

e Estimated

## 06412500 RAPID CREEK ABOVE CANYON LAKE NEAR RAPID CITY, SD--Continued

## PRECIPITATION RECORDS

PERIOD OF RECORD.--April 1981 to July 1982 (seasonal records) published in Open-File Report 87-45, March 1987 to current year.

INSTRUMENTATION.--Precipitation recorder. Elevation of gage is 3,420 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Published records fair.

		ACCUMULATED	PRECII	PITATION,	IN		WATER TION V		OCTOBER	1988	TO	SEPTEMBER	1989		
DAY	OCT	NOA	DEC	JAN		FEB	MAR	1	APR	MAY		JUN	JUL	AUG	SEP
1	.00	.00	.00	.00								.00	.00	.00	.01
2	.00	.00	.00	.00								.07	.00	.00	.00
3	.00	.00	.00									.01	.06	.00	.03
4	.00	.00	.00							.07		.00	.00	.00	.00
5	.00	.00	.00		9					.11		.00	.00	.01	.00
6	.00	.03	.10							.00		.00	.00	.04	.00
7	.00	.00	.00							.00		.00	.00	.00	.18
8	.00	.00	.00							.02		.00	.00	.00	.74
9	.00	.05	.04							.00		.00	.00	.00	.04
10	.00	.01	.00							.00		.00	.04	.00	.20
11	.00	. 43	.00							.00		.00	.01	.00	.00
12	.00	.00	.00							.60		.00	.71	.00	.00
13	.00	.09	.00							.21		.00	.03	.00	.00
14	.00	.16	.00							.00		.01	.37	.00	.00
15	.01	.00	.00							.08		.00	.16	.00	.00
16	.08	.00	.00							.04		.09	.07	.89	.00
17	.49	.00	.00		1.75					.03		. 13	.03	.00	.00
18	.00	.00	.00							.00		.00	.00	.00	.02
19	.00	.06	.00							.00		.00	.00	.38	.03
20	.00	.04	.00							.00		.00	.00	.01	.80
21	.00	.01	.00							.00		.01	.00	.02	1.06
22	.00	.00	.00							.00		.10	.00	.00	.00
23	.00	.00	.00							.00		.08	.00	.00	.00
24	.00	.00	.00							.00		. 64	.00	.81	.00
25	.00	.00	.00							.00		.19	.00	.01	.00
26	.00	.00	.00							.00		.01	.00	.00	.00
27	.00	.00	.00		19					.00		.00	.00	.68	.00
28	.00	. 13	.00							.00		.00	.78	.00	.00
29	.00	.01	.00		1					.03		.03	.01	.00	.00
30	.00	.00	.05							. 22		.00	.00	.00	.00
31	.00		.05		- 2					.04			.00	.01	
TOTAL	0.58	1.02	0.24									1.37	2.27	2.86	3.11

85 06412600 CLEGHORN SPRINGS MAIN CHANNEL AT FISH HATCHERY. AT RAPID CITY, SD

LOCATION.--Lat 44°03'32", long 103°17'50", in NEANWASEA sec.8, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, at concrete flume within Cleghorn Springs Fish Hatchery, 0.2 mi west of Canyon Lake within city limits of Rapid City.

DRAINAGE AREA. -- Indeterminate.

PERIOD OF RECORD. -- October 1987 to current year.

GAGE. -- Water-stage recorder and concrete flume. Datum of gage is 3,364.10 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. This is one of three stations that monitor flow from Cleghorn Springs (see stations 06412700 and 06412800). The South Dakota Fish Hatchery operation uses the flow from Cleghorn Springs. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 13 ft<sup>3</sup>/s, Jan. 20, July 28 to Aug. 4, Sept. 5, 12, Dec. 10-12, 1988, and Jan. 8, 1989; minimum daily discharge, 6.7 ft<sup>3</sup>/s, Nov. 24, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 13 ft<sup>3</sup>/s, Dec. 10-12, Jan. 8; minimum daily discharge, 7.8 ft<sup>3</sup>/s, Sept. 26.

REVISIONS. -- Revised figures of discharge for water year 1988, superseding those published in the report for 1988 are given below.

EXTREMES FOR WATER YEAR 1988.--Maximum daily discharge, 13 ft<sup>3</sup>/s, Jan. 20, July 28 to Aug. 4, Sept. 5, 12; minimum daily discharge, 6.7 ft<sup>3</sup>/s, Nov. 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

			100		M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2	9.7	11	9.5	11	11	11	11	11	10	11	13	12
2	9.8	10	10	11	11	11	11	11	9.7	11	13	12
3	9.6	9.9	10	11	11	11	11	11	9.8	11	13	12
4	9.7	9.8	9.9	11	11	12	11	11	9.8	11	13	12
5	9.5	9.7	10	11	11	11	11	11	9.8	11	12	13
6	9.4	9.2	10	11	11	11	11	11	10	12	12	12
7	9.4	8.5	9.8	11	11	12		11	10	12	12	12
							11					12
8	9.4	8.5	11	11	11	11	10	11	10	12	12	12
9	9.6	8.1	12	11	11	12	10	11	10	12	12	12
10	10	8.0	11	11	11	11	10	11	10	12	12	12
11	e9.3	7.4	11	11	12	11	10	11	11	12	12	12
12	e9.6	7.7	11	11	11	11	10	10	10	12	12	13
13	e9.6	8.3	11	11	11	11	10	11	10	12	12	12
14	e9.3	8.5	11	11	12	11	11	11	10	12	12	12
15	e9.3	8.5	11	11	11	11	11	11	9.9	12	12	12
16	e9.3	8.4	11	11	12	11	10	11	10	12	12	12
17	e9.1	9.5	11	11	11	11	9.9	11	10	12	12	12
18	e9.1	9.6	11	11	12	11	11	11	10	12	12	12
19	e9.1	9.8	11	11	12	11	11	11	10	12	12	12
20	e8.9	9.8	11	13	12	12	11	12	10	12	12	12
	60.5	5.0	11	13	12	12	11	12	10	12		
21	e8.9	9.7	11	12	11	12	11	11	10	12	12	12
22	e8.9	9.8	11	12	11	12	11	11	10	12	12	12
23	e8.9	8.7	11	12	12	12	11	11	11	12	12	11
24	9.6	6.7	11	12	11	12	11	10	11	12	12	11
25	9.1	7.7	11	12	12	12	11	10	11	12	12	11
26	9.2	9.7	11	12	11	12	11	10	11	12	12	12
27	11	9.8	11	12	11	12	11	10	11	12	12	12
28	11	9.8	11	11	11	12	10	10	11	13	12	12
29	11	9.6	11	11	11	11	11	10	11	13	12	12
30	10	9.6	11						11	13	12	11
31	11	9.0	11	11 11		11 11	11	10 9.9		13	12	
TOTAL	207.2	271 2	224.2	250	207	252	220 0	222.0	200.0	371	376	358
TOTAL	297.3	271.3	334.2	350	327	353	320.9	332.9	308.0			11 0
MEAN	9.59	9.04	10.8	11.3	11.3	11.4	10.7	10.7	10.3	12.0	12.1	11.9
MAX	11	11	12	13	12	12	11	12	11	13	13	13
MIN	8.9	6.7	9.5	11	11	11	9.9	9.9	9.7	11	12	11
AC-FT	590	538	663	694	649	700	637	660	611	736	746	710

WTR YR 1988 TOTAL 3999.6 MEAN 10.9 MAX 13 MIN 6.7 AC-FT 7930

e Estimated

06412600 CLEGHORN SPRINGS MAIN CHANNEL AT FISH HATCHERY, AT RAPID CITY, SD--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11	12	11	11	e11	11	8.9	10	9.9	9.7	9.8	10
2	11	12	11	11	e11	11	8.8	10	10	9.8	9.8	9.8
1 2 3 4 5	11	12	11	11	e11	12	9.3	10	10	9.7	10	9.5
4	11	12	11	11	e11	11	9.8	11	10	9.7	10	9.6
5	11	12	12	11	e11	11	9.5	10	11	9.7	10	9.6 9.7
6 7	11	12	12	12	e11	12	9.4	10	11	9.5	11	9.8
7	11	12	11	12	e11	12	9.2	10	11	9.7	10	
8	11	12	12	13	e11	12	9.2	10	10	10	10	10
9	11	11	12	11	e11	12	9.7	10	10	9.8	10	10
9 10	11	11	13	11	e11	12	9.5	10	10	9.7	10	10
11	11	11	13	11	e11	11	9.7	10	10	9.8	10	10
12	11	11	13	12	e11	11	10	10	11	9.9	9.8	10
13	11	11	12	12	e11	11	10	10	11	9.7	10	10
14	11	11	12	11	e11	12	9.6	10	11	9.7	10	9.8
15	11	11	12	11	e11	12	9.5	11	9.7	9.4	10	9.9
16	11	11	12	12	11	11	9.9	10	9.0	10	10	10
17	11	11	11	11	11	9.7	10	10	9.3	9.6	10	9.8
18	11	11	12	11	11	9.6	10	10	9.3	9.3	10	10
19	11	11	12	12	11	9.8	10	10	9.2	9.1	9.8	11
20	11	11	12	11	11	9.8	10	10	9.2	9.4	9.8	10
21	11	11	11	e11	11	10	10	10	9.3	9.4	9.7	11
22	11	11	12	e11	11	10	9.7	10	9.2	9.5	9.7	11
23	11	11	11	e11	11	9.9	9.5	11	9.2	9.3	9.7	11
24	11	11	11	e11	11	9.8	9.7	11	9.2	9.5	9.3	10
25	11	12	12	e11	11	9.7	10	10	9.0	9.7	9.2	8.7
26	11	11	12	e11	11	9.7	10	11	9.1	9.7	10	7.8
27	11	11	11	e11	11	9.9	11	10	9.0	10	9.9	9.7
28	11	12	11	e11	11	9.6	11	10	9.1	10	9.9	9.9
29	12	11	11	e11		9.6	10	11	9.2	10	9.9	10
30	12	11	11	e11		9.4	10	11	9.6	9.9	10	10
31	12		11	e11		9.3		10		9.6	9.8	
TOTAL	344	340	361	349	308	329.8	292.9	317	293.5	299.8	307.1	297.8
MEAN	11.1	11.3	11.6	11.3	11.0	10.6	9.76	10.2	9.78	9.67	9.91	9.93
MAX	12	12	13	13	11	12	11	11	11	10	11	11
MIN	11	11	11	11	11	9.3	8.8	10	9.0	9.1	9.2	7.8
AC-FT	682	674	716	692	611	654	581	629	582	595	609	591

CAL YR 1988 TOTAL 4141.8 MEAN 11.3 MAX 13 MIN 9.7 AC-FT 8220 WTR YR 1989 TOTAL 3839.9 MEAN 10.5 MAX 13 MIN 7.8 AC-FT 7620

e Estimated

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LOCATION.--Lat 44°03'31", long 103°17'52", in NE½NW½SE½ sec.8, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, at weir on left bank within Cleghorn Springs Fish Hatchery, 0.2 mi west of Canyon Lake within city limits of Rapid City.

06412700 CLEGHORN SPRINGS SOUTH CHANNEL AT FISH HATCHERY, AT RAPID CITY, SD

DRAINAGE AREA. -- Indeterminate.

PERIOD OF RECORD . -- October 1987 to current year.

GAGE. -- Water-stage recorder and Cipolletti weir. Datum of gage is 3,368.03 ft above National Geodetic Vertical Datum of 1929.

REMARKS . -- Records fair . This is one of three stations that monitor flow from Cleghorn Springs (see stations 06412600 and 06412800). The South Dakota Fish Hatchery operation uses the flow from Cleghorn Springs. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum daily discharge, 2.2 ft<sup>3</sup>/s, Nov. 19, 1987; minimum daily discharge, 0.77 ft<sup>3</sup>/s, Dec. 10, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 1.2 ft<sup>3</sup>/s, June 13, July 27-28; minimum daily discharge, 0.82 ft<sup>3</sup>/s, Jan. 3, Apr. 21.

REVISIONS. -- Revised figures of discharge for water year 1988, superseding those published in the report for 1988 are given below.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

EXTREMES FOR WATER YEAR 1988.--Maximum daily discharge, 2.2 ft<sup>3</sup>/s, Nov. 19; minimum daily discharge, 0.77 ft<sup>3</sup>/s, Dec. 10.

MEAN VALUES DAY OCT NOV JUN JUL AUG SEP DEC JAN FEB MAR APR MAY 1.5 1.4 1.3 .87 1.0 1.1 1.0 1.2 1.1 1.1 1.1 .99 1.4 2 1.3 1.6 . 82 1.0 .95 1.2 1.1 1.1 1.1 .98 1.1 1.2 1.1 1.1 3 1.4 1.6 .84 1.0 .95 1.1 1.0 1.1 1.1 1.4 1.2 1.8 .98 1.1 1.1 1 1 1.1 94 1.1 1.1 1.1 5 1.3 1.2 1.0 1.1 1.1 1.0 1.6 .85 1.0 .98 1.1 1.1 6 1.0 1.4 1.1 1.6 1.2 1.0 1.0 1.0 1.1 1.0 1.1 1.1 .98 7 1.8 1.2 1.5 1.2 1.0 1.0 1.1 1.1 1.1 1.1 1.0 8 1.8 1.1 1.3 .90 1.0 1.1 1.0 1.2 1.0 1.1 1.1 1.0 .98 9 1.8 1.1 .80 .85 1.0 1.0 1.1 1.0 1.1 1.1 1.1 10 1.3 1.5 .77 .84 1.0 1.0 1.1 1.0 1.0 .99 1.1 11 1.3 .83 .79 1.0 1.0 1.1 1.1 1.1 1.0 1.1 12 1.7 .87 .81 1.0 1.1 1.1 1.0 1.0 1.0 1.1 1.1 1.1 13 1.2 .87 1.1 1.0 1.4 1.1 1.0 1.0 1.1 1.1 1.0 1.1 1.0 1.3 1.2 .87 .86 1.0 1.0 1.1 .98 1.1 1.1 15 1.5 1.2 .85 1.2 1.0 .96 1.1 .99 1.0 1.0 1.2 1.1 16 .83 1.0 .97 1.7 1.2 85 1.1 1 0 1.1 .96 1.1 1.1 1.7 .94 17 1.3 88 .83 1.0 1.0 1.1 1.1 1.0 1.0 1.1 1.0 1.0 1.0 18 1.3 2.1 91 1.1 1.1 1.0 1.1 1.2 1.1 19 1.5 2.2 .84 .86 1.0 1.0 1.1 1.2 1.1 1.0 1.0 1.0 20 1.4 1.8 .86 .87 1.1 1.0 1.3 1.1 1.0 1.1 .96 21 1.5 2.0 . 87 . 84 1.1 1.0 1.2 1.2 1.0 1.1 .95 22 1.3 2.0 .85 .85 .96 1.2 1.2 1.1 1.0 1.1 .95 1.1 1.3 1.9 .89 .85 .99 1.2 1.1 1.1 1.0 1.0 . 96 1.1 24 1.3 1.7 .88 .91 1.2 1.0 .98 99 1.0 1.2 1.1 1.0 25 1.2 1.0 .94 1.0 1.5 .87 1.2 . 86 1.1 1.0 1.1 .97 26 1 7 1 6 87 89 .98 . 98 1.0 1.0 1.3 1.1 1 1 .99 .98 27 99 1.0 1.3 1.6 .87 .90 1.0 1.2 1.1 1.1 1.0 .96 28 1.3 1.6 .82 .98 1.1 .99 1.1 1.1 1.1 1.0 .98 29 1.5 1.5 .86 1.0 .99 1.1 1.1 1.1 . 97 1.1 1.1 30 1.3 1.5 1.2 .95 .99 1.2 1.1 1.1 1.1 .99 .94 .99 31 1.3 1.1 1.0 ---1.2 1.1 1.0 TOTAL 44.4 43.9 32.78 28.75 32.40 35.3 32.06 32.26 32.75 29.79 30.28 31.40 1.04 MEAN 1.43 .93 1.07 1.06 .99 1.46 1.06 1.04 1.01 1.08 1.14 MAX 1.8 2.2 1.8 1.2 1.3 1.1 1.1 1.1 1.1 1.1 1.1 1.3 MIN 1.2 .77 .96 .95 .94 .94 1.1 .79 .98 .96 .94 1.1 57 65 59 AC-FT 88 87 65 60 62 64 70 64 64

WTR YR 1988 TOTAL 406.07 MEAN 1.11 MAX 2.2 MIN .77 AC-FT 805

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CHEYENNE RIVER BASIN

## 06412700 CLEGHORN SPRINGS SOUTH CHANNEL AT FISH HATCHERY, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.94	1.1	. 92	. 87	. 86	.97	.90	.88	1.0	1.1	1.0	.95
2	.91	1.1	.87	.83	.85	.96	.92	.88	1.0	1.1	1.1	1.0
3	.92	1.1	.88	.82	.86	.96	.90	.93	1.1	1.1	1.1	1.0
4	1.0	1.1	.88	.87	.95			.89	1.1	1.1	1.0	.99
5	.96	1.1	.89			. 93	.90					.96
3	.90	1.1	.09	.89	. 97	.91	.88	. 90	1.1	1.0	1.0	.90
6	. 92	1.1	.89	.90	.96	. 93	.88	. 93	1.1	1.0	1.1	.96
7	. 95	1.1	.88	. 89	. 95	. 94	.91	. 95	1.1	1.0	1.1	1.0
8	.98	1.0	.90	. 87	. 96	. 92	. 89	. 92	1.1	1.1	1.1	1.1
9	.99	. 96	.98	. 84	. 96	. 90	.88	. 95	1.1	1.0	1.1	1.1
10	. 96	.91	1.0	.85	.96	.89	.85	. 97	1.1	1.0	1.1	1.1
11	.99	.93	1.0	.89	.96	.90	.91	.98	1.1	1.1	1.1	1.0
12	. 97	. 98	1.1	.90	.97	.92	.88	.96	1.1	1.1	1.1	1.0
13	.97	1.0	1.0	. 87	.94	.89	.89	1.0	1.2	1.0	1.1	. 97
14	.99	.98	. 98	.89	.94	.94	.85	1.0	1.1	1.0	1.1	.97
15	1.1	.99	. 95	.86	.98	.93	.90	1.0	1.0	.99	1.1	1.0
			.00	.00	.50	. 50		1.0	2.0	.00		2.0
16	1.0	1.0	.91	. 87	1.0	.91	.86	. 97	.99	1.0	1.1	.98
17	.98	. 97	. 94	. 85	. 97	. 87	.88	. 96	1.1	. 97	1.0	.99
18	.98	. 94	.98	. 85	. 99	. 92	. 85	. 92	1.0	.98	.90	. 94
19	. 97	. 95	. 94	. 88	1.1	.91	. 83	. 95	. 99	. 95	.91	. 87
20	. 96	.97	.91	. 87	1.0	. 87	.83	.98	1.0	1.0	.93	.90
21	.94	.98	. 87	.89	.98	.87	.82	.96	1.0	1.1	.91	.97
22	. 95	.98	.90	.87	.96	.87	.83	.98	1.0	1.1	.90	.94
23	. 97	.99	.89	.90	.94	.89	.86	1.0	1.0	1.1	.90	.89
24	.96	.99	.89	.91	.96	.90	.85	1.0	1.1	1.1	1.0	.91
25	. 93	1.0	.87	.90	.96	.89	.91	1.1	1.0	1.1	1.1	.84
				. 30	. 30	.09	.51	1.1	1.0	1.1	1.1	.04
26	. 93	1.0	. 87	.90	.99	.89	. 93	1.1	1.0	1.1	1.0	. 90
27	. 95	. 96	. 85	.89	1.0	. 90	. 96	1.0	. 98	1.2	1.1	. 95
28	. 97	. 96	. 84	.91	1.0	. 86	.91	1.0	1.1	1.2	1.0	.91
29	1.1	. 96	.86	. 90		.88	.90	. 96	1.0	1.1	1.0	. 87
30	1.1	. 93	.87	90		. 85	.92	1.1	1.1	1.1	1.0	.89
31	1.1		.90	. 87		. 86		1.0		1.1	.96	
TOTAL	30.34	30.03	28.41	27.20	26.92	28.03	26.48	30.12	31.66	32.89	31.91	28.85
MEAN	.98	1.00	.92	.88	.96	.90	.88	.97	1.06	1.06	1.03	.96
MAX	1.1	1.1	1.1	.91	1.1	.97	.96	1.1	1.2	1.2	1.1	1.1
MIN	.91	.91	.84	.82	.85	.85	.82	.88	.98	.95	.90	.84
AC-FT	60	60	56	54	53	. 65	53	60	63	65	63	57
AC-FI	00	00	36	54	23	36	23	60	03	65	03	3/

CAL YR 1988 TOTAL 373.77 MEAN 1.02 MAX 1.3 MIN .79 AC-FT 741 WTR YR 1989 TOTAL 352.84 MEAN .97 MAX 1.2 MIN .82 AC-FT 700

89 CHEYENNE RIVER BASIN 06412800 CLEGHORN SPRINGS NORTH CHANNEL AT FISH HATCHERY, AT RAPID CITY, SD

LOCATION.--Lat 44°03'32", long 103°17'50", in NE\https://docs.at weir on right bank within Cleghorn Springs Fish Hatchery, 0.2 mi west of Canyon Lake within city limits of Rapid City.

DRAINAGE AREA . -- Indeterminate.

PERIOD OF RECORD . -- October 1987 to current year.

GAGE. -- Water-stage recorder and V-notch weir. Datum of gage is 3,367.59 ft above National Geodetic Vertical Datum of 1929.

REMARKS .-- Records good. Flows may vary depending on operational activities of fish hatchery. This is one of three stations that monitor flow from Cleghorn Springs (see stations 06412600 and 06412700). Several observations of water temperature and specific conductance were made during the year.

EXTREMES FQR PERIOD OF RECORD. -- Maximum daily discharge, 3.0 ft<sup>3</sup>/s, Nov. 13-16, 1987; minimum daily discharge, 0.40 ft3/s. Oct. 1. 1987.

EXTREMES FQR CURRENT YEAR. -- Maximum daily discharge, 1.6 ft 3/s, June 13, Aug. 25; minimum daily discharge, 0.52 ft<sup>3</sup>/s, Nov. 30.

REVISIONS. -- Revised figures of discharge for water year 1988, superseding those published in the report for 1988 are given below.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

EXTREMES FOR WATER YEAR 1988.--Maximum daily discharge, 3.0 ft<sup>3</sup>/s, Nov. 13-16; minimum daily discharge, 0.40 ft<sup>3</sup>/s, Oct. 1.

MEAN VALUES OCT AUG SEP DAY NOV DEC JAN FEB MAR APR MAY JUN .IIII. 1.0 e. 40 2.0 . 51 1.3 e.80 .73 54 1.2 1.2 1.3 .93 . 47 2 e.46 2.0 54 1.1 .74 1.2 1.1 1.3 1.0 .91 e.80 3 .49 56 .72 .99 1.4 1.3 .94 2.0 1.3 e.80 . 46 1.1 . 97 1.5 1.3 .99 .49 1.9 e.82 1.1 e.80 .74 .48 1.1 5 .99 e.56 1.9 .54 1.3 e.70 .58 .50 . 85 1.2 1.4 1.1 6 e.76 . 80 92 2.3 .54 1.2 e.70 .66 .54 1.1 1.4 1.1 e.76 2.9 .54 1.0 e.70 .64 .53 .92 1.2 1.4 1.1 .92 8 e.64 2.9 .54 e.70 1.0 1.5 1.0 .87 1.1 .71 .60 1.1 9 e.67 e.50 .77 .97 1.0 1.5 1.0 .87 1.3 e.70 .60 10 1.0 1.0 .88 e2.9 e.50 1.3 e.70 .49 .85 .91 11 .70 2.9 e.60 1.1 e.70 .51 .62 .91 1.1 1.5 1.0 12 e.79 2.9 .79 1.2 . 64 .98 1.3 1.4 1.0 .92 e. 60 . 62 e.92 1.5 13 3.0 1.3 1.1 .85 .86 1.1 e.60 56 . 58 1.1 95 3.0 .85 e.60 .46 1.0 1.4 . 82 14 1.3 .65 1.1 1.1 15 1.4 1.0 e.96 3.0 1.1 e1.0 e.60 .48 .72 1.1 .91 .86 16 .86 e.92 3.0 1.2 e1.0 e.60 .61 .79 1.1 .94 1.6 1.1 17 . 92 e2.1 1.3 e1.0 . 58 .63 .83 1.3 1.1 1.6 1.1 .81 18 .92 e1.1 1.5 e1.0 . 57 . 57 .93 1.4 1.2 1.5 1.1 .88 19 e.92 e1.2 1.2 e1.0 .75 .86 1.4 1.2 1.5 .95 .93 20 e.92 e1.2 1.3 e1.0 .67 .73 1.0 1.4 1.1 1.4 .97 .85 21 e1.0 .56 1.4 e1.0 .58 .63 .97 1.3 1.2 1.5 1.0 .84 .59 1.2 e.90 .56 .50 1.0 1.3 1.3 1.6 1.1 .82 1.1 23 1.1 e.59 1.5 e.90 .69 . 49 1.6 1.0 .82 1.5 1.1 1.1 1.3 e.56 e.90 1.2 1.6 .90 .83 24 . 49 .52 1.0 1.6 1.4 .76 e.51 .96 .90 .84 1.3 1.6 1.4 e 90 1.3 1.4 .54 26 1.6 97 . 89 e1.3 1.5 e.90 63 . 59 1.1 1.2 1.5 27 e1.3 .51 1.4 e.90 .62 .51 1.0 1.0 1.5 1.2 .97 . 92 .75 .88 28 1.7 .51 1.1 e.90 . 53 .89 .94 .88 .68 29 e1.9 .49 1.3 .53 1.0 1.6 .93 .92 .81 e.80 .70 .83 30 2.0 .54 1.2 e.80 . 52 1.1 1.4 1.1 .94 1.1 2.0 1.2 e.80 .51 1.2 1.1 .94 31.90 26.31 TOTAL 30.87 52.50 30.89 32.40 19.21 18.45 23.16 34.13 36.65 43.58 MEAN 1.00 1.75 .60 1.22 1.41 1.03 .88 1.00 1.05 66 .77 1.10 MAX 1.6 .99 2.0 3.0 1.5 1.3 80 .75 1.1 1.4 1.6 1.3 MIN 40 49 .50 80 .49 . 46 .46 .80 .91 .75 . 90 .75 73 63 52 AC-FT 61 104 61 64 38 37 46 68 86

WTR YR 1988 TOTAL 380.05 MEAN 1.04 MAX 3.0 MIN .40 AC-FT 754

e Estimated

CHEYENNE RIVER BASIN

## 06412800 CLEGHORN SPRINGS NORTH CHANNEL AT FISH HATCHERY, AT RAPID CITY, SD--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

					-							
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.73	.99	.55	.98	.96	. 93	.86	.90	1.2	1.1	1.1	.94
1 2	.67	1.0	. 53	.87	.96	.88	.92	.89	1.2	1.1	1.2	1.0
3	.63	1.0	.63	.82	.96	.90	.93	.97	1.4	1.1	1.3	.97
									1.4	1.1	1.2	1.0
4	.75	1.0	.62	1.0	.99	.85	1.2	.94			1.2	.89
5	.71	1.2	. 69	1.1	.98	.72	1.2	.99	1.3	1.1	1.2	.09
6 7	.63	1.2	.70	.97	1.0	. 87	1.2	.99	1.4	1.0	1.4	.90
7	. 68	1.2	. 63	. 98	. 95	.89	1.3	1.0	1.4	1.0	1.3	.99
8	.70	1.1	.72	. 95	1.2	.75	1.3	. 95	1.4	1.2	1.2	1.2
9	.71	. 99	1.1	.77	1.0	.80	1.3	1.0	1.3	1.1	1.2	1.2
10	.68	. 82	1.1	.71	1.0	.79	1.2	1.1	1.4	1.1	1.3	1.1
11	.68	. 87	1.0	.77	1.0	.78	1.4	1.1	1.4	1.1	1.2	1.1
12	.69	.99	1.0	. 83	1.0	.82	1.2	1.1	1.4	1.2	1.2	1.1
13	.66	.98	1.0	.86	.91	.77	.94	1.2	1.6	1.2	1.3	.94
14	.66	.89	.89	.88	.97	.86	.79	1.2	1.4	1.2	1.2	. 85
15	.76	. 87	.79	.72	.93	.90	.82	1.2	1.3	1.1	1.2	.98
			.,,				.02					
16	. 63	. 85	.73	. 84	. 93	.87	.80	1.2	1.2	1.2	1.3	1.0
17	. 64	.74	.80	.75	.81	.70	. 93	1.1	1.5	1.1	1.2	1.0
18	. 58	.70	. 86	. 84	.76	. 84	. 88	1.1	1.5	1.0	. 92	. 87
19	. 63	.73	. 85	1.0	. 94	. 84	.77	1.1	1.3	.99	.88	.77
20	.69	.75	.80	.98	.91	.71	.74	1.1	1.3	1.0	.91	. 86
21	.69	.80	.64	.92	.85	.77	.68	1.1	1.3	1.1	.84	.97
22	.72	.78	.74	.85	.84	.80	.71	1.1	1.3	1.2	.82	1.0
23	.73	.72	.72	.97	.88	.76	.78	1.2	1.3	1.2	.84	.94
24	.68	.72	.85	1.0	.87	.76	.76	1.3	1.5	1.1	1.2	.89
											1.6	.71
25	. 62	.77	.86	. 95	.79	.75	. 95	1.4	1.3	1.1	1.0	./1
26	.64	.66	.86	.99	.88	.74	1.0	1.5	1.2	1.2	1.1	.88
27	.60	. 55	. 82	. 95	. 97	. 82	1.1	1.3	1.0	1.3	1.2	. 85
28	. 60	. 62	.90	1.0	. 99	.74	1.0	1.3	.91	1.4	1.1	.77
29	.88	. 56	1.0	. 97		. 93	. 95	1.2	. 94	1.2	1.1	.73
30	. 98	. 52	1.0	. 93		.81	1.0	1.4	1.0	1.1	1.1	.76
31	. 99		1.1	.88		.85		1.2		1.1	.94	
TOTAL	21.64	25.57	25.48	28.03	26.23	25,20	29.61	35.13	39.05	34.99	35.55	28.16
MEAN	.70	.85	. 82	.90	.94	.81	.99	1.13	1.30	1.13	1.15	.94
MAX	.99	1.2	1.1	1.1	1.2	.93	1.4	1.5	1.6	1.4	1.6	1.2
MIN	. 58	.52	.53	.71	.76	.70	.68	.89	.91	.99	.82	.71
AC-FT	43	51	51	56	52	50	.00	70	77	69	71	56
AC-FI	43	21	21	30	34	30	29	/0	//	09	/1	20

CAL YR 1988 TOTAL 338.48 MEAN .92 MAX 1.6 MIN .46 AC-FT 671 WTR YR 1989 TOTAL 354.64 MEAN .97 MAX 1.6 MIN .52 AC-FT 703

## 06412900 RAPID CREEK BELOW CLEGHORN SPRINGS, AT RAPID CITY, SD

LOCATION.--Lat 44°03'33", long 103°17'49", in NWkNEkSEk sec.8, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right bank 100 ft downstream from confluence of fish hatchery discharge.

DRAINAGE AREA. -- 378 mi 2.

PERIOD OF RECORD . -- October 1987 to current year.

GAGE. -- Water-stage recorder. Datum of gage is 3,358.46 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Flow regulated by Pactola Dam approximately 22 mi upstream since August 1956 (see station 06411000). Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 375 ft<sup>3</sup>/s, July 12, 1989, gage height, 7.15 ft; minimum daily discharge, 13 ft<sup>3</sup>/s, Feb. 3, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1972, reached a discharge of 43,800 ft<sup>3</sup>/s based on summation of slope-area measurements of peak flow at station 06412500 and miscellaneous site at Clephorn Canyon.

EXTREMES FOR CURRENT YEAR 3-Maximum discharge, 375 ft<sup>3</sup>/s at 1830 hours, July 12, gage height, 7.15 ft; minimum daily discharge, 13 ft<sup>3</sup>/s, Feb. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES SEP DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG e18 2.7 e18 e20 e18 e19 e26 e19 e19 e20 e20 e18 e16 e17 ---2.7 TOTAL MEAN 20.9 21.1 19.8 17.9 17.1 18.5 21.9 54.9 93.9 97.0 72.3 36.2 MAX MIN 

CAL YR 1988 TOTAL 17831 MEAN 48.7 MAX 144 MIN 14 AC-FT 35370 WTR YR 1989 TOTAL 15008 MEAN 41.1 MAX 152 MIN 13 AC-FT 29770

e Estimated

## 06413200 RAPID CREEK BELOW PARK DRIVE. AT RAPID CITY. SD

LOCATION.--Lat 04°03'33", long 103°17'02", in NE\NE\SW\ sec.9, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on left bank on Meadowbrook Golf Course 400 ft below Park Drive, 1,000 ft below Canyon Lake Dam

DRAINAGE AREA. -- 384 mi<sup>2</sup>.

PERIOD OF RECORD. --October 1987 to November 1989 (discontinued).

GAGE. -- Water-stage recorder. Datum of gage is 3,327.91 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records for water year 1989 good except those for estimated daily discharges, which are fair. Records for period October to November 1989 good. Small amount of diversion for private use upstream from station. Substantial amounts of flow are released from Canyon Lake Dam which are diverted through Canyon Lake Park. A large percentage of this diversion returns to Rapid Creek upstream from station. Several observations of specific conductance and water temperature were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 570 ft<sup>3</sup>/s, Aug. 24, 1989, gage height unknown, based on comparison with Rapid Creek above Jackson Boulevard, at Rapid City (06413570); minimum daily discharge, 10 ft<sup>3</sup>/s, Mar. 31, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD. -- The flood of June 9, 1972, reached a discharge of 50,000 ft<sup>3</sup>/s, from slope-area measurement at site 2.4 mi downstream from station.

EXTREMES FOR CURRENT PERIOD. --Water year 1989: Maximum discharge, 570 ft<sup>3</sup>/s, Aug. 24, gage height unknown, based on comparison with Rapid Creek above Jackson Boulevard, at Rapid City (06413570); minimum daily discharge, 10 ft<sup>3</sup>/s, Mar. 31.

October to November 1989: Maximum daily discharge during period, 30  ${\rm ft}^3/{\rm s}$ , Nov. 24; minimum daily discharge, 13  ${\rm ft}^3/{\rm s}$ , Nov. 16.

REVISIONS. -- Revised daily discharges, in cubic feet per second, for period October and November 1987 are given below. These figures supersede those published in the report for 1988.

Oct. 23	23 22 21 28	30 31 Nov. 1 2		Nov.	4	23 24 23 23	Nov. 10
MONTH	TOTAL	MEAN	MAX	MIN	AC-FT		un .
October 1987 November 1987 Wtr Yr 1988	780 670 17022	25.2 22.3 46.5	34 29 135	21 16 15	1550 1330 33760		

06413200 RAPID CREEK BELOW PARK DRIVE, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

					4.7							
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	26	29	26	24	17	18	11	18	53	82	72	e37
2	22	28	23	21	14	18	11	18	72	83	81	e40
1 2 3	20	28	23	17	13	20	13	21	91	83	83	e27
4	21	29	21	22	16	16	17	21	92	82	82	e24
5	19	30	26	25	22	15	23	23	90	80	95	e23
			-			20				-		
6 7	17	31	23	26	24	19	24	26	97	79	105	e28
7	17	31	23	23	21	23	25	30	99	81	100	e41
8	17	28	17	17	20	26	23	30	96	88	88	e51
9	17	21	27	15	21	26	19	39	95	94	95	e33
10	17	19	38	14	20	26	17	42	94	95	98	e27
	3											
11	14	21	33	15	21	25	17	53	93	99	97	e26
12	14	25	32	21	22	24	19	52	93	114	97	e24
13	16	24	32	25	22	23	22	57	89	100	93	e22
14	17	23	24	24	22	23	22	54	76	92	93	e20
15	18	22	20	22	21	19	20	54	73	70	98	e17
16	17	22	16	22	20	20	20	40	79	54	117	e14
17	21	20	22	22	19	13	19	37	91	51	e82	e14
18	20	23	27	22	19	14	19	35	79	49	e38	e13
19	19	19	26	24	19	23	19	41	75	48	e27	e14
20	17	17	25	23	19	18	19	48	84	69	e27	e18
21	16	21	19	21	20	17	16	50	86	77	e24	e31
22	15	23	24	22	19	19	13	50	84	80	e23	e24
23	18	23	19	23	21	18	19	62	73	80	e28	e20
24	18	21	17	25	23	18	24	67	74	81	e60	e18
25	17	19	19	22	21	17	23	70	56	82	e37	e17
26	17	20	18	21	23	15	23	81	53	74	e32	e17
27								80	49	72	e41	e16
	16	17	15	21	23	16	23			87	e40	15
28	18	15	13	25	20	12	22	80	55			
29	27	27	15	23		13	19	87	69	81	e34	14
30	29	26	21	23		11	20	88	76	80	e32	15
31	29		26	23		10		59		73	e32	
TOTAL	586	702	710	673	562	575	581	1513	2386	2460	2051	700
MEAN	18.9	23.4	22.9	21.7	20.1	18.5	19.4	48.8	79.5	79.4	66.2	23.3
MAX	29	31	38	26	24	26	25	88	99	114	117	51
MIN		15								48	23	13
	14		13	14	13	10	11	18	49			1390
AC-FT	1160	1390	1410	1330	1110	1140	1150	3000	4730	4880	4070	1390

CAL YR 1988 TOTAL 16895 MEAN 46.2 MAX 135 MIN 13 AC-FT 33510 WTR YR 1989 TOTAL 13499 MEAN 37.0 MAX 117 MIN 10 AC-FT 26780

e Estimated

## 06413200 RAPID CREEK BELOW PARK DRIVE, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	15	23										
2	16	24										
3	17	23										
4	18	20										
5	17	22										
-	1,	44										
6	17	22										
7	19	18										
8	19	17										
9												
	18	15										
10	18	15										
11	18	15										
12	19	15										
13	19	15										
14	19	15										
15	19	16										
16	18	13										
17	20	20										
18	20	18										
19	19	18										
20	20	21										
21	20	25										
22	20	25										
23	19	23										
24	18	30										
25	17	29										
26	17	28										
27	19	24										
28	24	17										
29	23	21										
30	22	21										
31	22											
TOTAL	586	608										
MEAN	18.9	20.3										
MAX	24	30										
MIN	15	13										
AC-FT	1160	1210										

95 06413300 LEEDY DITCH AT HEADGATE BELOW CANYON LAKE DAM, AT RAPID CITY, SD

LOCATION.--Lat 44°03'27", long 103°17'12", in SWanEasWa sec.9, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right upstream edge of Parshall flume 470 ft west of intersection of Park Drive and Falls Drive, and 250 ft northeast of Canyon Lake Dam.

PERIOD OF RECORD. -- October 1987 to November 1989 (discontinued).

GAGE, -- Water-stage recorder and Parshall flume. Datum of gage is 3,346,19 ft above National Geodetic Vertical Datum of 1929. August 1946 to September 1951, water-stage recorder at different site and datum (data prior to 1951 published in WSP 1309 and 1729).

REMARKS.--Records good for water year 1989 except estimated daily discharge, Dec. 22, which is poor. Records for period October to November 1989 good. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. -- Maximum daily discharge, 2.8 ft3/s, Apr. 14-16, Aug. 3, 4, 1988, July 20, 21, 1989; no flow for many days in 1988-90.

EXTREMES FOR CURRENT PERIOD. -- Water Year 1989: Maximum daily discharge, 2.8 ft 3/s, July 20, 21; no flow for many days.

October to November 1989: Maximum daily discharge during period, 1.4 ft3/s, Oct. 16.

REVISIONS, -- Revised figures of discharge for water year 1988, superseding those published in the report for 1988 are given below.

EXTREMES FOR WATER YEAR 1988 .- Maximum daily discharge, 2.8 ft 3/s, Apr. 14-16, Aug. 3, 4; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP  1 1.6 1.6 1.0 .00 .00 .00 .00 .00 2.3 e2.0 1.2 2.2 2.3 2 1.6 1.6 1.4 .00 .00 .00 .00 .00 2.2 e2.0 1.4 2.2 2.3 3 1.6 1.6 1.0 .00 .00 .00 .00 .00 2.2 e2.0 1.4 2.2 2.3 4 1.6 1.6 1.5 .94 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.8 2.3 5 1.6 1.5 .94 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.8 2.3 7 1.6 1.4 .00 .00 .00 .00 .00 .00 1.7 e2.0 2.6 2.8 2.3 7 1.6 1.4 .00 .00 .00 .00 .00 .00 1.7 e2.0 2.6 2.5 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 9 1.4 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 9 1.4 1.4 .00 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.5 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 1.9 1.9 e2.0 2.6 2.5 2.3 11 1.4 1.3 .00 .00 .00 .00 .00 1.9 1.3 e2.0 2.6 2.5 2.3 12 1.4 1.3 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.6 2.5 2.3 13 1.4 1.1 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.6 2.4 2.2 2.2 14 1.5 1.5 .94 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.2 2.2 15 1.6 1.3 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.2 2.2 16 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.4 2.3 17 1.5 .69 .00 .00 .00 .00 .00 2.8 2.1 e1.0 2.3 2.4 2.4 18 1.5 1.1 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 19 1.5 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 19 1.5 .69 .00 .00 .00 .00 .00 2.8 2.1 e1.0 2.3 2.4 2.4 19 1.5 .69 .00 .00 .00 .00 .00 2.8 2.1 e1.0 2.3 2.4 2.4 19 1.5 .69 .00 .00 .00 .00 .00 2.8 2.1 e1.0 2.3 2.4 2.4 19 1.5 .69 .00 .00 .00 .00 .00 2.8 2.1 e1.0 2.3 2.4 2.4 21 22 .53 1.3 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.4 2.4 22 .53 1.3 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.4 24 .45 2.1 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.4 25 .50 1.3 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.4 26 .36 2.0 .00 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.3 29 .70 .83 .84 .00 .00 .00 .00 .00 2.4 2.4 2.1 e1.7 2.3 2.3 2.4 24 .45 2.1 .00 .00 .00 .00 .00 .00 2.4 2.4 2.1 e1.7 2.3 2.3 2.3 29 .71 .75 .70 .70 .70 .70 .70 .70 .70 .70 .70 .70				1237111		M	EAN VALUE	S					
2 1.6 1.6 1.6 1.4 .00 .00 .00 .00 .00 2.2 e2.0 1.4 2.2 2.3 4 1.6 1.6 1.0 .00 .00 .00 .00 .00 2.0 e2.0 2.6 2.8 2.3 4 1.6 1.5 .94 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.8 2.3 2.3 5 1.6 1.5 .94 .00 .00 .00 .00 .00 1.8 e2.0 2.6 2.8 2.3 2.3 6 1.6 1.5 .94 .00 .00 .00 .00 .00 1.8 e2.0 2.6 2.5 2.3 2.3 7 1.6 1.4 e.05 .00 .00 .00 .00 .00 1.7 e2.0 2.6 2.5 2.5 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.6 2.5 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 1.0 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.4 2.4 2.3 13 1.4 1.1 .00 .00 .00 .00 .00 .00 2.1 2.3 2.2 e2.0 2.3 2.4 2.4 14 1.5 1.1 .00 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 15 1.5 .94 .00 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.3 18 1.3 .63 .00 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 .69 .00 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 17 1.5 .69 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.6 2.5 2.3 2.3 18 1.3 .63 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 2.3 2.3 2.4 2.4 4 4.5 2.1 .00 .00 .00 .00 .00 .00 2.4 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
2 1.6 1.6 1.6 1.4 .00 .00 .00 .00 .00 2.2 e2.0 1.4 2.2 2.3 4 1.6 1.6 1.0 .00 .00 .00 .00 .00 2.2 e2.0 2.6 2.8 2.3 4 1.6 1.5 .94 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.8 2.3 5 1.6 1.5 .94 .00 .00 .00 .00 .00 1.8 e2.0 2.6 2.8 2.3 2.3 6 1.6 1.5 .94 .00 .00 .00 .00 .00 1.8 e2.0 2.6 2.5 2.3 2.3 7 1.6 1.4 e.05 .00 .00 .00 .00 .00 1.7 e2.0 2.6 2.5 2.3 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 8 1.5 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 .00 1.9 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 1.0 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 1.0 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.4 2.4 2.3 1.3 1.4 1.1 .00 .00 .00 .00 .00 .00 2.1 2.3 2.2 e2.0 2.3 2.4 2.4 1.4 1.5 1.1 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 1.5 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.3 2.4 2.4 1.5 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 1.5 1.5 .69 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.3 2.4 2.4 1.7 1.5 .69 .00 .00 .00 .00 .00 2.7 2.2 e1.6 2.5 2.3 2.3 1.8 1.3 .63 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.4 2.4 1.7 1.5 .69 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.3 2.4 2.4 2.4 1.7 1.5 .69 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.6 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.4 2.2 e1.7 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.2 e1.6 2.5 2.3 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.6 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.6 2.5 2.3 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 2.4 2.4 2.4 e1.6 2.7 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.4 2.4 e1.6 2.7 2.5 2.3 2.3 2.3 1.9 1.1 .64 .00 .00 .00 .00 .00 .00 2.4 2.4 2.4 e1.6 2.7 2.3 2.1 2.0 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2	1	1.6	1.6	1.0	.00	.00	00	.00	2.3	e2.0	1.2	2.2	2.3
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7 1.6 1.4 e.05 .00 .00 .00 .00 1.3 e2.0 2.6 2.6 2.3 2.3 9 1.4 1.4 .00 .00 .00 .00 .00 1.3 e2.0 2.6 2.5 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.2 2.0 12 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.4 2.2 13 13 1.4 1.1 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.4 2.4 14 1.5 1.1 .00 .00 .00 .00 .00 2.1 2.3 e1.9 2.3 2.4 2.4 15 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 15 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 .69 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.3 2.3 18 1.3 .63 .00 .00 .00 .00 .00 2.7 2.2 e1.6 2.5 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 19 1.1 .64 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.9 2.0 .83 .64 .00 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.2 2.2 2.0 2.3 2.2 2.0 2.3 2.2 2.0 2.3 2.2 2.0 2.3 2.3 2.4 2.4 2.4 2.3 2.4 2.4 2.5 2.5 2.3 2.3 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	3	1.0	1.5	.54	.00	.00	.00	.00	1.0	62.0	2.0	2.5	2.5
8 1.5 1.4 0.0 0.0 0.0 0.0 83 1.3 e2.0 2.6 2.5 2.3 10 1.4 1.4 0.0 0.0 0.0 0.0 0.0 2.0 1.3 e2.0 2.6 2.3 2.3 10 1.4 1.4 0.0 0.0 0.0 0.0 0.0 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 0.0 0.0 0.0 0.0 0.0 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 0.0 0.0 0.0 0.0 0.0 1.8 2.1 e2.0 2.3 2.2 2.0 12 1.4 1.3 0.0 0.0 0.0 0.0 0.0 1.8 2.1 e2.0 2.3 2.4 2.3 13 13 1.4 1.1 0.0 0.0 0.0 0.0 0.0 1.8 2.2 e2.0 2.3 2.4 2.4 14 1.5 1.1 0.0 0.0 0.0 0.0 0.0 1.8 2.2 e2.0 2.3 2.4 2.4 14 1.5 1.1 0.0 0.0 0.0 0.0 0.0 2.1 2.3 e1.9 2.3 2.4 2.4 15 1.5 0.1 0.0 0.0 0.0 0.0 0.0 2.8 2.2 e1.5 2.3 2.4 2.4 15 1.5 0.9 0.0 0.0 0.0 0.0 0.0 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 6.9 0.0 0.0 0.0 0.0 0.0 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 6.9 0.0 0.0 0.0 0.0 0.0 2.8 2.2 e1.5 2.3 2.3 18 1.3 6.3 0.0 0.0 0.0 0.0 0.0 2.7 2.2 e1.6 2.5 2.3 2.3 18 1.3 6.3 0.0 0.0 0.0 0.0 0.0 2.4 2.2 e1.7 2.5 2.3 2.3 18 1.3 6.3 0.0 0.0 0.0 0.0 0.0 2.4 2.2 e1.7 2.5 2.3 2.3 19 1.1 6.4 0.0 0.0 0.0 0.0 0.0 2.4 2.2 e1.7 2.5 2.3 2.3 2.2 2.0 83 64 0.0 0.0 0.0 0.0 0.0 2.4 2.1 e1.7 2.3 2.3 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.3													2.3
9 1.4 1.4 1.4 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.6 2.3 2.3 10 1.4 1.4 .00 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2 11 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.4 2.3 13 1.4 1.1 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.4 2.3 13 1.4 1.1 .00 .00 .00 .00 .00 2.1 2.3 e1.9 2.3 2.4 2.4 15 1.5 1.1 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4 15 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 15 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 69 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4 17 1.5 69 .00 .00 .00 .00 .00 2.7 2.2 e1.6 2.5 2.3 2.3 18 1.3 63 .00 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 19 1.1 64 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 19 1.1 64 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3 2.2 20 .83 .64 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.3 2.2 20 .83 .64 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.3 2.2 20 .83 .64 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2 2.2 2.2 2.3 2.3 2.3 2.3 2.3 2.3							.00						2.3
10 1.4 1.4	8	1.5	1.4	.00	.00	.00	.00	. 83	1.3	e2.0	2.6		2.3
10 1.4 1.4 .00 .00 .00 .00 1.9 1.4 e2.0 2.4 2.2 2.2  11 1.4 1.3 .00 .00 .00 .00 1.8 2.1 e2.0 2.3 2.2 2.0  12 1.4 1.3 .00 .00 .00 .00 .00 1.8 2.2 e2.0 2.3 2.4 2.3  13 1.4 1.1 .00 .00 .00 .00 .00 2.1 2.3 e1.9 2.3 2.4 2.4  14 1.5 1.1 .00 .00 .00 .00 .00 2.8 2.2 e1.7 2.3 2.4 2.4  15 1.5 .94 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4  16 1.4 .72 .00 .00 .00 .00 .00 2.8 2.2 e1.5 2.3 2.4 2.4  17 1.5 .69 .00 .00 .00 .00 2.7 2.2 e1.6 2.5 2.3 2.3  18 1.3 .63 .00 .00 .00 .00 2.7 2.2 e1.6 2.5 2.3 2.3  19 1.1 .64 .00 .00 .00 .00 2.4 2.2 e1.7 2.5 2.3 2.3  19 1.1 .64 .00 .00 .00 .00 2.4 2.1 e1.7 2.5 2.3 2.3  20 .83 .64 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.3  21 .73 .61 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2  21 .73 .61 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2  21 .73 .61 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2  21 .73 .61 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2  21 .73 .61 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2  22 .63 1.3 .00 .00 .00 .00 .00 2.5 2.4 e1.6 2.2 2.3 2.0  24 .45 2.1 .00 .00 .00 .00 .00 2.5 2.4 e1.6 2.2 2.3 2.0  24 .45 2.1 .00 .00 .00 .00 .00 2.4 2.4 e1.6 2.7 2.3 2.1  25 .40 1.7 .00 .00 .00 .00 .00 2.4 2.4 e1.6 2.7 2.3 2.1  26 .36 2.0 .00 .00 .00 .00 .00 2.4 2.4 e1.6 2.7 2.3 2.1  27 .65 1.9 .00 .00 .00 .00 .00 2.4 2.4 e1.6 2.7 2.3 2.1  28 1.7 1.2 .00 .00 .00 .00 .00 2.4 2.4 e1.6 2.7 2.3 2.1  29 1.7 .53 .00 .00 .00 .00 .00 2.1 e2.0 e1.1 2.6 2.3 1.7  30 1.6 .36 .00 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  30 1.6 .36 .00 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  30 1.6 .36 .00 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  32 1.4 .4 .5 .1 1.4 .00 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  31 1.600 .00 .00 .00 .00 .00 2.3 e2.0 e1.1 2.6 2.3 1.7  32 1.4 .4 .5 .1 1.4 .00 .00 .00 .00 .00 1.74 2.03 1.74 2.03	9	1.4	1.4	.00	.00	.00			1.3	e2.0	2.6	2.3	2.3
12	10	1.4	1.4	.00	.00	.00		1.9	1.4	e2.0	2.4	2.2	2.2
12	11	1.4	1.3	00	00	00	00	1.8	2 1	e2 0	2.3	2.2	2.0
13													
14       1.5       1.1       .00       .00       .00       .00       2.8       2.2       e1.7       2.3       2.4       2.4         15       1.5       .94       .00       .00       .00       .00       2.8       2.2       e1.5       2.3       2.4       2.4         16       1.4       .72       .00       .00       .00       .00       2.8       2.1       e1.6       2.4       2.3       2.4         17       1.5       .69       .00       .00       .00       .00       2.7       2.2       e1.6       2.5       2.3       2.3         18       1.3       .63       .00       .00       .00       .00       2.4       2.2       e1.7       2.5       2.3       2.3         19       1.1       .64       .00       .00       .00       .00       2.4       2.1       e1.7       2.3       2.3       2.3         20       .83       .66       .00       .00       .00       .00       2.4       1.7       e1.8       2.1       2.2       2.2         21       .73       .61       .00       .00       .00       .00       2.4       1.													
15													
16													
17	15	1.5	.94	.00	.00	.00	.00	2.8	2.2	61.5	2.3	2.4	2.4
18       1.3       .63       .00       .00       .00       .00       2.4       2.2       e1.7       2.5       2.3       2.3         19       1.1       .64       .00       .00       .00       .00       2.4       2.1       e1.7       2.3       2.3       2.2         20       .83       .64       .00       .00       .00       .00       2.4       2.0       e1.7       2.1       2.2       2.2         21       .73       .61       .00       .00       .00       .00       2.4       1.7       e1.8       2.1       2.2       2.2         22       .63       1.3       .00       .00       .00       .00       2.5       2.4       e1.8       2.1       2.3       2.1         23       .53       2.1       .00       .00       .00       .00       2.5       2.4       e1.7       1.9       2.3       2.0         24       .45       2.1       .00       .00       .00       .00       2.5       2.4       e1.6       2.2       2.3       2.0         25       .40       1.7       .00       .00       .00       .00       2.4       2.							.00						
19 1.1 64 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.2 2.2 2.0 .83 .64 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2 2.2 2.2 2.3 .63 1.3 .00 .00 .00 .00 .00 2.4 1.7 e1.8 2.1 2.2 2.1 2.2 2.2 2.3 .53 2.1 .00 .00 .00 .00 .00 2.5 2.4 e1.8 2.1 2.3 2.1 2.3 2.1 2.3 .53 2.1 .00 .00 .00 .00 .00 2.5 2.4 e1.8 2.1 2.3 2.1 2.3 2.0 2.4 4.5 2.1 .00 .00 .00 .00 .00 2.5 2.4 e1.6 2.2 2.3 2.0 2.5 4.0 1.7 .00 .00 .00 .00 .00 2.5 2.4 e1.6 2.2 2.3 2.0 2.5 2.4 e1.6 2.7 2.3 2.1 2.0 2.0 2.0 2.0 2.1 2.0 2.0 2.0 2.1 2.0 2.0 2.1 2.0 2.0 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1	17	1.5		.00	.00	.00	.00	2.7	2.2	e1.6		2.3	
19 1.1 64 .00 .00 .00 .00 2.4 2.1 e1.7 2.3 2.3 2.2 2.2 2.0 .83 .64 .00 .00 .00 .00 .00 2.4 2.0 e1.7 2.1 2.2 2.2 2.2 2.2 2.2 2.3 .63 1.3 .00 .00 .00 .00 .00 2.4 1.7 e1.8 2.1 2.2 2.1 2.2 2.3 2.3 2.3 2.2 2.3 2.2 2.3 2.3 2.3	18	1.3	. 63	.00	.00	.00	.00	2.4	2.2	e1.7	2.5	2.3	2.3
20	19	1.1	. 64	.00	.00					e1.7	2.3	2.3	2.2
21													2.2
22													
23			.61	.00	.00	.00	.00	2.4	1.7	e1.8			
24       .45       2.1       .00       .00       .00       .00       2.5       2.4       e1.6       2.2       2.3       2.0         25       .40       1.7       .00       .00       .00       .00       2.4       2.4       e1.6       2.7       2.3       2.1         26       .36       2.0       .00       .00       .00       .00       2.4       2.4       e1.5       2.7       2.3       2.1         27       .65       1.9       .00       .00       .00       .00       2.3       2.4       e1.4       2.6       2.1       2.1         28       1.7       1.2       .00       .00       .00       .00       2.1       e2.0       e1.2       2.6       2.1       2.0         29       1.7       .53       .00       .00       .00       .00       2.1       e2.0       e1.2       2.6       2.1       2.0         29       1.7       .53       .00       .00       .00       2.1       e2.0       e1.1       2.6       2.3       1.7         30       1.6       .36       .00       .00       .00       2.3       e2.0       e1.1       <	22	. 63	1.3	.00	.00	.00	.00	2.5	2.4	e1.8	2.1	2.3	
24       .45       2.1       .00       .00       .00       .00       2.5       2.4       e1.6       2.2       2.3       2.0         25       .40       1.7       .00       .00       .00       .00       2.4       2.4       e1.6       2.7       2.3       2.1         26       .36       2.0       .00       .00       .00       .00       2.4       2.4       e1.5       2.7       2.3       2.1         27       .65       1.9       .00       .00       .00       .00       2.3       2.4       e1.4       2.6       2.1       2.1         28       1.7       1.2       .00       .00       .00       .00       2.1       e2.0       e1.2       2.6       2.1       2.0         29       1.7       .53       .00       .00       .00       .00       2.1       e2.0       e1.1       2.6       2.3       1.7         30       1.6       .36       .00       .00        .00       2.3       e2.0       e1.1       2.6       2.3       1.7         31       1.6        .00       .00        .00 <td< td=""><td>23</td><td>. 53</td><td>2.1</td><td>.00</td><td>.00</td><td>.00</td><td>.00</td><td>2.5</td><td>2.4</td><td>e1.7</td><td>1.9</td><td>2.3</td><td>2.0</td></td<>	23	. 53	2.1	.00	.00	.00	.00	2.5	2.4	e1.7	1.9	2.3	2.0
25	24									e1.6	2.2	2.3	2.0
27       .65       1.9       .00       .00       .00       .00       2.3       2.4       e1.4       2.6       2.1       2.1         28       1.7       1.2       .00       .00       .00       .00       2.1       e2.0       e1.2       2.6       2.1       2.0         29       1.7       .53       .00       .00       .00       .00       2.1       e2.0       e1.1       2.6       2.3       1.7         30       1.6       .36       .00       .00        .00       2.3       e2.0       e1.1       2.6       2.3       1.7         31       1.6        .00       .00        .00        e2.0       e1.1       2.6       2.3       1.7         31       1.6       .36       .00       .00        .00        e2.0       e1.1       2.6       2.3       1.7         TOTAL       39.18       37.86       5.87       0.00       0.00       52.23       62.9       52.2       73.1       72.6       65.7         MEAN       1.26       1.26       .19       .00       .00       .00       1.7													
27       .65       1.9       .00       .00       .00       .00       2.3       2.4       e1.4       2.6       2.1       2.1         28       1.7       1.2       .00       .00       .00       .00       2.1       e2.0       e1.2       2.6       2.1       2.0         29       1.7       .53       .00       .00       .00       .00       2.1       e2.0       e1.1       2.6       2.3       1.7         30       1.6       .36       .00       .00        .00       2.3       e2.0       e1.1       2.6       2.3       1.7         31       1.6        .00       .00        .00        e2.0       e1.1       2.6       2.3       1.7         31       1.6       .36       .00       .00        .00        e2.0       e1.1       2.6       2.3       1.7         TOTAL       39.18       37.86       5.87       0.00       0.00       52.23       62.9       52.2       73.1       72.6       65.7         MEAN       1.26       1.26       .19       .00       .00       .00       1.7	26	36	2.0	00	00	00	00	2 4	2 4	o1 5	2 7	2 3	2 1
28 1.7 1.2 .00 .00 .00 .00 2.1 e2.0 e1.2 2.6 2.1 2.0 29 1.7 .53 .00 .00 .00 .00 .00 2.1 e2.0 e1.1 2.6 2.3 1.7 30 1.6 .36 .00 .00 .0000 2.3 e2.0 e1.1 2.6 2.3 1.7 31 1.600 .0000 2.3 e2.0 e1.1 2.6 2.3 1.7 31 1.600 .0000 2.3 e2.0 e1.1 2.6 2.3 1.7 2.1 1.6 2.3 1.7 2.1 1.6 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3													
29 1.7 .53 .00 .00 .00 .00 2.1 e2.0 e1.1 2.6 2.3 1.7 30 1.6 .36 .00 .0000 2.3 e2.0 e1.1 2.6 2.3 1.7 31 1.600 .0000 e2.0 2.5 2.3   TOTAL 39.18 37.86 5.87 0.00 0.00 0.00 52.23 62.9 52.2 73.1 72.6 65.7 MEAN 1.26 1.26 .19 .00 .00 .00 1.74 2.03 1.74 2.36 2.34 2.19 MAX 1.7 2.1 1.4 .00 .00 .00 2.8 2.4 2.0 2.7 2.8 2.4 MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
30 1.6 .36 .00 .0000 2.3 e2.0 e1.1 2.6 2.3 1.7 31 1.600 .0000 e2.0 2.5 2.3  TOTAL 39.18 37.86 5.87 0.00 0.00 0.00 52.23 62.9 52.2 73.1 72.6 65.7 MEAN 1.26 1.26 1.9 .00 .00 .00 1.74 2.03 1.74 2.36 2.34 2.19 MAX 1.7 2.1 1.4 .00 .00 .00 2.8 2.4 2.0 2.7 2.8 2.4 MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
31 1.600 .0000 e2.0 2.5 2.3  TOTAL 39.18 37.86 5.87 0.00 0.00 0.00 52.23 62.9 52.2 73.1 72.6 65.7  MEAN 1.26 1.26 .19 .00 .00 .00 1.74 2.03 1.74 2.36 2.34 2.19  MAX 1.7 2.1 1.4 .00 .00 .00 2.8 2.4 2.0 2.7 2.8 2.4  MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
TOTAL 39.18 37.86 5.87 0.00 0.00 0.00 52.23 62.9 52.2 73.1 72.6 65.7 MEAN 1.26 1.26 1.9 .00 .00 .00 1.74 2.03 1.74 2.36 2.34 2.19 MAX 1.7 2.1 1.4 .00 .00 .00 2.8 2.4 2.0 2.7 2.8 2.4 MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
MEAN     1.26     1.26     .19     .00     .00     .00     1.74     2.03     1.74     2.36     2.34     2.19       MAX     1.7     2.1     1.4     .00     .00     .00     2.8     2.4     2.0     2.7     2.8     2.4       MIN     .36     .36     .00     .00     .00     .00     1.3     1.1     1.2     2.1     1.7	31	1.6		.00	.00		.00		e2.0		2.5	2.3	
MEAN     1.26     1.26     .19     .00     .00     .00     1.74     2.03     1.74     2.36     2.34     2.19       MAX     1.7     2.1     1.4     .00     .00     .00     2.8     2.4     2.0     2.7     2.8     2.4       MIN     .36     .36     .00     .00     .00     .00     1.3     1.1     1.2     2.1     1.7	TOTAL	39.18	37.86	5.87	0.00	0.00	0.00	52.23	62.9	52.2	73.1	72.6	65.7
MAX 1.7 2.1 1.4 .00 .00 .00 2.8 2.4 2.0 2.7 2.8 2.4 MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
MIN .36 .36 .00 .00 .00 .00 .00 1.3 1.1 1.2 2.1 1.7													
	AC-FT	78	75	12	.0	.0	.0	104	125	104	145	144	130

WTR YR 1988 TOTAL 461.64 MEAN 1.26 MAX 2.8 MIN .00 AC-FT 916

e Estimated

06413300 LEEDY DITCH AT HEADGATE BELOW CANYON LAKE DAM, AT RAPID CITY, SD--Continued

## DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	.86	.64	.00	.00	.00	.00	1.9	1.5	1.9	1.7	.71
2	1.6	1.2	.61	.00	.00	.00	.00	1.9	1.6	1.9	1.7	1.2
3	1.6	1.2	.58	.00	.00	.00	.00	1.8	1.7	1.9	1.7	1.8
4	1.5	.99	.58	.00	.00	.00	.00	1.7	1.7	1.9	1.7	1.7
5	.74	. 63	.58	.00	.00	.00		1.2	1.7	1.9	1.8	1.7
,	.,4	.03	. 36	.00	.00	.00	.00	1.2	1.7	1.9	1.0	1.7
6	.50	. 53	.58	.00	.00	.00	.00	1.2	1.7	2.0	1.8	1.8
7	.51	.48	.55	.00	.00	.00	.00	1.9	1.7	2.0	1.8	1.6
8	.75	. 45	. 43	.00	.00	.00	.00	1.8	1.7	1.8	1.8	.61
9	.65	.43	.28	.00	.00	.00	.00	1.8	1.7	1.5	1.8	1.3
10	.25	.40	.54	.00	.00	.00	.00	1.9	1.7	1.5	1.7	1.3
11	.89	.38	.99	.00	.00	.00	.00	1.9	1.7	1.5	1.7	1.3
12	2.4	.35	.96	.00	.00	.00	.00	1.9	1.6	1.5	1.7	1.2
13	1.5	.33	.90	.00	.00	.00	.00	1.9	1.6	1.5	1.6	1.2
14	1.4	.30		.00	.00			1.9	1.5	2.0	1.7	1.2
15			.84			.00	.00			1.9		1.2
15	1.4	.30	.85	.00	.00	.00	.00	1.9	1.5	1.9	1.8	1.2
16	1.4	.28	.82	.00	.00	.00	.00	1.9	1.5	1.8	1.8	1.1
17	1.4	.28	. 82	.00	.00	.00	.00	1.9	1.5	1.4	1.7	1.0
18	. 97	.28	.87	.00	.00	.00	.00	1.8	1.4	1.1	1.5	. 86
19	.95	. 54	.86	.00	.00	.00	.00	1.8	1.9	2.1	1.5	.81
20	. 67	.78	.45	.00	.00	.00	.00	1.8	1.9	2.8	1.4	.81
21	1.2	.80	.27	.00	.00	.00	.00	1.8	1.9	2.8	1.1	.81
22	1.0	.81	e.05	.00	.00	.00	.00	1.8	1.7	2.4	1.1	.81
23	. 84	.79	.00	.00	.00	.00	.21	1.9	1.7	2.4	1.4	.80
24	.63	.77	.00	.00	.00	.00	. 14	1.9	1.8	2.4	1.4	.80
25	.71	.76	.00	.00	.00	.00	.22	1.8	1.7	1.8	1.2	.81
26	.75	.75	.00	.00	.00	.00	2.5	1.7	1.7	2.2	1.2	.88
27	.70	.65	.00	.00	.00	.00	2.4	1.6	1.7	2.0	1.2	.88
28	.65	.56	.00	.00	.00	.00	1.9	1.6	1.7	1.6	.77	.88
29	.69	.65	.00	.00		.00	1.8	1.6	1.8	1.8	.89	.89
30	.63	.64	.00	.00		.00	1.9	1.6	1.8	1.8	.88	.87
31	.60		.00	.00		.00		1.5		1.3	.88	
mom a T							44.05				45.00	20.00
TOTAL	31.08	18.17	14.05	0.00	0.00	0.00	11.07	54.6	50.3	58.4	45.92	32.83
MEAN	1.00	.61	.45	.00	.00	.00	.37	1.76	1.68	1.88	1.48	1.09
MAX	2.4	1.2	.99	.00	.00	.00	2.5	1.9	1.9	2.8	1.8	1.8
MIN	.25	.28	.00	.00	.00	.00	.00	1.2	1.4	1.1	.77	.61
AC-FT	62	36	28	.0	.0	.0	22	108	100	116	91	65

CAL YR 1988 TOTAL 442.03 MEAN 1.21 MAX 2.8 MIN .00 AC-FT 877 WTR YR 1989 TOTAL 316.42 MEAN .87 MAX 2.8 MIN .00 AC-FT 628

e Estimated

# 06413300 LEEDY DITCH AT HEADGATE BELOW CANYON LAKE DAM, AT RAPID CITY, SD--Continued

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.84	. 56								422		
2	.85	.45										
3	.73	.00										
4	.57									222		
		.00										
5	. 55	.00										
6	. 55	.00										
7	. 56	.00										
8	. 58	.00										
9	.58	.00										
10	. 57	.00										
11	. 55	.00								222		
12	.55	.00										
13	. 56	.00										
14	.58	.00										
15	.94	.00										
16	1.4	.00	2.22	111						-222		
17	. 58	.00										
18	. 48	.00										
19	.37	.00										
20	. 29	.00										
21	.25	.00										
22	.25	.00										
23	.25	.00										
24	. 52	.00										
25	1.2	.00										
26	1.0	00										
26	1.2	.00										
27	1.1	.00										
28	.89	.00										
29	.85	.00										
30	. 82	.00										
31	. 66											
TOTAL	20.67	1.01										
MEAN	.67	.034										
MAX	1.4	.56										
MIN												
	. 25	.00										
AC-FT	41	2.0										

#### 06413550 LEEDY DITCH AT MOUTH, AT RAPID CITY, SD

LOCATION.--Lat 44°03'49", long 103°16'18", in NE\SE\NE\sec.9, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, at weir on left bank 250 ft upstream from mouth in Meadowbrook Golf Course, immediately west of Meadowbrook School.

PERIOD OF RECORD. -- October 1987 to November 1989 (discontinued).

GAGE.--Water-stage recorder and metal V-notch weir. Datum of gage is 3,305.71 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good for water year 1989 except those for Apr. 23 to Sept. 28, which are poor. Records for period October to November 1989 good. Flow regulated approximately 1.3 mi upstream from gage at headgate. Flow diverted from ditch for lawn and garden watering by several homeowners. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2.0 ft<sup>3</sup>/s, Aug. 24, 1989; no flow for many days in 1988-89.

EXTREMES FOR CURRENT PERIOD. -- Water year 1989: Maximum daily discharge, 2.0 ft<sup>3</sup>/s, Aug. 24; no flow for many days.

October to November 1989: Maximum daily discharge during period, 0.23 ft<sup>3</sup>/s, Oct. 28; no flow for many days.

REVISIONS. -- Revised figures of discharge for water year 1988, superseding those published in the report for 1988 are given below.

EXTREMES FOR WATER YEAR 1988.--Maximum daily discharge, 1.6 ft<sup>3</sup>/s, Aug. 3, 4, Sept. 27; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		DIDOMENOD	, IN CODIC			EAN VALUE		DIM 1907	10 billia	DIM 1300		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.90	.81	.09	.00	.00	.00	.00	1.0	.96	.40	1.1	1.1
2	. 93	.86	.70	.00	.00	.00	.00	1.0	.94	. 43	.98	1.1
3	. 94	. 83	. 62	.00	.00	.00	.00	.75	. 94	1.1	1.6	1.1
4	.94	. 82	. 55	.00	.00	.00	.00	.61	.98	1.1	1.6	1.1
5	.92	.78	. 54	.00	.00	.00	.00	.58	.95	1.1	1.4	1.1
6	.85	.79	.35	.00	.00	.00	.00	. 59	.94	1.2	1.3	1.2
7	. 83	.77	.01	.00	.00	.00	.00	.36	. 93	1.2	1.3	1.2
8	.84	.76	.00	.00	.00	.00	.00	.39	.92	1.2	1.3	1.2
9	.86	.77	.00	.00	.00	.00	.00	.31	.85	1.2	1.1	1.2
10	.87	.77	.00	.00	.00	.00	.00	.32	.84	1.2	.91	1.1
11	.90	.76	.00	.00	.00	.00	.00	.85	. 82	1.2	.89	.94
12	.90	.76	.00	.00	.00	.00	.00	.85	.79	1.1	1.1	1.2
13	.90	. 64	.00	.00	.00	.00	.00	. 87	.82	1.1	1.1	1.2
14	.94	.62	.00	.00	.00	.00	.03	.89	.70	1.1	1.2	1.2
15	.98	. 53	.00	.00	.00	.00	.18	.82	. 57	1.1	1.2	1.2
16	.93	.39	.00	.00	.00	.00	.33	.81	. 58	1.1	1.2	1.3
17	.94	.38	.00	.00	.00	.00	.33	.87	.61	1.2	1.2	1.5
18	.87	.34	.00	.00	.00	.00	.28	.80	.64	1.2	1.1	1.5
19	.72	.32	.00	.00	.00	.00	.34	.80	.68	1.2	1.1	1.5
20	.56	.34	.00	.00	.00	.00	.38	.78	.66	1.1	1.1	1.5
21	. 48	.33	.00	.00	.00	.00	. 50	. 58	. 67	.97	1.1	1.5
22	.38	. 55	.00	.00	.00	.00	.61	1.1	.74	1.0	1.1	1.5
23	.31	1.0	.00	.00	.00	.00	. 66	1.0	.70	. 83	1.1	1.5
24	. 16	1.1	.00	.00	.00	.00	. 67	. 97	.63	. 95	1.1	1.5
25	.09	1.0	.00	.00	.00	.00	.68	1.0	. 58	1.3	1.2	1.5
26	.06	1.2	.00	.00	.00	.00	.71	. 96	. 56	1.3	1.2	1.5
27	.09	1.2	.00	.00	.00	.00	.76	. 96	.59	1.3	1.0	1.6
28	.72	.90	.00	.00	.00	.00	.71	.91	.45	1.3	1.0	1.5
29	.76	.34	.00	.00	.00	.00	.73	. 90	.57	1.3	1.1	1.3
30	.77	. 16	.00	.00		.00	.77	.88	.45	1.2	1.1	1.3
31	.81		.00	.00		.00		1.0		1.2	1.1	
TOTAL	22.15	20.82	2.86	0.00	0.00	0.00	8.67	24.51	22.06	34.18	35.88	39.14
MEAN	.71	. 69	.092	.00	.00	.00	.29	.79	.74	1.10	1.16	1.30
MAX	.98	1.2	.70	.00	.00	.00	.77	1.1	.98	1.3	1.6	1.6
MIN	.06	.16	.00	.00	.00	.00	.00	.31	. 45	.40	.89	.94
AC-FT	44	41	5.7	.00	.00	.00	17	49	44	68	71	78
WC-LI		41	3.7	. 0	. 0	.0	1/	49	44	00	11	/0

WTR YR 1988 TOTAL 210.27 MEAN .57 MAX 1.6 MIN .00 AC-FT 417

06413550 LEEDY DITCH AT MOUTH, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

D.111			220									ann
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	.19	.13	.00	.00	.00	.00	e.40	e.22	. 47	.43	.04
2	1.3	.44	.11	.00	.00	.00	.00	e.40	e.24	. 45	. 43	. 17
3	1.4	.44	.10	.00	.00	.00	.00	e.40	.26	.45	.42	. 47
4	1.4	.35	.10	.00	.00	.00	.00	e.30	.26	.43	.38	.49
5	. 63	.15	.11	.00	.00	.00	.00	e.10	.26	.41	. 43	.51
100							12.2	10000				
6	. 23	.09	.10	.00	.00	.00	.00	e.10	. 26	.43	.49	. 54
7	. 19	.07	.09	.00	.00	.04	.00	e.10	.26	. 43	. 47	. 58
8	. 42	.06	.08	.00	.00	.00	.00	e.20	.26	.35	. 45	.11
9	.37	.05	.04	.00	.00	.00	.00	.18	.26	.18	. 47	.39
10	.08	.04	.02	.00	.00	.00	.00	.23	. 26	.18	.42	.38
11	00	10	25	00	00	00	00	26	26	.22	.35	.35
	.02	.12	.35	.00	.00	.00	.00	.26	. 26			
12	. 67	.04	.33	.00	.00	.00	.00	.30	. 26	.26	. 40	.34
13	. 65	.03	.29	.00	.00	. 0	.00	.29	. 26	.26	.38	.33
14	. 62	.04	.24	.00	.00	.00	.00	. 29	.29	.64	. 42	.32
15	. 57	.03	.24	.00	.00	.00	.00	.29	.30	. 54	. 48	.28
16	. 58	.02	.24	.00	.00	.00	.00	.31	.30	. 47	.64	.16
17	.87	.01	.25	.00	.00	.00	.00	.26	.30	.41	.49	.10
18	.46	.01	.26	.00	.00	.00	.00	.26	. 23	.14	.39	.19
19	.37	.04	.26	.00	.00	.00	.00	.26	. 48	.62	.38	. 13
												. 26
20	. 19	.20	. 13	.00	.00	.00	.00	. 26	. 47	. 83	.31	. 20
21	.49	.22	.01	.00	.00	.00	.00	. 26	. 52	.74	. 17	.33
22	.40	.22	.00	.00	.00	.00	.00	.26	.49	. 55	.12	e.30
23	. 23	.23	.00	.00	.00	.00	e.04	e.32	. 50	. 53	.25	e.20
24	.13	.20	.00	.00	.00	.00	e.02	e.32	.69	.51	e2.0	e.20
25	. 13	.19	.00	.00	.00	.00	e.04	e.32	. 50	.37	.33	e.20
											07	00
26	.19	.19	.00	.00	.00	.00	e.20	e.29	. 47	. 56	.27	e.20
27	. 15	. 17	.00	.00	.00	.00	e.50	.26	.41	. 53	. 52	e.15
28	.11	.15	.00	.00	.00	.00	e.40	e.22	.38	. 45	. 12	e.20
29	. 10	. 15	.00	.00		.00	e.30	e.22	.40	. 54	.13	.12
30	.11	.13	.00	.00		.00	e.40	e.22	.44	.49	. 11	.07
31	. 13		.00	.00		.00		e.19		.29	.11	
TOTAL	14.49	4.27	3.48	0.00	0.00	0.04	1.90	8.07	10.49	13.73	12.76	8.11
												.27
MEAN	. 47	.14	.11	.00	.00	.001	.063	.26	.35	. 44	.41	
MAX	1.4	. 44	.35	.00	.00	.04	. 50	. 40	. 69	. 83	2.0	. 58
MIN	.02	.01	.00	.00	.00	.00	.00	.10	. 22	. 14	.11	.04
AC-FT	29	8.5	6.9	.0	.0	.08	3.8	16	21	27	25	16

CAL YR 1988 TOTAL 186.68 MEAN .51 MAX 1.6 MIN .00 AC-FT 370 WTR YR 1989 TOTAL 77.34 MEAN .21 MAX 2.0 MIN .00 AC-FT 153

e Estimated

# CHEYENNE RIVER BASIN

# 06413550 LEEDY DITCH AT MOUTH, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00										
2	.00	.00										
3	.00	.00										
4	.00	.00										
5	.00	.00										
6	.00	.00										
7	.00	.00										
8	.00	.00										
9	.00	.00										
10	.00	.00										
11	.00	.00								100		
12	.00	.00										
13	.00	.00										
14	.00	.00										
15	.00	.00										
	.00	.00										
16	.02	.00										
17	.00	.00										
18	.00	.00										
19	.00	.00										
20	.00	.00										
21	.00	.00										
22	.00	.00										
23	.00	.00										
24	.00	.00										
25	.00	.00										
26	.02	.00										
27	.01	.00										
28	.23	.00										
29	.05	.00										
30	.04	.00										
31	.02											
TOTAL	0.39	0.00										1 122
MEAN	.013	.00										
MAX	.23	.00										
MIN	.00	.00										100
AC-FT	.8	.00									1	
TIO LI	. 0											

#### CHEYENNE RIVER BASIN

### 06413570 RAPID CREEK ABOVE JACKSON BOULEVARD, AT RAPID CITY, SD

LOCATION.--Lat 44°03'55", long 103°16'21", in SE\NE\NE\sec.9, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right bank 150 ft upstream from Jackson Boulevard, and 1.1 mi downstream from Canyon Lake Dam.

DRAINAGE AREA. -- 391 mi<sup>2</sup>.

PERIOD OF RECORD, --October 1987 to November 1989 (discontinued).

GAGE. -- Water-stage recorder. Datum of gage is 3,305.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records for water year 1989 good except those for estimated daily discharges and those above 200 ft<sup>3</sup>/s, which are poor. Flow regulated by Pactola Dam 24 mi upstream since August 1956 (see station 06411000). Flow is diverted upstream from gage for private use. Rapid City pumps water from galleries upstream from gage during summer months to supplement water supply. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 576 ft<sup>3</sup>/s, Aug. 24, 1989, gage height, 2.65 ft; minimum daily discharge, 9.7 ft<sup>3</sup>/s, Apr. 22, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 9, 1972, reached a discharge of 50,000 ft<sup>3</sup>/s, from floodmarks, on basis of slope-area measurement of peak flow in immediate vicinity below gage.

EXTREMES FOR CURRENT PERIOD. -- Water year 1989: Maximum discharge, 576 ft<sup>3</sup>/s at 1930 hours, Aug. 24, gage height, 2.65 ft; minimum daily discharge, 9.7 ft<sup>3</sup>/s, Apr. 22.

October to November 1989: Maximum daily discharge during period, 23  ${\rm ft}^3/{\rm s}$ , Oct. 28, Nov. 2, 3, 24; minimum daily discharge, 13  ${\rm ft}^3/{\rm s}$ , Oct. 1.

REVISIONS. -- Revised daily discharges, in cubic feet per second, for periods in October and November 1987 are given below. These figures supersede those published in the report for 1988.

Oct. 24	19 18 26	Nov. 1 2 3		Nov.	5	Nov.	11 12 13 14	20 22
MONTH	TOTAL	MEAN	MAX	MIN	AC-FT			
October 1987 November 1987 Wtr Yr 1988	717 659 16770	23.1 22.0 45.8	33 29 147	18 15 12	1420 1310 33260			

### CHEYENNE RIVER BASIN

06413570 RAPID CREEK ABOVE JACKSON BOULEVARD, AT RAPID CITY, SD--Continued
DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

					1-1	CUM AUTOR						
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	23	20	20	e16	20	14	17	49	87	69	35
1 2	17	22	18	17	e14	19	14	17	68	88	80	38
3	17	23	18	15	e12	19	15	19	87	87	80	2.4
3 4	18	23	18	18	e11	17	17	20	85	87	78	24 23
5	17	24	20	20	e16	16	21	22	85	85	94	21
6	14	24	19	20	e18	19	22	24	91	75	104	26
7	14	24	18	20	20	22	23	27	94	83	100	39
8	13	22	15	17	20	27	22	27	91	92	86	49
9	14	17	21	14	20	24	19	35	91	98	96	31
10	14	16	32	14	20	23	18	36	94	98	98	31 25
11	11	18	29	15	20	22	18	46	93	102	97	25
12	12	20	30	18	21	22	18	46	94	123	97	25 23
13	16	19	25	20	20	21	20	55	91	109	92	20
14	17	18	19	19	19	23	20	52	75	101	91	20 18 15
15	18	18	18	18	19	20	18	54	71	75	95	15
13	10	10	10	10	19	20	10	34	/1	/3	93	13
16	19	18	13	18	18	21	18	39	79	53	111	13
17	22	17	17	18	18	17	17	35	92	49	78	13
18	21	19	20	19	18	17	17	33	79	46	31	11
19	20	17	20	20	18	23	17	38	73	45	25	12
20	18	16	21	19	18	20	16	46	85	73	26	16
21	17	18	16	18	18	19	13	45	88	81	23	29 21
22	17	20	20	19	18	20	9.7	43	86	84	20	21
23	18	20	16	20	19	19	15	57	74	83	24	17
24	18	17	15	21	20	19	20	61	77	84	56	16
25	16	16	16	19	19	19	19	64	54	84	33	14
26	16	17	16	19	20	17	21	75	50	75	27	15 14
27	16	16	15	19	20	18	22	75	44	71	39	14
28	17	14	13	22	20	16	21	74	52	89	38	12
29	24	21	14	20		16	18	84	70	83	32	12
30	25	20	18	20		15	18	86	79	81	30	12
31	24		22	20		14		56		70	29	
TOTAL	541	577	592	576	510	604	540.7	1408	2341	2541	1979	639
MEAN	17.5	19.2	19.1	18.6	18.2	19.5	18.0	45.4	78.0	82.0	63.8	21.3
MAX	25	24	32	22	21	27	23	86	94	123	111	49
MIN	11	14	13	14	11	14	9.7	17	44	45	20	11
AC-FT	1070	1140	1170						4640	5040	3930	1270
AC-FI	10/0	1140	11/0	1140	1010	1200	1070	2790	4040	3040	3930	12/0

CAL YR 1988 TOTAL 16489 MEAN 45.1 MAX 147 MIN 11 AC-FT 32710 WTR YR 1989 TOTAL 12848.7 MEAN 35.2 MAX 123 MIN 9.7 AC-FT 25490

e Estimated

06413570 RAPID CREEK ABOVE JACKSON BOULEVARD, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	22	444									
2	15	23										
3	16	23										
4	17	20										
5	15	20										
6	16	18							04441			
7	17	15										
8	16	15										
9	15	15										
10	15	15										
11	15	16				222					212	
12	15	16										
13	15	16										
14	16	16										
15	16	16										
16	15	14										
17	17	20										
18	17	16										
19	17	16										
20	18	18										
21	18	21										
22	17	21										
23	15	18										
24	15	23										
25	14	22										
26	16	22	2.52			122		-222		222		
27	17	20										
28	23	15										
29	22	18										
30												
	20	18										777
31	21											
TOTAL	514	548										
MEAN	16.6	18.3										
MAX	23	23										
MIN	13	14										
AC-FT	1020	1090										

### 06413650 LIME CREEK AT MOUTH, AT RAPID CITY, SD

LOCATION.--Lat 44°04'27", long 103°15'53", in NWkNEkSWk sec.3, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, at weir 500 ft above mouth, and 1,000 ft downstream from Canyon Lake Drive.

DRAINAGE AREA. -- 10.1 mi2.

PERIOD OF RECORD. --April 24, 1981, to July 21, 1982 (seasonal records only), October 1987 to current year.

GAGE.--Water-stage recorder and 5 ft metal rectangular weir since October 1987. Datum of gage is 3,281.11 ft above National Geodetic Vertical Datum of 1929. From April 24, 1981, to July 21, 1982 (seasonal records), at datum about 60 ft higher.

REMARKS.--Records fair except those for estimated daily discharges and those for May 12, June 24, July 12, Aug. 16, 17, 19, 24, Sept. 8, 21, Oct. 28, which are poor. Some flow is pumped from stream for irrigation of lawns and gardens. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 178 ft<sup>3</sup>/s, Aug. 24, 1989, gage height, 2.96 ft, present datum; minimum daily discharge, 0.44 ft<sup>3</sup>/s, Aug. 12, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 25, 1982, reached a stage of 3.6 ft, present datum, from floodmarks. A discharge of 103 ft<sup>3</sup>/s was measured July 22, 1982.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 178 ft<sup>3</sup>/s at 2015 hours, Aug. 24, gage height, 2.96 ft; minimum daily discharge, 0.44 ft<sup>3</sup>/s, Aug. 12.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT JUN JUL AUG SEP NOV DEC APR MAY JAN FEB MAR .95 .47 . 59 . 62 1.1 1.0 e1.2 e1.1 77 1.1 90 73 . 55 .96 .83 .62 2 .66 1.0 1.0 e1.0 e.90 1.0 93 .48 . 52 3 . 66 .96 1.0 1.0 e.80 e.80 .80 1.1 .85 .71 .48 .73 .67 .96 1.0 1.1 e.80 e.80 .86 .71 . 45 56 5 .71 .96 1.0 1.1 e.80 e.80 .77 1.5 .63 .59 .46 .50 6 .75 .96 1.1 1.0 e.80 e1.4 1.0 1.1 .62 .58 .54 .45 .77 1.0 1.0 e1.0 e.80 2.6 .78 1.1 . 53 .54 .56 .70 8 .75 .98 .96 e.90 e.90 4.6 1.0 .48 .51 .48 2.7 . 84 .71 e.90 . 47 .77 9 1.0 .96 e1.2 .81 1.0 . 54 .48 2.1 . 55 .51 10 . 69 1.0 .77 1.0 . 45 1.1 .96 e1.0 1.3 1.1 .77 .70 .77 . 52 . 46 .74 2.2 . 96 1.0 11 e1.0 1.2 1.0 .51 .68 12 .75 .96 1.8 .44 1.3 1.0 1.3 . 94 .76 1.9 49 67 13 1.5 . 73 1.1 96 1.0 1.3 67 1.5 1.4 2.7 . 64 14 .72 1.3 96 1.0 1.2 1.0 . 67 1.2 . 55 . 49 . 59 15 .75 .96 1.0 1.1 .99 . 67 1.2 . 52 1.6 . 46 56 .77 1.1 .97 1.0 .80 .80 1.2 49 1.0 1.7 17 2.3 1.1 .96 1.1 1.0 .94 .81 1.0 1.0 .93 2.7 . 52 1.0 18 .96 1.1 1.2 1.0 e1.0 .75 .65 .89 2.1 .51 19 .91 . 96 1.2 1.0 e1.0 .77 .98 . 57 .82 1.7 .51 1.1 . 87 1.0 .96 1.2 1.0 .90 . 87 .91 .69 1.3 2.1 6.3 21 .87 1.0 .96 1.3 1.2 .88 .60 .66 .62 1.0 .89 22 .89 1.0 . 99 1.0 .85 .61 .61 .52 1.0 1.3 1.0 .87 .63 .94 23 . 89 1.0 .77 .86 .61 .46 1.0 1.3 1.1 .87 10 .89 .80 2.7 . 84 24 . 87 1.0 1.0 1.3 1.3 .84 .61 25 .88 1.0 1.0 1.3 1.5 .77 .87 .78 1.0 .57 1.6 .77 .75 26 .87 1.1 e1.0 1.3 1.4 .77 1.5 .78 .98 . 55 .81 e.90 27 .87 1.0 1.3 1.4 .90 2.5 .79 .84 .51 1.3 .67 28 .90 1.2 e.90 1.3 e1.4 .88 1.4 .66 .71 .52 .83 .67 29 .90 1.1 e1.0 1.3 .77 1.3 .74 .65 . 53 .69 .65 30 .87 .77 1.2 .68 .55 .67 .64 1.1 1.3 1.2 1.1 .78 .96 .52 .79 31 . 87 1.1 1.3 32.93 24.87 35.04 29.22 TOTAL 26.17 21.85 30.64 35.00 30.90 35.38 28.40 32.19 .99 1.13 .97 .73 .80 MEAN .84 1.10 1.13 1.10 1.14 .95 1.04 2.3 1.1 2.5 2.7 6.3 MAX 2.2 1.3 1.5 4.6 1.9 10 .67 .95 MTN . 62 90 90 . 80 .77 66 45 . 51 . 44 . 45 70 AC-FT 52 65 61 69 61 70 56 64 43 49 58

CAL YR 1988 TOTAL 507.05 MEAN 1.39 MAX 14 MIN .51 AC-FT 1010 WTR YR 1989 TOTAL 362.59 MEAN .99 MAX 10 MIN .44 AC-FT 719

e Estimated

105

#### 06413660 STORYBOOK DITCH AT HEADGATE, AT RAPID CITY, SD

LOCATION.--Lat 44°04'04", long 103°15'15", in SWkSWkSWk sec.3, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on left bank 67 ft downstream from headgate at Rapid Creek and downstream from 32nd Street.

PERIOD OF RECORD. -- April 1988 to November 1989 (discontinued).

GAGE. -- Water-stage recorder. Datum of gage is 3,293.37 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Records for period October to November 1989 fair. Flow is completely regulated by a headgate 67 ft upstream from gage. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. -- Maximum daily discharge, 9.0 ft3/s, June 3, 4; no flow Apr. 1, 19-21, 1989.

EXTREMES FOR CURRENT PERIOD. -- Water year 1989: Maximum daily discharge, 9.0 ft<sup>3</sup>/s, June 3, 4; no flow Apr. 19-21.

October to November 1989: Maximum daily discharge during period, 3.9  ${\rm ft}^3/{\rm s}$ , Nov. 6; minimum daily, 0.12  ${\rm ft}^3/{\rm s}$ , Nov. 4.

REVISIONS.--The maximum daily discharge for water year 1988 has been revised to 7.5 ft<sup>3</sup>/s, June 19, 20, 28. Revised estimated daily discharges, in cubic feet per second, for periods in May, June, and July 1988 are given below. These figures supersede those published in the report for 1988.

May	14	6.0 6.5 June 6.5 6.5 6.5 6.5	28	6.0 5.5 7.0 7.0 6.5 6.5 6.6	e 19	7.5 7.0 6.0 6.0 5.5 6.0 7.5	1. 6.0 13. 4.5 14. 6.0 15. 5.5 16. 5.0 17. 5.0 22. 5.0 23. 6.5 24. 6.5
	26 27	6.5	18	10.5 / /	30		25 6.0
	MONTH TO	TAL MEAN	MAX	MIN	AC-FT		
June	1988 16	1.1 5.20 0.8 5.36 6.6 4.73	7.0 7.5 6.5	2.8 2.9 2.4	320 319 291		

# 06413660 STORYBOOK DITCH AT HEADGATE, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2	.46	2.2	2.2	2.6	3.1	e1.0	.42	2.4	7.5	3.8	4.9	1.7
2	.35	1.9	1.9	2.4	e2.8	e1.0	.41	2.5	e8.5	3.9	4.6	1.5
3	.34	1.9	2.0	2.0	e2.2	e1.0	.35	2.9	e9.0	3.8	4.1	1.3
4	.32	1.6	1.9	2.2	e1.5	e1.0	.29	3.0	e9.0	3.8	3.8	1.3
5	.25	1.4	2.2	2.3	e1.5	e1.0	.32	3.1	6.2	3.8	4.1	1.3
		1.7		2.5	61.5	61.0	.52	3.1	0.2	0.0		1.0
6 7	. 52	1.3	2.2	2.3	e1.5	e1.0	.34	3.2	4.3	3.7	4.0	1.4
7	.77	2.1	2.1	2.1	e1.5	e1.0	.35	3.5	4.1	3.6	3.5	1.7
8	.76	2.3	1.6	2.2	e1.5	e1.2	.24	3.5	4.1	3.8	2.9	1.8
9	.86	1.7	2.1	2.1	e1.6	e1.3	.15	3.6	4.0	4.1	2.9	2.8
10	. 83	1.7	2.6	1.7	e1.6	e1.3	.11	3.2	4.0	3.8	2.9	3.6
11	.71	1.8	2.1	1.8	2.0	e1.2	1.1	3.2	3.8	3.8	2.6	3.5
12	.92	1.7	2.0	2.0	1.8	e1.0	2.9	2.8	3.7	3.5	3.7	3.0
13	1.1	1.9		2.1	1.6	e1.2	3.2	2.8	3.8	3.0	5.8	2.4
14	1.0	2.4	2.1	2.0	e1.6	e1.2	3.1	2.5	3.5	2.8	5.5	1.8
15	1.3	2.3	2.8	1.9	e1.5	e1.0	2.7	2.5	3.4	2.4	5.3	1.4
13	1.3	2.3	2.0	1.5	61.5	61.0	2.7	2.5	3.4	2.4	5.5	1.4
16	.77	2.2	2.3	2.0	e1.4	e.96	2.8	2.1	3.4	2.5	5.5	1.2
17	. 94	2.1	2.7	2.0	e1.2	.92	2.6	2.0	3.4	2.3	3.9	1.2
18	. 89	2.4	3.5	1.9	e1.2	.91	.85	1.9	3.7	2.3	2.0	1.1
19	.83	2.0	3.7	2.0	e1.2	e.90	.00	2.1	3.6	2.3	1.9	1.5
20	1.1	2.1	3.6	1.9	e1.3	e.80	.00	2.3	3.8	2.9	2.2	1.5 2.7
21	1.4	2.2	2.9	1.7	e1.3	e.80	.00	2.3	3.9	3.4	1.7	4.8
22	1.1	2.3	3.4	1.9	e1.3	.82	.90	2.4	3.8	3.4	1.6	3.1
23	.63	2.4	2.7	2.0	e1.4	.69	2.2	2.9	3.6	3.2	2.0	2.4
24	.54	2.2	2.5	2.0	e1.6	.65	3.0	3.1	3.7	3.1	e7.5	2.1
25	.50	2.0	2.7	1.9	e1.5	.61	3.0	3.3	3.2	2.7	2.4	1.9
25	.50	2.0	2.7	1.9	91.5	.01	3.0	3.3	3.2	2.7	2.4	1.5
26	.38	2.1	2.7	1.9	e1.5	. 59	3.0	3.6	3.1	4.0	1.9	1.9
27	.27	1.9	2.6	2.4	e1.5	. 57	2.9	3.7	3.1	6.1	2.4	1.8
28	.20	1.6	2.5	3.5	e1.2	. 54	2.8	3.7	3.3	6.3	2.3	1.6
29	1.4	2.4	2.5	3.3		. 46	2.7	3.9	3.6	5.7	1.8	1.7
30	2.5	2.2	2.6	3.2		. 44	2.7	6.0	3.8	6.9	1.7	1.7
31	2.5		2.8	3.2		.42		6.0		5.8	1.8	
TOTAL	26.44	60.3	77.3	68.5	44.9	27.48	45.43	96.0	131.9	116.5	103.2	61.2
MEAN	.85	2.01	2.49	2.21	1.60	.89	1.51	3.10	4.40	3.76	3.33	2.04
MAX	2.5	2.4	3.7	3.5		1.3	3.2	6.0	9.0	6.9	7.5	4.8
					3.1					2.3	1.6	1.1
MIN	.20	1.3	1.6	1.7	1.2	. 42	.00	1.9	3.1			
AC-FT	52	120	153	136	89	55	90	190	262	231	205	121

WTR YR 1989 TOTAL 859.15 MEAN 2.35 MAX 9.0 MIN .00 AC-FT 1700

e Estimated

# 06413660 STORYBOOK DITCH AT HEADGATE, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	.17										
2	2.1	.16										
3	2.4	.16										
4	2.6	.12										
5	2.3	2.3										
-	2.0	2.0										
6	2.2	3.9										
7	2.3	2.9										
8	2.0	1.7										
9	1.8	1.3										
10	1.6	2.1										
11	1.5	2.9										
12	1.5	2.8										
13	1.5	2.6										
14	1.5	2.5										
15	1.4	2.4										
1.5												
16	1.1	2.0										
17	1.1	2.8										
18	. 98	3.0										
19	. 96	2.8										
20	.99	2.9						:				
21	1.0	3.0				222						
22	1.0	1.8			12.53							
23	.90	1.3										
24	.75	1.3										
25	.61	1.2										
26	.62	1.4										
27	. 55	1.3										
28	.33	1.2										
29	.25	1.2										
30	.17	1.2										
31	.17	1.2		555								
31	.17				777							
TOTAL	40.08	56.41	111									
MEAN	1.29	1.88										
MAX	2.6	3.9										
MIN	.17	.12										
AC-FT	79	112										

#### 06413670 STORYBOOK DITCH AT MOUTH, AT RAPID CITY, SD

LOCATION.--Lat 44°04'29", long 103°15'44", in NE\NE\SW\ sec.3, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right bank 20 ft north of Storybook Island parking lot, 80 ft west of Sheridan Lake Road, and 120 ft upstream from mouth.

PERIOD OF RECORD. -- October 1987 to November 1989 (discontinued).

GAGE.--Water-stage recorder and V-notch weir. Datum of gage is 3,272.52 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges and those for June 2-5, 24, Aug. 16, 24, which are poor. Records for October to November 1989 good except those for estimated daily discharges, which are poor. Flow is regulated by headgate approximately 0.8 mi upstream for use by private home owners and Storybook Island. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum daily discharge, 7.8 ft3/s, June 3, 1989; no flow Nov. 3, 4, 1989.

EXTREMES FOR CURRENT PERIOD. --Water year 1989: Maximum daily discharge, 7.8 ft<sup>3</sup>/s, June 3; minimum daily discharge, 0.14 ft<sup>3</sup>/s, Oct. 5.

October to November 1989: Maximum daily discharge during period, 3.2 ft<sup>3</sup>/s, Nov. 18; no flow Nov. 3, 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP 1.0 .40 2.2 e2.5 e.80 36 2 2 3.0 3.4 1.6 .93 2 .33 3.0 1.9 1.7 e2.0 e.80 .39 2.2 6.8 3.0 1.3 3 .24 .87 2.0 1.7 e1.5 e.80 .31 2.6 7.8 3.0 2.8 1.2 .19 .78 2.0 1.7 e1.3 e.80 . 22 2.7 7.6 3.0 2.6 1.2 5 1.0 .14 .67 2.1 1.8 e.70 .37 2.9 5.2 2.9 2.7 e1.3 .67 6 .29 2.0 2.0 e1.3 e.70 .46 2.8 3.4 2.8 2.9 1.1 7 .49 1.0 2.0 . 27 2.5 2.6 e1.8 e1.3 e.70 2.9 3.2 1.4 . 47 2.7 8 1.2 1.8 e1.8 e1.3 e.80 .20 2.8 3.2 2.2 1.9 9 45 1.0 1.7 e1.8 e1.4 .92 .17 2.9 3.1 3.0 2.2 1.7 10 .41 1.0 1.9 2.0 e1.4 .94 .15 2.7 3.1 2.8 2.1 2.6 11 .36 1.3 1.6 2.0 .74 1.5 2.2 3.0 3.0 1.9 2.5 e1.6 12 .37 1.2 1.5 2.1 .68 2.7 2.1 2.9 3.0 2.4 2.4 e1.4 13 .53 1.4 2.1 3.1 2.6 3.9 2.1 e1.2 .83 2.8 2.2 14 .42 1.6 1.4 2.1 .85 2.7 2.1 3.0 2.8 3.8 1.9 e1.2 15 2.2 .56 1.5 1.9 .73 2.5 2.1 2.8 3.7 1.6 e1.2 16 .39 1.5 1.8 2.1 . 59 2.4 2.4 2.7 2.1 4.3 1.2 e1.1 2.1 17 2.8 . 84 1.4 1.8 e.90 .59 2.4 1.8 1.9 3.5 1.1 18 . 59 1.8 2.0 2.1 e.80 . 59 2.9 1.6 1.1 1.6 1.7 1.4 2.8 19 . 62 2.1 1.7 1.2 1.6 e.90 e.60 .15 1.5 1.6 1.6 20 .80 2.0 e.90 2.9 1.9 1.5 1.7 e.60 .15 1.5 1.8 2.1 .93 21 1.7 e.90 2.2 3.6 1.8 1.6 e.60 .15 1.7 3.0 1.4 22 .82 1.8 2.0 1.5 e.90 e.60 .48 1.6 3.0 2.2 1.2 2.4 23 .56 1.9 1.9 1.5 e1.1 .55 1.7 1.8 2.8 2.2 1.4 2.1 24 .47 1.8 1.7 1.5 1.2 . 55 2.5 2.4 3.5 2.1 5.8 1.9 25 .45 1.7 .50 2.6 2.5 2.7 1.9 2.7 26 .42 1.9 1.7 .72 .29 2.9 2.9 2.6 2.5 1.8 1.7 1.4 27 .31 1.8 .80 2.3 2.4 1.6 1.9 1.7 .43 3.1 2.5 4.2 . 47 28 .24 1.7 2.6 2.7 2.7 2.4 2.3 1.9 4.6 1.3 e.80 29 1.6 1.9 49 2.2 2.8 .36 2.8 3.9 1.3 ---2.4 ---30 1.2 2.2 1.6 2.7 .23 2.4 4.3 2.8 4.6 1.7 1.3 ---31 1.1 1.6 2.8 .29 4.5 4.0 1.6 79.2 TOTAL 15.88 42.82 56.1 59.8 33.64 19.63 42.23 75.9 105.9 85.9 51.5 MEAN .51 1.43 1.81 1.93 1.20 1.41 2.45 3.53 2.77 2.55 1.72 .63 MAX 1.2 2.2 2.2 2.8 3.1 4.5 7.8 4.6 5.8 3.6 2.5 .94 MIN 1.4 1.4 .23 2.3 1.6 1.0 .14 .67 .72 151 157 210 102

CAL YR 1988 TOTAL 868.21 MEAN 2.37 MAX 5.9 MIN .14 AC-FT 1720 WTR YR 1989 TOTAL 668.50 MEAN 1.83 MAX 7.8 MIN .14 AC-FT 1330

e Estimated

# 06413670 STORYBOOK DITCH AT MOUTH, AT RAPID CITY, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	e.05										
2	1.4	e.01										
3	1.5	e.00										
4	1.6	e.00										
5	1.4	1.1										
6	1.3	2.9		232								
7	1.5	2.5										
8	1.4	1.7										
9	1.5	1.1										
10	1.6	1.8										
11	1.5	2.8										
12	1.2	2.8										
13	.90	2.7										
14	. 83	2.6										
15	. 82	2.5										
16	.81	2.2										
17	. 82	2.7										
18	. 82	3.2										
19	. 86	3.1										
20	. 92	3.1							,			
21	.90	3.0								222		
22	.76	1.7										
23	.74	.99										
24	.65	.72										
25	.48	.64										
26	.49	. 82										
27	.48	1.1										
28	. 96	1.1										
29	. 26	. 92										
30	e.10	.75										
31	e.05											
TOTAL	29.95	50.60					222					
MEAN	.97	1.69										
MAX	1.6	3.2										
MIN	.05	.00										
AC-FT	.03	100		111								
AC-FI	28	100	3.55	2.2.								

e Estimated

#### 06413700 RAPID CREEK ABOVE WATER TREATMENT PLANT. AT RAPID CITY. SD

LOCATION.--Lat 44°04'29", long 103°15'34", in SW\sW\nE\s sec.3, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on right bank at downstream side of foot bridge in Sioux Park, and 700 ft downstream from Sheridan Lake Road.

DRAINAGE AREA, -- 404 mi 2.

PERIOD OF RECORD. -- May 1980 to July 1982, October 1987 to November 1989 (discontinued).

GAGE.--Water-stage recorder. Datum of gage is 3,265.73 ft above National Geodetic Vertical Datum of 1929. May 1980 to July 1982, at same datum.

REMARKS.--Records fair except those for estimated daily discharges and flows above 200 ft<sup>3</sup>/s, which are poor. Flow regulated by Pactola Reservoir 24.0 mi upstream (see station 06411000). Several small diversions upstream from station for municipal park pools and for irrigation of about 320 acres. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 914 ft<sup>3</sup>/s, Aug. 24, 1989, gage height, 8.73 ft; minimum daily discharge, 7.5 ft<sup>3</sup>/s, Aug. 3, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 50,000 ft<sup>3</sup>/s, June 9, 1972 (revised), stage unknown. Flood of July 25, 1982, reached a stage of 10.1 ft, from floodmarks.

EXTREMES FOR CURRENT PERIOD. -- Water year 1989: Maximum discharge, 914 ft<sup>3</sup>/s at 2000 hours, Aug. 24, gage height, 8.73 ft; minimum daily discharge, 11 ft<sup>3</sup>/s, Sept. 18.

October to November 1989: Maximum discharge during period, 101 ft<sup>3</sup>/s at 1700 hours, Oct. 28, gage height, 5.65 ft; minimum daily discharge, 14 ft<sup>3</sup>/s, Nov. 28.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24	21	24	20	e14	e21	16	18	58	97	71	27
2	20	21	22	19	e13	e20	16	17	75	97	83	26
1 2 3 4 5	19	22	22	17	e12	e20	16	20	95	98	83	21
4	20	23	21	19	e12	e18	17	20	96	97	80	20
5	19	23	23	20	e17	e18	20	23	94	93	94	18
,	13	23	23	20	617	610	20	23	34	93	34	10
6 7 8 9	17	23	22	20	e20	e21	22	25	99	92	105	23
7	17	23	22	e20	e21	24	21	27	103	94	99	41
8	16	23	19	e18	e22	30	21	28	101	102	83	59
9	15	19	22	e15	e22	27	18	36	101	106	86	30
10	15	18	28	15	e22	25	17	39	100	107	85	25
					922	23			100	107		
11	13	21	25	15	e21	24	17	49	100	109	81	25
12	13	21	24	18	e22	23	19	50	101	122	81	21
13	13	20	24	19	e21	e23	23	57	98	112	76	19
14	13	21	20	19	19	e23	22	54	83	109	75	17
15	15	20	18	18	19	e21	20	55	76	83	80	15
16	16	20	16	19	e19	e21	19	44	83	58	98	12
17	23	19	19							52	74	12
				19	e19	e18	19	38	102			
18	20	22	20	19	e19	e18	19	36	86	47	26	11
19	19	20	21	19	19	25	18	40	79	44	21	12
20	18	18	20	19	19	22	17	46	92	75	23	20
21	18	20	18	18	19	22	15	47	97	84	18	45
22	18	21	21	18	19	22	12	48	93	88	16	22
23	19	22	19	19	19	21	15	59	80	87	19	18
24	19	22	e17	19	20	21	19	66	88	87	73	17
25	19									88	29	15
23	19	21	e17	18	19	21	19	69	58	00	29	13
26	19	22	e16	18	21	18	23	81	53	75	21	16
27	19	21	e16	17	21	18	26	81	46	73	37	14
28	20	19	e15	20	20	18	22	79	53	93	34	13
29	22	24	e17	19		17	19	87	74	87	28	14
30	22	23	20	19		16	18	92	86	85	27	15
31	22		21	e18		16		64		73	26	
										4		
TOTAL	562	633	629	570	530	652	565	1495	2550	2714	1832	643
MEAN	18.1	21.1	20.3	18.4	18.9	21.0	18.8	48.2	85.0	87.5	59.1	21.4
MAX	24	24	28	20	22	30	26	92	103	122	105	59
MIN	13	18	15	15	12	16	12	17	46	44	16	11
AC-FT	1110	1260	1250	1130	1050	1290	1120	2970	5060	5380	3630	1280
							3.00					

CAL YR 1988 TOTAL 16750 MEAN 45.8 MAX 128 MIN 13 AC-FT 33220 WTR YR 1989 TOTAL 13375 MEAN 36.6 MAX 122 MIN 11 AC-FT 26530

e Estimated

06413700 RAPID CREEK ABOVE WATER TREATMENT PLANT, AT RAPID CITY, SD--Continued DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	25	-42					444				
2	17	24										
3	18	24										
4	18	21										
5	17	22										
3	1,	22			1222	225		17.57		222	11322	
6	17	22										
7	19	20										
8	20	19										
9	19	19										
10	18	19										
11	18	18										
12	19	19										
13	18	19										
14	19	19										
15	19	20										
		20										
16	17	17										
17	20	21										
18	20	19										
19	20	20										
20	21	20										
7.7												
21	21	22										
22	20	21										
23	20	18										
24	19	22										
25	18	21										
26	20	21										
27	20	20										
28	36	14										
29	28	17										
30	25	17										
31	25	1-2-										
TOTAL	622	600										
MEAN	20.1	20.0										
MAX	36	25										
MIN	16	14										
AC-FT	1230	1190										
100		=====										

#### 06413800 DEADWOOD AVENUE DRAIN AT MOUTH, AT RAPID CITY, SD

LOCATION.--Lat 44°04'58", long 103°15'22", in SWkSEkSEk sec.34, T.2 N., R.7 E., Pennington County, Hydrologic Unit 10130302, 200 ft upstream from mouth.

DRAINAGE AREA. -- 2.18 mi<sup>2</sup>.

PERIOD OF RECORD. --April 1981 to July 1982 (seasonal records only), July 1987 to current year.

GAGE. -- Water-stage recorder. Datum of gage is 3,205.79 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records for periods July to September 1987, 1988, and 1989 water years good except those for estimated daily discharges, which are fair, and discharges above 4.5 ft<sup>3</sup>/s (Aug. 24, 25, 1989), which are poor. Several observations of water quality were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 184 ft<sup>3</sup>/s at 2030 hours, Aug. 24, 1989 (discharge determined from rating extension, based on poor indirect measurement), gage height, 51.42 ft; minimum daily discharge, 1.8 ft<sup>3</sup>/s, July 29, 30, 1988, Aug. 14, 15, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 25, 1982, reached a stage of 53.65 ft, from floodmarks. Discharge of 42 ft<sup>3</sup>/s was measured July 22, 1982.

EXTREMES FOR CURRENT PERIOD. -- July to September 1987: Maximum discharge during period, 20 ft<sup>3</sup>/s at 2045 hours, Aug. 13, gage height, 50.07 ft; minimum daily discharge, 2.2 ft<sup>3</sup>/s, July 30.

Water year 1988: Maximum discharge, 12 ft<sup>3</sup>/s at 2130 hours, May 6, gage height, 49.94 ft; minimum daily discharge, 1.8 ft<sup>3</sup>/s, July 29, 30.

Water year 1989: Maximum discharge, 184 ft<sup>3</sup>/s at 2030 hours, Aug. 24 (discharge determined from rating extension, based on poor indirect measurement), gage height, 51.42 ft; minimum daily discharge, 1.8 ft<sup>3</sup>/s, Aug. 14, 15.

#### DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1986 TO SEPTEMBER 1987 MEAN VALUES

DAY OCT  1 2 3 4	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3											
3										2.4	3.0
										2.3	3.0
										2.6	3.1
										3.4	3.2
5										2.9	3.3
6										2.8	3.3
7										3.5	3.7
8										3.1	3.3
9										2.9	3.0
10										2.9	3.1
11										2.9	3.4
12										2.9	3.3
13									2.8	3.9	3.2
14									2.7	3.4	3.2
15									2.7	3.0	3.2
16									2.8	2.9	3.2
17									2.8	2.9	3.2
18									2.8	3.0	3.3
19									2.8	3.0	3.3
20									2.8	3.0	3.2
21									2.9	3.0	3.2
22									2.9	3.1	3.1
23									2.8	3.0	3.0
24									2.7	3.0	3.0
25									2.6	3.3	3.0
26									2.4	3.7	3.0
27									2.4	3.3	2.9
28									2.4	3.3	2.9
29									2.3	3.2	2.9
30									2.2	3.0	2.9
31									2.5	3.0	
TOTAL										94.6	94.4
MEAN										3.05	3.15
MAX										3.9	3.7
MIN										2.3	2.9
AC-FT										188	187

### 06413800 DEADWOOD AVENUE DRAIN AT MOUTH, AT RAPID CITY, SD--Continued

#### DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988 MEAN VALUES SEP DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG 2.9 2.8 2.9 e3.0 2.8 2.6 2.7 3.7 2.5 2.5 1.9 2.1 2.9 2.8 3.0 e3.0 2.8 2.5 2.7 3.3 2.5 2.4 1.9 2.1 3.0 2.9 2.9 e3.0 2.7 2.6 2.7 2.7 2.4 2.4 2.7 1.9 2.5 2.4 2.9 2.9 2.9 e3.0 2.7 2.5 2.8 2.6 2.4 5 2.3 2.9 2.9 3.0 2.0 2.2 2.6 2.5 2.4 3.0 2.6 2.8 2.0 6 2.8 2.9 2.8 2.2 3.0 3.0 2.5 2.6 2.7 2.6 1.9 2.0 2.4 2.8 2.9 3.0 3.0 2.5 2.6 2.7 2.6 2.1 1.9 8 2.8 2.8 2.9 e3.0 e2.5 2.5 2.7 2.7 2.4 2.1 2.0 2.0 q 2.9 2.8 2.9 e3.0 e2.5 2.6 2.6 2.6 2.5 2.1 1.9 2.2 10 2.9 2.9 2.9 e3.0 e2.4 e2.6 2.6 2.4 2.3 2.3 1.9 2.2 11 2.9 2.9 2.9 e3.0 2.4 e3.0 2.6 2.3 2.3 2.2 1.9 2.2 12 2.9 2.9 2.9 3.0 2.4 e2.7 2.5 2.4 2.4 2.1 1.9 2.3 2.7 13 3.1 2.9 2.9 3.0 2.4 2.5 2.3 2.6 2.0 1.9 2.3 14 2.9 2.8 2.9 3.0 2.4 2.6 2.4 2.6 2.0 1.9 2.3 15 2.8 2.9 3.0 3.1 2.4 2.7 2.4 2.5 1.9 1.9 2.3 2.6 16 2.7 2.9 3.0 3.2 2.5 2.7 2.3 2.6 1.9 1.9 2.2 2.5 2.7 2.8 2.7 2.7 1.9 1.9 2.1 17 3.0 3.1 2.4 2.7 2.2 2.1 2.6 1.9 1.9 18 2.7 2.9 3.0 2.7 2.7 2.2 3.0 2.4 19 2.7 2.9 2.7 2.5 2.6 1.9 1.9 3.0 3.0 2.4 2.9 2.4 1.9 20 2.8 2.9 3.0 3.0 2.5 3.0 2.7 2.6 2.6 1.9 2.7 2.9 1.9 21 2.5 2.6 1.9 2.3 3.0 3.1 2.5 2.9 2.7 2.2 22 1.9 2.7 2.9 3.0 3.1 2.5 2.9 2.8 2.5 2.9 1.9 23 2.6 2.9 3.0 3.0 2.4 2.9 2.8 2.5 2.9 1.9 2.0 2.2 24 2.5 2.9 3.0 2.9 2.4 2.9 2.8 2.4 2.4 1.9 2.1 2.2 25 2.5 2.9 3.0 2.4 2.9 2.8 2.5 1.9 1.9 2.2 1.9 26 2.5 2.9 3.0 2.9 2.7 2.8 2.9 2.4 2.6 2.0 2.2 27 2.6 2.9 e3.0 2.9 2.7 2.9 2.8 2.5 2.6 1.9 2.0 2.1 2.9 28 2.7 2.9 e3.0 2.6 2.7 2.4 2.6 2.0 1.9 2.2 2.8 29 2.7 1.8 1.9 2.2 2.9 e3.0 2.9 2.6 2.7 2.7 2.4 2.5 2.7 2.2 30 2.9 2.8 2.7 2.7 2.5 2.5 1.8 1.9 e3.0 ---31 2.7 1.9 1.9 e3.0 2.8 2.7 2.6 TOTAL 85.9 86 4 92.0 78 6 76.0 63.4 60.9 65.6 92.6 73.0 84.6 80.8 2.77 2.53 MEAN 2.88 2.97 2.99 2.52 2.73 2.69 2.54 2.05 1.96 2.19 MAX 2.9 2.4 3.1 2.9 3.0 3.2 2.8 3.0 2.9 3.7 2.5 2.7 1.8 1.9 MIN 2.5 2.8 2.9 2.8 2.4 2.5 2.5 2.2 2.3 1.9 AC-FT 170 171 182 184 168 160 156 151 126 121 130

WTR YR 1988 TOTAL 939.8 MEAN 2.57 MAX 3.7 MIN 1.8 AC-FT 1860

e Estimated

# 06413800 DEADWOOD AVENUE DRAIN AT MOUTH, AT RAPID CITY, SD--Continued DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

#### MEAN VALUES DAY OCT NOV JUN DEC JAN FEB APR MAY JUL AUG SEP MAR 2.0 2.0 2.2 2.2 2.5 2.5 2.4 2.5 e2.5 2.4 2.5 2.0 2 2.5 2.3 2.2 2.0 2.0 2.6 2.4 2.5 2.5 2.3 2.0 e2.5 3 2.6 2.2 2.3 2.5 2.1 2.4 2.0 2.0 2.5 e2.5 2.5 2.3 2.2 2.6 2.0 2.2 2.4 2.5 2.5 2.5 2.4 2.1 2.0 2.5 5 2.3 2.3 2.6 2.5 2.5 2.5 2.4 2.5 2.0 1.9 2.0 2.5 6 2.3 2.5 2.6 2.5 2.5 2.6 2.6 2.3 2.0 1.9 1.9 2.5 7 2.3 2.5 e2.5 2.4 2.5 3.1 2.4 2.4 2.0 1.9 1.9 2.6 8 2.4 2.4 e2.5 2.4 2.5 2.9 2.3 2.5 2.0 2.0 1.9 3.6 9 2.3 2.5 2.5 2.5 2.3 2.0 2.0 1.9 2.7 2.4 2.8 10 2.2 2.5 2.5 2.5 2.0 2.7 2.7 2.2 2.4 2.0 1.9 11 2.1 3.2 2.5 2.5 2.5 2.0 2.1 2.6 2.5 2.2 2.4 1.9 2.1 12 2.4 2.5 2.7 2.5 1.9 2.5 2.0 2.8 2.5 2.5 2.2 2.5 2.4 13 2.5 2.1 2.0 2.4 2.5 2.6 2.1 2.8 2.4 1.9 14 2.2 2.0 2.4 2.4 2.6 2.2 2.8 4.4 1.8 2.4 2.1 2.4 2.5 2.4 2.4 2.2 2.7 2.1 3.4 1.8 2.5 16 2.2 2.5 e2.4 2.6 2.4 2.5 2.3 2.5 2.0 2.5 2.4 2.5 17 2.5 2.2 2.5 3.2 2.4 2.6 2.4 2.5 2.3 2.3 2.3 2.1 18 2.7 2.3 2.5 2.5 2.4 2.4 2.2 2.2 2.0 2.2 1.9 2.4 2.7 19 2.4 2.5 2.5 2.4 2.5 2.2 2.2 1.9 2.2 2.1 2.2 20 2.3 2.7 2.5 2.2 2.1 2.0 3.2 1.9 21 2.1 2.6 2.4 2.6 2.4 2.4 2.2 2.4 2.0 1.9 6.2 22 2.2 2.7 2.4 2.3 2.1 2.9 2.7 2.3 2.4 2.2 1.9 1.9 23 2.7 2.7 2.3 2.2 2.0 2.2 2.7 2.2 2.4 2.3 1.9 2.1 24 2.2 2.7 2.0 12 2.5 2.4 2.7 2.3 2.2 2.2 2.1 3.8 25 2.2 2.7 2.7 4.6 2.4 2.4 2.3 2.1 2.2 1.9 2.5 2.1 26 27 2.2 2.7 2.5 2.6 2.4 2.3 2.4 2.1 2.0 2.0 2.7 2.6 2.7 2.2 2.4 1.9 2.9 2.7 2.6 2.5 2.3 3.1 2.1 2.1 28 2.2 2.4 2.8 2.5 e2.5 2.4 2.8 2.0 1.9 2.1 29 2.2 2.6 2.4 2.6 ---2.4 2.5 2.0 1.9 2.2 2.6 2.6 ---30 2.2 2.5 2.4 2.7 2.3 2.5 2.3 1.9 2.1 2.5 2.5 31 2.2 2.7 ---2.3 2.0 2.0 2.5

77.0

2.48

3.1

2.2

153

70.4

2,35

3.1

2.1

72.3

2.33

2.8

2.0

143

62.1

2.07

3.8

1.9

123

68.3

2.20

4.4

1.9

135

77.8

2.51

12

1.8

82.1

2.74

6.2

2.2

163

CAL YR 1988 TOTAL 897.7 MEAN 2.45 MAX 3.7 MIN 1.8 AC-FT 1780 WTR YR 1989 TOTAL 879.1 MEAN 2.41 MAX 12 MIN 1.8 AC-FT 1740

78.5

2.53

2.7

156

68.4

2.44

2.5

2.3

136

76.3

2.46

2.6

2.4

69.4

2.24

3.2

2.0

138

76.5

2.55

3.2

2.2

TOTAL

MEAN

MAX

MIN

AC-FT

e Estimated

#### 06414000 RAPID CREEK AT RAPID CITY, SD

LOCATION.--Lat 44°05'09", long 103°14'31", in NELSELSWL sec.35, T.2 N., R.7 E., Pennington County, Hydrologic Unit 10120110, on left bank 3,000 ft upstream from 12th Street in Rapid City and 3.5 mi downstream from Canyon Lake Dam.

DRAINAGE AREA. -- 410 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--June 1903 to November 1906, July 1942 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 3,230.14 ft above National Geodetic Vertical Datum of 1929.

Prior to Nov. 30, 1906, nonrecording gage at site 1.0 mi downstream at different datum, and June 10, 1972, to Nov. 1, 1972, nonrecording gage at site 800 ft downstream at datum 0.80 ft higher. July 1942 to June 9, 1972, water-stage recorder at site 300 ft downstream at datum 0.80 ft higher (destroyed by flood).

REMARKS.--Records good except those for estimated daily discharges, which are fair. Several small diversions upstream from station to municipal park pools and for irrigation of about 320 acres. Flow regulated by Pactola Dam 25.4 mi upstream since Aug. 22, 1956. Several observations of water temperature and specific conductance were made during the year. National Weather Service telemeter at station.

AVERAGE DISCHARGE. -- 50 years, 59.8 ft3/s, 43,330 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 50,000 ft<sup>3</sup>/s, June 9, 1972, gage height, 19.66 ft, from floodmarks, on basis of slope-area measurement of peak flow; minimum, 1.6 ft<sup>3</sup>/s, Apr. 20, 1962.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of May 12, 13, 1920, reached a stage of 14.4 ft present datum, from floodmarks.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 1,360 ft<sup>3</sup>/s at 2030 hours, Aug. 24, gage height, 7.10 ft; minimum daily discharge, 7.3 ft<sup>3</sup>/s, Oct. 9.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES OCT AUG SEP DAY NOV DEC JAN FEB MAR APR MAY JIIN. JIII. e17 e23 e23 e16 e23 e15 e22 2.7 e19 e22 e22 e23 e25 e26 e23 e19 e24 7.3 e24 e18 e18 A24 e19 e23 e22 e22 e22 e20 e19 e18 e18 e22 ---e20 TOTAL 477.3 23.0 77.1 74.3 60.0 26.5 MEAN 15.4 24.1 23.2 21.1 25.1 22.5 49.5 MAX 7.3 MTN AC-FT 

CAL YR 1988 TOTAL 14970.3 MEAN 40.9 MAX 134 MIN 7.3 AC-FT 29690 WTR YR 1989 TOTAL 13482.3 MEAN 36.9 MAX 115 MIN 7.3 AC-FT 26740

e Estimated

#### CHEYENNE RIVER BASIN

### 06418900 RAPID CREEK BELOW SEWAGE PLANT, NEAR RAPID CITY, SD

LOCATION.--Lat 44°01'24", long 103°05'43", in NWkNEkNEk sec.25, T.1 N., R.8 E., Pennington County, Hydrologic Unit 10120110, on right bank 120 ft downstream from sewage treatment plant effluent and 6.7 mi southeast of Rapid City.

DRAINAGE AREA. -- 452 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- October 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,000 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good. Flow regulated by Pactola Dam 40.9 mi upstream since Aug. 22, 1956. Diversions for irrigation of about 7,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 56.9 ft3/s, 41,220 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,680 ft<sup>3</sup>/s, July 25, 1982, gage height, 9.12 ft; minimum daily, 13 ft<sup>3</sup>/s, Oct. 4, 7-9, 1981.

EXTREMES FOR CURRENT YEAR, --Maximum discharge, 592 ft<sup>3</sup>/s at 0330 hours, Aug. 25, gage height, 5.54 ft; minimum daily discharge, 16 ft<sup>3</sup>/s, Aug. 23, 24.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			,		M	EAN VALUE	3					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	33	39	38	23	31	31	22	33	28	26	23
2	20	34	36	36	29	30	30	20	26	32	25	20
3	20	34	37	36	29	28	31	20	42	36	32	18
4	20	35	37	34	30	28	26	20	47	35	35	19
5	25	32	38	38	32	32	33	23	45	34	38	22
6	27	36	37	40	34	32	48	20	36	24	50	17
7	27	35	40	34	36	37	37	20	38	25	68	29
8										25		89
	26	36	36	31	34	59	37	21	41		44	48
9	20	35	36	32	32	82	35	19	40	29	33	
10	20	34	42	34	35	63	33	22	36	39	34	31
11	21	35	42	34	36	50	32	25	37	72	37	36
12	20	58	42	33	38	44	33	27	39	65	39	30
13	20	36	43	35	38	43	34	71	39	101	36	25
14	20	41	40	38	35	59	34	35	33	92	37	23
15	19	41	36	37	36	41	31	44	30	108	36	21
16	20	38	36	38	35	43	30	36	26	48	49	18
17	75	37	35	39	31	37	34	23	30	33	121	17
18	37	37	39	38	29	34	33	20	34	24	34	19
19	30	39	40	41	31	48	33	19	34	23	19	17
20	31	36	37	38	34	45	30	19	22	21	27	28
20	31	30	37	30	34	43	30	19	22	41	2,	20
21	30	36	40	39	35	39	32	21	36	30	20	148
22	29	37	37	39	33	42	27	23	34	34	17	43
23	29	38	38	37	35	40	22	23	34	42	16	29
24	31	36	35	37	38	39	21	25	84	44	16	25
25	30	37	31	33	37	38	19	31	55	41	206	23
26	30	36	27	34	35	37	22	44	43	32	25	22
27	31	36	32	38	35	38	60	46	27	24	17	22
28	30	36	32	37	33	39	60	46	21	26	55	20
29	35	39	31	38		36	36	45	21	44	26	20
												20
30	33	39	35	40		33	23	65	22	40	24	
31	32		37	37		31		49		32	22	
TOTAL	859	1112	1143	1133	938	1278	987	944	1085	1283	1264	922
MEAN	27.7	37.1	36.9	36.5	33.5	41.2	32.9	30.5	36.2	41.4	40.8	30.7
MAX	75	58	43	41	38	82	60	71	84	108	206	148
MIN	19	32	27	31	23	28	19	19	21	21	16	17
AC-FT	1700	2210	2270	2250	1860	2530	1960	1870	2150	2540	2510	1830
										10		

CAL YR 1988 TOTAL 13928 MEAN 38.1 MAX 178 MIN 19 AC-FT 27630 WTR YR 1989 TOTAL 12948 MEAN 35.5 MAX 206 MIN 16 AC-FT 25680

#### 06421500 RAPID CREEK NEAR FARMINGDALE, SD

LOCATION.--Lat 43°56'31", long 102°51'12", in SWkSWkSwk sec.19, T.1 S., R.11 E., Pennington County, Hydrologic Unit 10120110, on right bank at downstream side of bridge, 2 mi southeast of Farmingdale, and 4.8 mi downstream from Antelope Creek.

DRAINAGE AREA. -- 602 mi 2.

PERIOD OF RECORD .-- July 1946 to September 1989 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 2,700 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Sept. 19, 1947, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Pactola Dam 67 mi upstream since Aug. 22, 1956. Diversions for irrigation of about 10,000 acres upstream from station. Several observations of water quality were made during the year. Gage-height telemeter at station.

AVERAGE DISCHARGE. -- 43 years, 55.3 ft3/s, 40,060 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 7,320 ft<sup>3</sup>/s, June 10, 1972, gage height, 11.85 ft, from floodmarks, from rating curve extended about 400 ft<sup>3</sup>/s on basis of contracted-opening and flow-over-road measurement of peak flow; no flow at times in 1949, 1952-56, 1958-63, 1969-71.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 234 ft<sup>3</sup>/s at 0500 hours, Sept. 22, gage height, 6.67 ft; maximum gage height, 7.75 ft, Mar. 10, backwater from ice; minimum daily discharge, 0.54 ft<sup>3</sup>/s, July 10.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC FEB JUN JUL AUG SEP JAN MAR APR MAY 27 29 30 4.2 11 15 31 e30 e25 e20 e20 27 6.1 5.7 23 31 e30 e22 e10 e17 26 25 17 16 3 15 21 34 e30 e25 e9.0 e15 28 22 11 7.8 4.5 20 33 e30 e25 e15 e15 26 21 18 14 3.0 13 5 20 33 e30 e25 e20 21 20 22 18 1.7 8.0 e10 6 22 31 27 22 20 11 4.9 5.7 e25 e25 e20 e10 9.2 7.0 10 7 29 35 e25 e20 e25 e15 41 26 13 20 8 28 34 e20 e17 e25 e20 29 21 13 3.0 23 9 28 34 e20 e20 e30 e35 31 16 16 1.2 15 81 .54 10 26 36 e25 14 15 7.4 53 e20 e32 29 e60 21 35 e25 e20 27 1.7 8.4 38 e35 29 8.9 39 22 41 e25 e20 e40 e50 27 15 14 27 13 21 e25 e20 e40 e50 29 15 16 8.1 39 6.4 27 19 e20 e20 e40 e50 28 41 16 48 53 5.6 15 19 43 e20 e20 26 26 21 e35 e50 16 17 e25 30 21 9.7 43 6.7 21 44 e25 e30 840 17 24 22 18 19 42 A25 A25 e30 e30 25 18 11 69 18 49 37 9.5 18 16 e30 e25 e25 e35 27 13 8.0 12 21 15 19 34 38 e35 e25 e30 e35 21 15 17 20 28 44 e35 e25 e30 e40 20 7.8 13 14 24 20 21 7.1 12 51 28 42 e40 e20 e35 **e40** 16 9.2 e35 22 28 40 e40 e25 e35 16 8.2 8.2 12 14 134 23 26 41 e40 e25 e30 e35 16 6.5 15 18 12 46 27 38 e35 e25 e40 e40 12 6.3 9.7 18 6.9 31 25 26 43 e35 e20 e40 61 11 6.0 34 20 26 25 26 24 40 e25 e20 e40 11 9.4 30 78 22 55 14 27 22 25 19 21 14 11 e20 A20 A35 43 10 18 9.3 19 28 23 A25 e20 35 21 8.1 13 e17 e30 52 5.7 31 18 29 25 e25 e17 e25 ---37 60 21 4.0 ---17 30 28 e28 e20 e30 33 49 24 3.1 10 17 31 34 e25 e25 31 ---35 6.4 16 TOTAL 784 1096 704 826.0 1117 800 558.3 444.7 480.74 512.2 873.9 844 MEAN 27.2 14.8 15.5 16.5 29.1 25.3 36.5 22.7 29.5 36.0 26.7 18.0 MAX 54 40 30 60 34 53 78 134 49 40 75 41 6.0 3.1 MIN 17 25 17 17 9.0 10 10 1.7 954 1020 1730 AC-FT 1560 2170 1670 1400 2220 1590 1110 882 1640

CAL YR 1988 TOTAL 11805.6 MEAN 32.3 MAX 579 MIN 1.5 AC-FT 23420 WTR YR 1989 TOTAL 9040.84 MEAN 24.8 MAX 134 MIN .54 AC-FT 17930

e Estimated

#### 06422500 BOXELDER CREEK NEAR NEMO, SD

LOCATION.--Lat 44°08'38", long 103°27'16", in SE\SE\s sec.12, T.2 N., R.5 E., Lawrence County, Hydrologic Unit 10120111, on right bank at ranch 0.2 mi upstream from county line, 0.9 mi downstream from Jim Creek, and 4.5 mi southeast of Nemo.

DRAINAGE AREA. -- 96 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD .-- July 1945 to July 1947, May 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 4,320.27 ft above National Geodetic Vertical Datum of 1929. July 1945 to July 1947 nonrecording gage at site 100 ft upstream at different datum. May 17, 1966, to June 9, 1972, water-stage recorder (destroyed by flood) and June 10, 1972, to Aug. 8, 1972, nonrecording gage, both at site 100 ft upstream at datum 2.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year. Recording rain gage at station.

AVERAGE DISCHARGE.--24 years (water years 1946, 1967-89), 16.6 ft<sup>3</sup>/s, 12,030 acre-ft/yr; median of yearly mean discharges, 14 ft<sup>3</sup>/s, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 30,100 ft<sup>3</sup>/s, June 9, 1972, gage height, 20.4 ft, site and datum then in use (22.0 ft, present site and datum, from floodmarks), from rating curve extended above 600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily, 0.10 ft<sup>3</sup>/s, Aug. 8, 1989.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of 1911 reached a stage of about 16 ft, present datum.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 8	0400	a	*2.18	Mar. 10	0045	*30	1.89

a Backwater from ice. Minimum daily discharge, 0.10 ft<sup>3</sup>/s Aug. 8.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES SEP DAY OCT NOV DEC JAN FEB MAR APR MAY JIIN. JUI. AUG 2.1 1.6 1.8 e1.5 1.6 e1.5 5.7 7.6 9.5 3.2 .48 .50 2 1.7 1.7 1.6 e1.5 e1.0 e1.5 5.6 9.0 3.1 .30 .48 3 1.6 1.8 1.7 1.7 e1.0 e1.5 5.5 14 8.6 2.7 .25 .50 1.6 1.8 1.8 1.7 e1.0 e1.5 5.0 14 9.1 3.0 .76 5 1.8 1.7 1.8 1.6 e1.0 e1.5 4.6 17 9.0 2.3 . 67 6 1.5 1.6 7.3 18 7.6 1.7 .15 . 54 1.7 1.5 1.2 e2.0 7 1.5 1.6 2.0 e1.5 e4.0 e15 6.6 1.8 .12 .82 10 12 1.3 1.6 1.9 9.5 12 .10 8 1.5 .96 e1.0 5.4 1.5 e1.5 7.4 .11 5 8 q 1.4 1.5 1.8 e1.0 e1.5 2.2 11 1.3 1.1 6.0 10 1.3 1.5 1.5 e1.5 e1.5 24 5.5 11 19 1 1 1.6 32 1.3 1.4 1.5 e2.0 1.3 19 6.2 10 5.6 1.4 12 1.3 1.6 1.7 2.2 1.5 16 6.7 10 5.1 3.8 .36 1.6 1.5 13 1.3 1.5 2.0 2.2 13 6.4 21 5.6 4.6 .45 1.8 14 1.3 e1.7 e2.0 2.0 1.5 8.3 6.4 21 6.6 5.1 .82 1.7 15 1.9 2.0 1.5 7.1 6.1 16 6.7 .91 e1.6 e1.5 16 1.9 1.9 e6.0 5.9 16 5.3 6.1 .99 1.5 e1.6 e1.5 1.5 17 e2.0 1.8 5.9 15 5.4 5.2 1.2 1.4 2.5 e1.5 1.5 e5.0 3.9 1.3 5.8 6.0 1.4 18 3.0 e1.5 e2.0 1.7 14 1.4 e4.0 1.8 19 5.3 13 5.7 3.3 1.4 3.1 e1.5 e1.8 1.6 1.3 e5.0 1.5 4.3 2.9 2.0 20 2.8 e1.5 1.8 1.4 1.2 e5.0 4.9 11 2.5 3.2 21 2.6 e1.5 1.8 1.4 1.2 e5.0 5.2 10 3.9 1.7 e1.5 22 2.2 1.8 1.3 1.2 5.5 4.9 9.5 4.4 2.0 1.4 3.4 1.7 2.7 23 2.1 1.6 e1.5 1.3 1.3 4.9 4.6 8.9 5.3 1.3 24 2.0 2.1 e1.5 1.2 1.4 5.6 8.2 7.7 1.5 1.0 2.3 25 2.0 2.0 e1.5 1.4 1.4 6.7 4.4 8.1 9.7 1.6 .97 2.1 26 1.8 1.7 e1.5 1.5 1.5 9.2 5.1 8.6 8.6 1.6 .91 1.9 27 e1.0 1.9 9.4 9.6 8.9 6.7 1.4 .89 1.9 1.6 e1.5 1.2 28 12 5.1 1.3 .93 1.8 e1.0 1.2 8.4 8.4 1.7 2.1 e1.5 9.3 .90 1.8 8.2 4.4 1.3 29 2.0 7.5 1.8 e1.0 1.3 ---.59 ---3.5 .78 9.2 1.7 6.2 8.7 30 1.5 1.9 e1.5 1.4 .56 ---.80 31 1.5 e1.5 3.0 5.5 10 45.43 372 6 192.2 79.89 23.53 TOTAL 57.2 49.7 51.0 49.5 38.2 236.8 193.9 MEAN 1.85 1.66 1.65 1.60 1.36 7.64 6.46 12.0 6.41 2.58 .76 1.51 MAX 3.1 2.1 2.0 3.0 1.9 24 12 21 9.7 6.1 2.0 3.4 MIN 1.3 1.4 1.0 1.0 1.0 7.6 3.5 59 .10 48 AC-FT 101 76 470 739 381 158 47 90

CAL YR 1988 TOTAL 1462.76 MEAN 4.00 MAX 29 MIN .60 AC-FT 2900 WTR YR 1989 TOTAL 1389.95 MEAN 3.81 MAX 24 MIN .10 AC-FT 2760

e Estimated

119

### 06422500 BOXELDER CREEK NEAR NEMO, SD--Continued

### PRECIPITATION RECORDS

PERIOD OF RECORD . -- March 1987 to current year.

INSTRUMENTATION.--Precipitation recorder. Elevation of gage is 4,340 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records fair .

		ACCUMULATED	PRECI	PITATION,		WATER TION V		1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.02	.01	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.01	.00	.01	.05	.00	.04	.00	.05	.00
3	.00	.01	.00	.01	.00	.16	.03	.04	.00	.21	.00	.00
4	.00	.00	.00	.00	.00	.02	.05	.02	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00
6	.00	.01	.01	.00	.00	.00	.02	.00	.00	.00	.05	.00
7	.00	.00	.01	.00	.00	.00	.02	.00	.00	.00	.00	.29
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	. 47
9	.00	.03	.00	.00	.00	.00	.02	.00	.00	.00	.04	.05
10	.00	.00	.01	.00	.00	.00	.00	.00	.00	.28	.00	.16
11	.00	.28	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00
12	.00	.00	.00	00	.00	.00	.00	1.01	.02	.59	.00	.00
13	.00	.10	.00	.00	.00	.09	.00	.21	.00	. 10	.00	.00
14	.00	.12	.00	.00	.00	.07	.00	.02	.01	.79	.00	.00
15	.04	.00	.00	.00	.00	.02	.00	.15	.00	.09	.00	.00
16	.14	.00	.00	.00	.00	.00	.00	.02	.29	.26	.73	.00
17	. 44	.01	.00	.00	.02	.03	.00	.01	.03	.02	.02	.00
18	.00	.03	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00
19	.01	.00	.00	.00	.00	.01	.00	.00	.00	.00	.41	.01
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	. 83
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.90
22	.00	.00	.00	.00	.00	.00	.00	.00	.26	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.01	.10	.00	.00	.00
24	.00	.00	.00	.01	.00	.00	.00	.00	. 46	.02	.00	.00
25	.00	.00	.01	.00	.00	.00	.00	.00	. 23	.00	.00	.00
26	.00	.01	.02	.00	.00	.00	. 12	.00	.00	.00	.00	.00
27	.00	.00	.01	.00	.00	.03	.49	.00	.00	.00	.30	.00
28	.00	.04	.00	.00	.01	.03	.03	.00	.00	.09	.00	.00
29	.00	.00	.00	.00		.00	.03	.04	.00	.08	.00	.00
30	.00	.00	.00	.00		.00	.00	.18	.00	.00	.00	.00
31	.00		.00	.00		.00		.07		.00	.01	
TOTAL	0.63	0.64	0.07	0.03	0.05	0.49	0.91	1.78	1.44	2.56	1.61	2.71

#### 06422600 BOXELDER CREEK AT CAMP COLUMBUS, NEAR NEMO, SD

LOCATION.--Lat 44°07'30", long 103°25'30", in SE½NW½ sec.17, T.2 N., R.6 E., Pennington County, Hydrologic Unit 10120111, 0.2 mi southeast of Camp Columbus, 3.4 mi downstream from Jim Creek, and 6.0 mi southeast of Nemo.

PERIOD OF RECORD. -- June 1978 to September 1980 (discontinued).

#### PRECIPITATION RECORDS

PERIOD OF DAILY RECORD . --

PRECIPITATION: October 1988 to September 1989 (seasonal records).

INSTRUMENTATION.--Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,260 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage is located 0.2 mi northeast of discontinued streamflow gaging station. Gage is read daily by observer.

ACCUMULATED PRECIPITATION,	IN	INCHES,	WATER	YEAR	OCTOBER	1988	TO	SEPTEMBER	1989
		STIMMA	TTON V	SHILLE					

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00					.00	.00	.10	.00	.05	.00
2	.00	.00					.00	.00	.09	.00	.00	.00
3	.00	.00					.00	.00	.00	. 23	.00	.00
4	.00	.04					.15	.00	.00	.00	.00	.00
5	.00	.00					.02	.28	.00	.00	.00	.00
6	.00	.00					.33	.00	.00	.00	.10	.00
7	.00	.02					.00	.00	.00	.00	.00	.39
8	.00	.00					.09	.08	.00	.00	.00	.27
9	.00	.00					.04	.00	.00	.00	.00	.35
10	.00	.04					.06	.00	.00	.29	.00	.07
11	.00	.00					.00	.00	.00	.00	.00	.00
12	.00	.39					.00	.00	.07	.00	.00	.00
13	.00	.00					.00	1.20	.05	.29	.00	.00
14	.00	.17					.00	.25	.00	.16	.00	.00
15	.11	.15					.00	.02	.00	.67	.00	.00
16	.03	.00					.00	.22	.03	.04	.00	.00
17	.74	.00					.10	.00	.00	. 26	.76	.00
18	.00	.09					.00	.05	.00	.02	.05	.00
19	.00	.00					.00	.00	.00	.00	.00	.02
20	.00	.00					.00	.00	.00	.00	.40	.00
21	.00	.00					.00	.00	.00	.00	.05	2.03
22	.00	.00					.00	.00	.03	.00	.00	.04
23	.00	.00					.00	.00	.08	.00	.00	.00
24	.00	.00					.00	.00	.45	.00	.00	.00
25	.00	.00					.00	.00	.22	.00	.01	.00
26	.00	.02					.21	.00	.13	.00	.00	.00
27	.00	.00					. 43	.00	.00	.00	.00	.00
28	.00	.07					. 12	.00	.00	.10	.25	.00
29	.00	.00					.23	.02	.00	.00	.00	.00
30	.00	.01					.00	.23	.00	.00	.00	.00
31	.00							.03		.00	.00	
TOTAL	0.88	1.00					1.78	2.38	1.25	2.06	1.67	3.17

### 06423010 BOXELDER CREEK NEAR RAPID CITY, SD

LOCATION.--Lat 44°07'54", long 103°17'54", in NW\sE\sec.17, T.2 N., R.7 E., Pennington County, Hydrologic Unit 10120111, near center span on downstream side of bridge on State Highway 79, and 4.0 mi northwest of Rapid City.

DRAINAGE AREA. -- 128 mi 2.

PERIOD OF RECORD . -- May 1978 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,450 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good. Considerable loss in sinkholes in reach above gage.

AVERAGE DISCHARGE. -- 11 years, 0.72 ft3/s, 522 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 253 ft<sup>3</sup>/s, May 18, 1978, gage height, 31.14 ft, from floodmark; maximum gage height, 31.51 ft, May 7, 1983, backwater from small dam; no flow for many days each year.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR .-- No flow during year.

		Dibominos,	111 00210		M	EAN VALUES		1000		1000		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	e.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00		.00	.00	.00	.00	.00	.00	.00
30	.00	.00	.00	.00		.00	.00	.00	.00	.00	.00	.00
31	.00		.00	.00		.00		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MAX	.00	.00									.00	.00
			.00	.00	.00	.00	.00	.00	.00	.00		
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	. 0	.0	.0	.0	. 0	.0

CAL YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .0 WTR YR 1989 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .0

e Estimated

#### 06423500 CHEYENNE RIVER NEAR WASTA, SD

LOCATION.--Lat 44°04'52", long 102°24'03", in NE½NE½NW½ sec.2, T.1 N., R.14 E., Pennington County, Hydrologic Unit 10120111, on left bank at downstream side of highway bridge, 200 ft downstream from railroad bridge, 3.0 mi east of Wasta, and 8.6 mi downstream from Boxelder Creek.

DRAINAGE AREA. -- 12,800 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--July 1914 to June 1915, August 1928 to June 1932, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1309. Records for Feb. 19-28, 1930, published in WSP 701, have been found to be unreliable and should not be used.

REVISED RECORDS. -- WSP 786: Drainage area. WSP 1279: 1930(M), 1931, 1937. See also Period of Record.

GAGE.--Water-stage recorder. Datum of gage is 2,260.78 ft above National Geodetic Vertical Datum of 1929.

Prior to Aug. 1, 1940, nonrecording gage at site 50 ft upstream; Aug. 1, 1940, to Dec. 3, 1940, nonrecording gage and Dec. 4, 1940, to Sept. 30, 1968, water-stage recorder at present site all at datum 2.00 ft higher.

Oct. 1, 1968, to Sept. 30, 1972, at datum 1.00 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Angostura Dam 108 mi upstream since October 1949 and by upstream dams on Rapid Creek since August 1956. Several observations of water quality were made during the year. National Weather Service telemeter and U.S. Army Corps of Engineers satellite data-collection platform at station.

AVERAGE DISCHARGE.--58 years (water years 1929-31, 1935-89), 336 ft<sup>3</sup>/s, 243,400 acre-ft/yr; median of yearly mean discharges, 293 ft<sup>3</sup>/s, 212,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge observed, 46,300 ft<sup>3</sup>/s, May 6, 1932, gage height, 13.28 ft, present datum, from rating curve extended above 11,000 ft<sup>3</sup>/s on basis of an incomplete discharge measurement at gage height 10.65 ft, present datum; maximum gage height observed, 14.5 ft, present datum, June 13, 1915; minimum discharge, 0.60 ft<sup>3</sup>/s, July 27, 1961.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of May 1920 reached a stage of 18 ft, present datum, from information by local residents.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,370 ft<sup>3</sup>/s at 1600 hours, Sept. 21, gage height, 6.18 ft; minimum daily discharge, 7.1 ft<sup>3</sup>/s, July 13.

MEAN VALUES DAY OCT NOV DEC TAN FER MAR APR MAY JUN. JIII. AUG SEP 126 86 e60 e50 e25 e30 83 142 65 e20 12 19 2 101 84 e60 e50 e18 e30 87 112 65 e20 16 17 3 88 84 e70 90 51 e15 16 16 e45 e15 e25 102 80 89 e25 117 76 43 e15 14 16 e60 e50 e25 5 17 77 e55 e55 e40 e25 100 36 11 6 78 10 86 e60 e50 e30 98 13 9.7 79 86 e65 e50 e60 e35 80 67 40 10 18 e45 83 e50 e60 e45 65 41 8.3 9.5 19 88 88 86 62 33 8.1 9.5 136 e45 e40 e60 e65 99 7.8 228 10 85 86 e50 e70 88 51 32 18 e40 e120 82 e70 47 7.6 13 681 11 90 e55 945 e180 82 35 12 77 96 e55 43 34 7.3 12 168 e50 e70 e200 80 13 76 33 16 98 e65 e40 e70 e250 84 59 98 14 e75 120 e55 e50 e60 e250 83 168 32 46 11 71 15 e80 99 e45 e60 e50 e200 86 135 29 161 13 62 16 e75 80 e40 e60 840 e180 82 31 65 55 17 e75 101 e40 e65 e40 e180 84 80 39 96 12 47 18 e80 107 e45 e55 e40 e150 92 69 32 166 11 38 19 e100 e55 192 60 33 146 37 58 e45 e50 e180 20 89 e60 47 e30 48 42 51 e90 e45 e60 e180 111 21 e50 83 e30 27 27 2630 86 88 A55 e60 e250 49 15 23 785 22 82 93 e45 955 e60 e300 73 57 e30 22 295 23 80 e80 e50 e40 e60 e350 63 37 A2.5 13 15 130 24 82 e70 e45 e35 e70 e300 63 35 A2.5 13 70 25 80 e65 e45 e40 e80 e300 63 31 e40 14 90 e40 e50 26 81 e55 e70 e500 63 31 12 85 81 27 82 e550 69 32 e40 13 73 78 e45 e45 e45 e60 e35 13 37 66 80 e45 e45 e45 e50 e400 216 33 29 11 25 59 81 e50 e40 e45 e200 286 40 e30 57 30 80 e55 e35 e50 45 e25 28 e120 217 24 83 e40 e65 42 787.0 6074 TOTAL 2593 1580 1515 1483 5737 3114 2040 1106 1082.9 2442 65.8 25.4 202 MEAN 83.6 81.4 51.0 48.9 53.0 185 104 36.9 34.9 2630 MAX 126 120 70 65 80 550 286 168 65 166 85 MIN 75 45 35 35 15 25 63 31 25 7.1 9.5 13 AC-FT 5140 4840 3130 3010 2940 11380 6180 4050 2190 2150 1560 12050

CAL YR 1988 TOTAL 46150 MEAN 126 MAX 2050 MIN 28 AC-FT 91540 WTR YR 1989 TOTAL 29553.9 MEAN 81.0 MAX 2630 MIN 7.1 AC-FT 58620

e Estimated

#### 06425100 ELK CREEK NEAR RAPID CITY. SD

LOCATION.--Lat 44°14'25", long 103°09'03", in NEWNEW sec.9, T.3 N., R.8 E., Meade County, Hydrologic Unit 10120110, on section line near right upstream corner of county road bridge, 1.7 mi downstream from Morris Creek tributary, and 10 mi north of Exit 61 and I-90 northeast of Rapid City.

DRAINAGE AREA. -- 190 mi 2.

PERIOD OF RECORD .-- November 1978 to current year.

GAGE .-- Water-stage recorder. Elevation of gage is 2.950 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good. Some flow is pumped from stream for irrigation.

AVERAGE DISCHARGE. -- 10 years, 5.94 ft3/s, 4.300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,560 ft<sup>3</sup>/s, May 20, 1982, gage height, 10.79 ft; maximum gage height, 11.80 ft, Feb. 26, 1986, backwater from ice; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 17	0915	*190	*7.76	No other	peak grea	ter than base of	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.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	54	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	6.5	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	4.1	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	4.2	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	2.2	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.80	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.46	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.28	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.16	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.01	.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
30	.00	.00	.00	.00		.00	.00	.00	.00	.00	.00	.00
31	.00		.00	.00		.00		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	72.79	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	.00	.00	2.35	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	.00	.00	54	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	.0	.0	144	.0	.0	.0	.0

CAL YR 1988 TOTAL 544.55 MEAN 1.49 MAX 76 MIN .00 AC-FT 1080 WTR YR 1989 TOTAL 72.79 MEAN .20 MAX 54 MIN .00 AC-FT 144

#### 06425500 ELK CREEK NEAR ELM SPRINGS. SD

LOCATION.--Lat 44°14'54", long 102°30'10", in SWkNWk sec.1, T.3 N., R.13 E., Meade County, Hydrologic Unit 10120111, on left bank near downstream end of county highway bridge, 1.4 mi downstream from Hay Draw, 5.0 mi southeast of Elm Springs, and 7.0 mi upstream from mouth.

DRAINAGE AREA. -- 540 mi<sup>2</sup>, approximately.

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

GAGE.--Water-stage recorder. Datum of gage is 2,304.49 ft above National Geodetic Vertical Datum of 1929.

Prior to Nov. 2, 1976, nonrecording gage, and prior to Feb. 1, 1967, at site 350 ft downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of specific conductance and water temperature were taken during the year.

AVERAGE DISCHARGE.--40 years, 22.5 ft<sup>3</sup>/s, 16,300 acre-ft/yr; median of yearly mean discharges, 20 ft<sup>3</sup>/s, 14,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 8,540 ft<sup>3</sup>/s, Mar. 29, 1952, gage height, 10.61 ft, from floodmarks, site and datum then in use, from rating curve extended above 5,100 ft<sup>3</sup>/s; maximum gage height, 13.25 ft, Feb. 27, 1986, backwater from ice; no flow for long periods in each year.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Maximum stage known, about 17 ft, at former site, in May 1920, from information by local residents.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 400 ft3/s and maximum (\*):

Dat	te	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar	. 22	0730	*11	*5.01				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

		DIDOMENOL,	, IN CODIC	, , , , , , , , , , , , , , , , , , , ,	M	EAN VALUE	S	DER 1500	IO DELLEA	DLIK 1505		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.08	1.6	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.08	2.1	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.10	1.9	.00	.00 .	.00	.00
4	.00	.00	.00	.00	.00	.00	.15	1.7	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.17	1.1	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.21	. 52	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	.17	.34	.00	.00	.00	.00
8	.00	.00	.00	.00					.00	.00	.00	.00
					.00	.00	.11	.41				
9	.00	.00	.00	.00	.00	.00	.09	.11	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.08	.05	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.13	.01	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	1.0	.13	.04	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	4.7	.14	.75	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	2.4	.10	.62	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	2.4	.17	. 54	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	1.9	.24	.39	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.35	.37	.27	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.11	.47	.18	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.02	.38	.11	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.65	.36	.03	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.03	.30	.03	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	2.1	.24	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	3.9	.04	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	3.8	.10	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	2.6	.06	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	2.5	.76	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	2.1	1.5	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	1.6	2.0	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.43	2.7	.00	.00	.00	.00	.00
29	.00	.00	.00	.00		.63	2.7	.00	.00	.00	.00	.00
30							1.9	.00	.00	.00	.00	.00
31	.00	.00	.00	.00		.73	1.9	.00	.00	.00	.00	.00
31	.00		.00	.00		. 19		.00	111	.00	.00	
TOTAL	0.00	0.00	0.00		0.00	34.11	15.73	12.77	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	1.10	. 52	.41	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	4.7	2.7	2.1	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	. 0	.0	68	31	25	.0	.0	.0	.0

CAL YR 1988 TOTAL 877.44 MEAN 2.40 MAX 65 MIN .00 AC-FT 1740 WTR YR 1989 TOTAL 62.61 MEAN .17 MAX 4.7 MIN .00 AC-FT 124

#### 06427000 KEYHOLE RESERVOIR NEAR MOORCROFT. WY

LOCATION.--Lat 44°22'55", long 104°46'45", in NWkNWk sec.27, T.51 N., R.66 W., Crook County, Hydrologic Unit 10120201, at reservoir dam on Belle Fourche River, 12 mi northeast of Moorcroft.

DRAINAGE AREA. -- 2,000 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- March 1952 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929 (Bureau of Reclamation datum). Prior to May 15, 1958, and Oct. 1, 1968, to Mar. 13, 1970, nonrecording gages, and May 15, 1958, to Sept. 30, 1968, water-stage recorder, all at present site and datum.

REMARKS.--Reservoir is formed by a zoned earth-fill dam completed by the Bureau of Reclamation Oct. 25, 1952. Storage began Feb. 12, 1952. Inactive storage, between elevations 4,036.0 ft and 4,051.0 ft, 7,952 acre-ft. Total capacity below elevation 4,099.3 ft (crest of spillway), 185,800 acre-ft. Siltation has eliminated dead storage. Figures given herein represent active contents. The reservoir provides flood control and water for irrigation in Wyoming and near Belle Fourche, SD.

COOPERATION .-- Records of elevation and contents provided by the Bureau of Reclamation .

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 200,744 acre-ft, May 21, 1978, elevation, 4,100.38 ft; minimum daily contents (since appreciable storage was attained), 6,030 acre-ft, Mar. 8, 9, 1955, elevation, 4,046.35 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 53,534 acre-ft, May 31, elevation, 4,077.81 ft; minimum, 32,558 acre-ft, Sept. 30, elevation, 4,071.11 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 Contents Change in contents Elevation Date (acre-feet) (acre-feet) (feet) 4,075.48 Sept. 30 45.432 -424 Oct. 31 4,075.35 45,008 Nov. -360 30 4.075.24 44,648 Dec. 31 +98 4,075.27 44,746 -24,535 Jan. 4,075.28 44,779 +53 Feb. 28 4,075.39 45,136 +357 Mar. 31 4,076.90 50,269 +5,133 30 51,050 +781 Apr. 4.077.12 May 31 4.077.81 53.534 +2.484 June 30 4.076.71 49,608 -3,926 July 31 4.074.08 40,970 -8.638 33,078 -7,892 Aug. 31 4,071.31 Sept. 30 4,071.11 32,558 -520 -12.854

#### 06428500 BELLE FOURCHE RIVER AT WYOMING-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 44°44′59", long 104°02′49", in NE½NW½NW½ sec.18, T.9 N., R.1 E., Butte County, Hydrologic Unit 10120202, on left bank 0.3 mi downstream from State line, 3.7 mi downstream from Oak Creek, and 11 mi northwest of Belle Fourche, SD.

DRAINAGE AREA. -- 3,280 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --December 1946 to current year. Records for water year 1947 incomplete, yearly estimate published in WSP 1729.

GAGE. -- Water-stage recorder. Datum of gage is 3.095.7 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Diversions upstream from station for irrigation of about 5,400 acres. Flow regulated by Keyhole Dam, usable capacity, 191,600 acre-ft, 143 mi upstream since Oct. 25, 1952. Several observations of water temperature and specific conductance were made during the year. U.S. Bureau of Reclamation satellite data-collection platform at station.

AVERAGE DISCHARGE. -- 43 years, 88.0 ft 3/s, 63,760 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 4,400 ft<sup>3</sup>/s, June 18, 1962, gage height, 15.59 ft; no flow at times some years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 533 ft<sup>3</sup>/s at 0115 hours, Mar. 13, gage height, 6.76 ft; maximum gage height, 10.56 ft, Mar. 11, backwater from ice; minimum daily discharge, 1.5 ft<sup>3</sup>/s, Feb. 3, 4.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JUN JUL AUG SEP JAN FER MAR APR MAY e12 e7.0 e4.0 e8.0 e13 e6.0 e2.5 e7.0 e13 e5.5 e1.5 e6.0 e12 e7.0 e1.5 e5.0 e13 e7.0 e2.0 e4.5 e13 e7.0 e3.0 e5.0 e12 e5.0 e3.0 e7.0 e10 e2.0 e3.0 e10 e10 e2.5 e20 e3.0 e10 e2.5 e4.0 e80 e390 e10 e2.5 e5.0 e11 e2.5 e6.0 e620 e12 e2.5 e7.0 15 e13 e2.5 e7.0 e11 e2.5 e7.0 9.7 e11 e2.5 e7.0 e11 e2.5 e6.0 e80 e12 e10 e2.5 e6.0 e70 e9.5 e13 e3.0 e6.0 e70 e9.0 e12 e2.5 e6.0 e70 e9.0 e7.0 e70 e11 e3.0 e9.0 e12 e3.0 e90 e7.0 e9.5 e10 e3.0 e7.0 e110 e9.5 e10 e3.0 e8.0 e130 9.7 e9.0 e2.5 e10 e9.0 e8.0 e2.5 e9.0 e10 e7.0 e2.5 e8.0 qq e10 e6.0 e3.0 e8.0 e11 e6.0 e3.0 ---e12 e7.0 e3.5 e7.0 e5.0 4102.5 TOTAL 357.9 327.0 154.5 111.0 52.5 92.4 82.2 36.2 3.58 7.0 55.9 15.0 5.52 MEAN 11.9 10.5 MAX 9.0 6.0 MIN 2.0 1.5 4.5 2.7 AC-FT 

CAL YR 1988 TOTAL 18405.80 MEAN 50.3 MAX 150 MIN .90 AC-FT 36510 WTR YR 1989 TOTAL 18695.9 MEAN 51.2 MAX 620 MIN 1.5 AC-FT 37080

e Estimated

# 06429900 SAND CREEK AT RANCH A, NEAR BEULAH, WY

LOCATION.--Lat 44°29'42", long 104°06'34", in SWk sec.18, T.52 N., R.60 W., Crook County, Hydrologic Unit 10120203, on right bank 0.35 mi downstream from headquarters building of Ranch A Fish Genetics Laboratory, 0.9 mi upstream from Hospital Gulch, and 3.6 mi south of Beulah.

PERIOD OF RECORD . -- October 1974 to September 1976 (discontinued).

#### PRECIPITATION RECORDS

PERIOD OF DAILY RECORD . --

PRECIPITATION: October 1988 to September 1989.

INSTRUMENTATION. -- Shielded, 8.0-in. diameter plastic gage, 48 in. tall. Elevation of gage is 3,800 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records poor. Gage is located 0.4 mi south of discontinued streamflow gaging station. Gage read daily by observer.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

					SUM	MATION VA	LUES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.08	e.00	e.07	.00	.20	.00	.00	.00
2	.00	.00	.00	.00	e.00	e.30	e.03	.00	.00	.00	.00	.00
3		.00	.00	.00	e.00	.20	e.00	.20	.00	.00	.00	.00
4		.00	.00	.00	e.00	.00	.00	.30	.00	.00	.00	.00
5		.00	.00	.00	e.00	.00	.00	.30	.00	.00	.00	.00
6	.00	.10	.10	.00	e.08	.00	.10	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	e.04	.00	.10	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.30
10	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00	. 20	.40
11	.00	.00	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.20	.00	.20	.00	.00
13	.00	.00	.00	.00	.10	. 50	.00	.20	.00	.20	.00	.00
14	.00	.00	.20	.00	.00	.00	.00	. 10	.00	.10	.00	.00
15	e.00	.30	.00	.00	.00	.00	e.00	.10	.00	e.60	.00	.00
16	.50	.00	.00	.00	.00	.00	e.30	.20	.30	e.00	.00	.00
17	.00	.10	.00	.00	.00	.30	e.10	.00	.00	.30	.00	.00
18	.00	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00	2.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.20	.00	.00	.00	.10	.00		.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00		.00
23	.00	.00	.00	.00	.00	.00	.00	.00	e.84	.00		.00
24	.00	.00	.00	.00	.00	.00	.00	.00	e.36	.00		.00
25	.00	.00	.00	.00	.00	.00	e.50	.00	e.00	.00		.00
26	.00	.00	.00	.00	.00	.00	e1.00	.00	.00	.00		.00
27	.00	.20	.00	.00	.20	.30	1.00	e.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	. 20	e.00	.00	.00	.00	.00
29	.00	.00	.00	.00		.00	.30	e.20	.00	.00	.00	.00
30	.00	.00	.00	.00		.00	.00	.40	.00	.00	.00	.00
31	.00		.20	.10		.10		.00		.00	.00	
TOTAL		0.90	0.50	0.10	0.70	1.80	3.90	2.50	2.00	1.40		2.70

e Estimated

#### CHEYENNE RIVER BASIN

### 06429997 MURRAY DITCH ABOVE HEADGATE AT WYOMING-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 44°34'35", long 104°03'20", in SWkSWk sec.7, T.7 N., R.1 E., Butte County, Hydrologic Unit 10120203, on right bank at State line and 12 mi southwest of Belle Fourche, SD.

PERIOD OF RECORD. -- April 1987 to current year.

GAGE. -- Water-stage recorder and concrete control. Elevation of gage is 3,440 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 23, 1987, published as 06430000 (below diversion at site 15 ft downstream).

REMARKS.--Records good except those for estimated daily discharges, which are fair. Ditch diverts water from left bank of Redwater Creek, 2.0 mi upstream, for irrigation of about 700 acres. Flow maintained during irrigation season only. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. -- Maximum daily discharge, 41 ft 3/s, Sept. 21, 1989; no flow for long periods in each year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR. -- Maximum daily discharge, 41 ft 3/s, Sept. 21; no flow for several months.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	3.9	.00	.00	.00	.00	e.00	.10	2.9	33	.00	19
2	1.6	7.9	.00	.00	.00	.00	e.00	.00	5.9	27	.00	20
3	20	4.1	.00	.00	.00	.00	e.00	.00	6.8	26	.00	26
4	29	.66	.00	.00	.00	.00	e.00	.00	6.5	25	.00	34
5	24	.74	.00	.00	.00	.00	e.00	.00	6.5	23	.00	24
6	12	.02	.00	.00	.00	.00	e.00	.00	6.5	20	.00	13
7	12	.00	.00	.00	.00	.00	e.00	.00	6.7	16	10	13
8	15	.00	.00	.00	.00	.00	e.00	.00	6.9	13	16	14
9	27	.00	.00	.00	.00	.00	e.00	.00	6.6	12	23	14
10	24	.00	.00	.00	.00	.00	e.00	.00	6.6	18	24	15
11	8.7	.00	.00	.00	.00	.00	e.00	.00	6.9	20	12	17
12	9.0	.00	.00	.00	.00	.00	e.00	.00	6.7	13	11	16
13	11	.00	.00	.00	.00	.00	e.00	.00	6.9	9.1	10	13
14	9.6	.00	.00	.00	.00	.00	e.00	.00	6.8	15	8.9	11
15	3.5	.00	.00	.00	.00	.00	e.00	.00	7.0	17	8.5	9.5
16	3.0	.00	.00	.00	.00	.00	e.00	.00	7.4	15	8.3	7.8
17	3.0	.00	.00	.00	.00	.00	e.00	.00	8.5	16	8.4	7.5
18	2.8	.00	.00	.00	.00	.00	e.00	.00	9.1	12	9.5	21
19	2.2	.00	.00	.00	.00	.00	e.00	.00	7.4	11	14	27
20	1.1	.00	.00	.00	.00	.00	e.00	.00	6.7	11	15	35
21	1.4	.00	.00	.00	.00	.00	e.00	.00	8.1	13	4.9	41
22	1.5	.00	.00	.00	.00	.00	e.00	.00	7.9	12	4.0	22
23	1.5	.00	.00	.00	.00	.00	e.00	,00	8.1	11	4.1	22
24	1.6	.00	.00	.00	.00	.00	e.00	.00	8.2	13	4.1	22
25	1.4	.00	.00	.00	.00	.00	e.00	.00	8.5	15	4.4	13
26	1.5	.00	.00	.00	.00	.00	.22	.00	8.5	14	4.6	7.1
27	1.5	.00	.00	.00	.00	.00	. 93	.00	8.1	14	4.7	2.5
28	1.4	.00	.00	.00	.00	.00	. 16	.00	8.3	1.0	4.2	1.6
29	1.3	.00	.00	.00		.00	.06	.00	8.7	.01	3.9	2.2
30	1.4	.00	.00	.00		.00	. 25	.00	14	.00	5.9	2.5
31	2.1		.00	.00		e.00		.00		.00	13	
TOTAL	235.12	17.32	0.00	0.00	0.00	0.00	1.62	0.10	223.7	445.11	236.40	492.7
MEAN	7.58	. 58	.00	.00	.00	.00	.054	.003	7.46	14.4	7.63	16.4
MAX	29	7.9	.00	.00	.00	.00	. 93	.10	14	33	24	41
MIN	.02	.00	.00	.00	.00	.00	.00	.00	2.9	.00	.00	1.6
AC-FT	466	34	.0	.0	.0	.0	3.2	.2	444	883	469	977

CAL YR 1988 TOTAL 1915.83 MEAN 5.23 MAX 32 MIN .00 AC-FT 3800 WTR YR 1989 TOTAL 1652.07 MEAN 4.53 MAX 41 MIN .00 AC-FT 3280

e Estimated

#### 06430500 REDWATER CREEK AT WYOMING-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 44°34'26", long 104°02'54", in NWkNWk sec.18 T.7 N., R.1 E., Butte County, Hydrologic Unit 10120203, on left bank 800 ft downstream from State line, 5.7 mi upstream from Crow Creek, and 12 mi southwest of Belle Fourche. SD.

DRAINAGE AREA. -- 471 mi<sup>2</sup>.

PERIOD OF RECORD. --April 1929 to September 1931 and February 1936 to July 1937 (published as "near Beulah, WY"), June 1954 to current year.

REVISED RECORDS. -- WSP 1309: 1931(M), 1936-37(M).

GAGE.--Water-stage recorder. Elevation of gage is 3,410 ft above National Geodetic Vertical Datum of 1929, from topographic map. Apr. 25, 1929, to Sept. 30, 1931, and Feb. 28, 1936, to July 31, 1937, nonrecording gage at site 2 mi upstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Large diversions for irrigation upstream from station. Total flow passing State line may be obtained by adding flow of Murray ditch (see station 06429997). Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 37 years, 34.8 ft3/s, 25,210 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 2,440 ft<sup>3</sup>/s, Aug. 22, 1973, gage height, 12.19 ft, from rating curve extended above 1,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 11.95 ft; no flow Aug. 13-15, 1929.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 3	1115	ice jam	*3.91	Apr. 27	1445	*40	2.68

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 1.9 ft3/s, July 1.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	25	26	29	e26	e27	28	33	29	1.9	23	17
	28	24	26	29	e23	e25	28	34	26	5.1	23	17
3	17	26	27	30	e20	e25	27	34	25	5.4	24	15
Å	14	28	27	30	e20	e23	27	34	24	6.3	24	12
2 3 4 5	14	29	27	30	e24	e22	27	37	24	6.5	24	12
	10											
6	13	29	31	30	e24	e25	28	37	24	6.7	24	12
7	9.0	29	31	e29	e24	31	27	35	24	6.9	15	12
8	12	28	30	e27	e24	31	27	34	23	7.7	6.2	12
9	5.0	27	31	e27	e24	31	27	33	23	7.5	5.0	13
10	6.9	28	31	e27	e26	33	27	33	22	6.3	5.0	13
11	14	28	31	e27	e28	35	27	32	23	6.7	9.9	13
12	14	29	31	28	30	34	27	33	24	6.0	14	13
13	11	29	30	29	30	34	26	35	24	5.0	15	13
14	13	29	30	29	30	36	26	34	24	7.1	18	14
15	22	29						33	24	7.7	17	16
13	22	29	29	29	30	33	26	33	24	1.7	17	10
16	22	28	29	29	30	31	27	34	25	7.5	17	18
17	28	28	29	30	e28	e30	27	34	25	7.5	19	18
18	30	28	29	30	e27	e30	27	32	24	5.9	17	7.9
19	29	28	30	30	29	e30	27	32	24	5.4	13	5.1
20	26	28	29	30	29	31	27	31	24	5.0	14	6.6
21	24	28	28	30	29	31	27	31	21	5.3	24	8.2
22	21	28	28	30	29	30	27	32	21	5.0	24	11
23	22	28	28	30	29	30	28	32	21	5.0	24	6.3
24	28	28	28	30	29	30	27	31	24	5.0	23	6.1
25	28	28	29	29	29	30	29	30	24	5.0	19	10
23	20	20	25	25	25	30	25	30	24	3.0	13	10
26	27	28	e27	29	28	31	31	31	23	5.0	15	16
27	27	28	e27	29	29	31	37	31	22	5.0	15	21
28	27	28	e27	29	e28	32	36	32	21	25	16	22
29	27	28	e27	29		31	34	31	20	25	17	22
30	27	27	e29	30		30	33	32	17	24	15	22
31	24		29	27		29		31		24	16	
TOTAL	638.9	836	891	901	756	932	849	1018	699	257.4	535.1	404.2
MEAN	20.6	27.9	28.7	29.1	27.0	30.1	28.3	32.8	23.3	8.30	17.3	13.5
MAX	30	29	31	30	30	36	37	37	29	25	24	22
					20		26	30	17	1.9	5.0	5.1
MIN	5.0	24	26	1700		22			1390	511	1060	802
AC-FT	1270	1660	1770	1790	1500	1850	1680	2020	1390	211	1000	002

CAL YR 1988 TOTAL 9085.2 MEAN 24.8 MAX 60 MIN 4.0 AC-FT 18020 WTR YR 1989 TOTAL 8717.6 MEAN 23.9 MAX 37 MIN 1.9 AC-FT 17290

e Estimated

#### 06430770 SPEARFISH CREEK NEAR LEAD, SD

LOCATION.--Lat 44°17'56", long 103°52'02", in NE\N\\ sec.22, T.4 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on right bank 0.5 mi below confluence of East Spearfish Creek, in the vicinity of Cheyenne Crossing, approximately 5 mi southwest of Lead.

DRAINAGE AREA. -- 63.5 mi<sup>2</sup>.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 5,310 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Unstream diversions out of drainage basin to Whitewood Creek basin by Homestake Mining Co. average about 12 ft /s. Figures of daily discharge do not include diversion by Homestake Mining Co. Satellite data-collection platform at station. Several observations of water quality were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD. --Maximum discharge, 673 ft<sup>3</sup>/s, May 14, 1965, from contracted opening measurement of peak flow 2.0 mi downstream; minimum not determined.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 30 ft<sup>3</sup>/s at 2130 hours, May 12, gage height, 7.45 ft; maximum gage height, 7.53 ft, Feb. 1, backwater from ice; minimum daily discharge, 11 ft<sup>3</sup>/s, Feb. 3, 4, 16-18, Mar. 2, 3, Aug. 29, 30.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			,		М	EAN VALUE	3			The Park		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	14	15	17	e14	e14	15	16	12	13	15	14
2	16	14	15	16	e13	e11	16	19	13	13	14	15
3	15	13	15	16	e11	e11	14	21	18	13	12	15 15
3	14	13	16	16	e11	e12	e14	23	19	13	12	15
5	14	15	15	15	e13	e14	e14	24	16	13	12	14
6	15	16	14	16	14	14	15	23	15	12	13	14
7	15	15	13	e16	14	12	13	23	15	13	12	14
8	15	14	12	e15	e14	13	14	24	15	14	13	13
9	15	15	14	13	e14	15	15	24	16	14	13	14
10	15	15	16	15	e14	16	e15	22	18	12	13	13
11	14	14	16	14	13	17	e15	22	18	12	13	13
12	14	16	16	13	15	18	15	21	18	12	13	13
13	15	15	15	12	14	16	13	25	18	12	15	13
14	15	15	e15	15	e13	15	14	25	18	12	14	13
15	15	14	e13	e15	e12	15	16	25	17	13	14	13 13
16	15	13	e14	14	e11	14	17	21	18	14	14	14
17	21	13	16	12	11	e15	15	20	17	13	14	14
18	16	14	17	14	e11	e13	15	20	19	14	12	14
19	15	16	17	13	e12	e14	13	23	18	14	17	13
20	15	15	17	14	12	e13	12	22	16	14	20	15
21	15	16	16	15	12	e13	12	23	15	14	17	18
22	15	16	16	16	12	12	14	20	16	15	16	16
23	15	16	14	13	12	13	15	19	19	15	15	16
24	15	16	17	13	13	13	15	18	22	15	14	16
25	15	16	e17	e13	14	15	15	19	19	14	15	16
26	15	14	e17	e13	15	17	17	19	18	14	13	16
27	15	13	e16	13	14	17	22	17	16	14	13	16
28	14	15	e16	13	e14	14	18	20	14	13	13	15
29	13	14	e16	e13		14	16	17	13	13	11	15
30	14	14	17	14		14	16	18	13	14	11	15
31	14		17	e15		14		15		14	13	
TOTAL	466	439	480	442	362	438	450	648	499	415	426	435
MEAN	15.0	14.6	15.5	14.3	12.9	14.1	15.0	20.9	16.6	13.4	13.7	435 14.5
MAX	21	16	17	17	15	18	22	25	22	15	20	18
MIN	13	13	12	12	11	11	12	15	12	12	11	13
AC-FT	924	871	952	877	718	869	893	1290	990	823	845	863
AC-LI	924	0/1	932	0//	110	009	093	1290	330	023	047	003

WTR YR 1989 TOTAL 5500 MEAN 15.1 MAX 25 MIN 11 AC-FT 10910

e Estimated

#### 06430800 ANNIE CREEK NEAR LEAD, SD

LOCATION.--Lat 44°19'37", long 103°53'38", in NE\nE\sec.9, T.4 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on left bank 200 ft upstream from mouth and about 6 mi southwest of Lead.

DRAINAGE AREA. -- 3.55 mi 2.

PERIOD OF RECORD. --October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 5,110 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge 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. 18	0830	a	*8.07	May 8	0915	*12	4.27

a Backwater from ice. No flow Mar. 2-7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP e.05 e.04 e.30 e.70 .60 .16 .10 .11 e.02 3.1 1.0 .11 .13 e.06 e.03 e.30 e.00 e.70 4.0 .57 .15 .10 3 .16 .09 .11 .13 e.06 e.04 e.20 e.00 e.70 5.7 .91 .56 .09 .11 e.06 e.04 e.10 e.00 e.70 7.1 . 88 .49 .15 .09 5 e.06 .09 .11 e.05 e.10 e.00 e.70 7.9 . 81 .47 . 13 .08 6 12 .12 e.06 e.06 e.00 8.4 81 46 13 .08 e.10 .50 .08 .13 .16 e.06 e.04 e.20 e.00 .46 9.8 .81 .41 .13 8 .15 e.04 .72 38 .09 .12 e.02 e.20 e.02 .43 12 13 9 .10 .13 e.04 e.02 e.20 e.10 .33 11 .72 . 33 .13 .11 10 .14 .11 e.04 e.03 e.20 e.20 .35 9.1 . 65 .30 .14 .11 11 .10 .12 e.04 e.03 e.30 e.50 .35 7.1 . 56 .34 .12 . 13 12 .09 .13 e.04 e.05 e.30 e.70 .40 6.3 .66 .35 .13 .13 13 .10 e.05 .59 .09 .15 e.10 e.30 e.80 6.2 .63 .11 .09 .15 .09 e.06 e.10 e.30 e.70 . 62 5.5 .73 . 55 15 .10 e.04 e.10 e.30 5.1 .56 .13 .09 e.60 .88 e.04 e.10 .90 16 .12 e.15 e.30 e.40 4.7 .55 .35 .14 .09 . 93 .79 17 .38 e.10 e.20 .09 e. 15 e. 04 e.20 . 28 .11 4.1 .25 18 .17 e.15 e.04 . 57 .09 .10 e.10 e.10 e.15 1.1 4.0 19 e.05 . 26 .11 . 13 e.10 e.20 e.05 e.10 1.3 3.2 . 51 .11 20 .12 e.10 e.07 e.20 e.05 e.10 1.6 2.9 . 47 .27 . 13 .19 21 e.10 2.7 .26 .11 .28 .12 e.10 e.05 e.20 e.05 1.7 .55 e.06 22 .13 e.10 e.05 e.20 e.10 2.0 2.5 .53 .26 .09 .14 23 .13 e.15 e.05 e.20 e.07 e.10 2.0 2.3 .56 .23 .09 .13 24 . 13 e.15 e.05 e.10 e.09 e.10 2.0 1.9 . 86 .23 .09 .13 25 . 13 e.10 e.04 e.10 e.10 e.10 1.9 1.6 .74 .22 .09 .11 26 .13 e.05 e.03 e.10 e.10 e.20 2.4 1.5 .60 .21 .09 .11 27 .12 e.05 e.02 e.10 e.30 3.4 1.5 .55 .19 .08 .11 e. 10 28 .14 e.04 e.02 e.20 e.40 . 53 . 17 .16 .09 e.07 3.4 1.4 29 e.50 .11 e.04 e.02 e.20 1.2 54 . 23 .11 .10 ---3.1 ---30 e.04 e.02 e.20 . 59 24 .09 .10 .11 e.80 2.9 1.1 ---31 .13 --e.03 e.20 e.80 1.1 .18 .09 TOTAL 3.87 3.48 1.38 3.25 4.74 8.09 39.04 146.0 20.49 10.47 3.69 3.34 MEAN .12 .045 .68 .34 .11 .12 .10 .17 .26 1.30 4.71 .12 MAX .38 .07 .60 .16 .28 .16 .20 .30 .80 3.4 12 1.1 .08 .08 .09 .04 .02 .02 .05 .00 .33 1.1 .17 21 7.3 6.6 AC-FT 7.7 6.9 2.7 6.4 9.4 77 290 41 16

WTR YR 1989 TOTAL 247.84 MEAN .68 MAX 12 MIN .00 AC-FT 492

e Estimated

#### 06430850 LITTLE SPEARFISH CREEK NEAR LEAD, SD

LOCATION.--Lat 44°20'58", long 103°56'08", in NE%NW%SE% sec.36, T.5 N., R.1 E., Lawrence County, Hydrologic Unit 10120203, on left bank 0.3 mi upstream from Savoy, 0.4 mi upstream from mouth, 0.6 mi downstream from Roughlock Falls, and 13.6 mi northwest of Lead.

DRAINAGE AREA. -- 25.8 mi<sup>2</sup>.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 5,020 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Estimated daily discharges fair. Rating not computed and discharges estimated on the basis of daily gage heights and twelve discharge measurements ranging from 13 to 16 ft<sup>3</sup>/s. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 16 ft<sup>3</sup>/s, May 2-10; minimum daily discharge, 13 ft<sup>3</sup>/s on many days.

DISCHARGE IN CIDIC BEET DED CECOND LIAMED VEAD OCTOBED 1000 TO CEDTEMBED 1000

		DISCHARGE,	IN CUBIC	FEET	PER SECONI	O, WATER	YEAR OCTOBER	1988	TO SEPTEMBER	1989		
					PIE	TAN ANTO	ES					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e14	e15	e15	e14	e13	e14	e14	e15	e15	e13	e13	e14
2	e14	e15	e15	e14	e13	e14	e14	e16	e15	e13	e13	e14
3	e14	e15	e15	e14	e13	e14	e14	e16	e14	e13	e13	e14
4	e14	e15	e15	e14	e13	e14	e14	e16	e14	e13	e13	e14
5	e14	e15	e14	e14	e13	e14	e14	e16	e14	e13	e13	e14
6	e14	e15	e14	e14	e13	e14	e14	e16	e14	e13	e13	e14
7	e14	e15	e14	e14	e13	e14	e14	e16	e14	e13	e13	e14
8	e15	e15	e14	e14	e14	e14	e14	e16	e14	e13	e13	e14
9	e15	e15	e14	e14	e14	e14	e14	e16	e14	e13	e13	e14
10	e15	e14	e14	e14	e14	e14	e14	e16	e14	e13	e14	e14
11	e15	e14	e14	e14	e14	e14	e14	e15	e14	e13	e14	e14
12	e15	e14	e14	e14	e14	e14	e14	e15	e14	e13	e14	e14
13	e15	e14	e14	e14	e14	e14	e14	e15	e14	e13	e14	e14
14	e15	e14	e14	e14	e14	e14	e14	e15	e14	e14	e14	e14
15	e15	e14	e14	e14	e14	e14	e14	e15	e14	e14	e14	e14
16	e15	e14	e14	e14	e14	e14	e14	e15	e14	e14	e14	e14
17	e15	e14	e14	e14	e14	e14	e14	e15	e14	e14	e14	e14
18	e15	e14	e14	e14	e14	e14	e14	e14	e14	e13	e14	e14
19	e15	e14	e14	e14	e14	e14	e14	e14	e14	e13	e14	e14
20	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
21	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
22	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
23	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
24	e15	e14	e14	e14	e14	e14	e14	e14	e14	e13	e14	e14
25	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
26	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
27	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
28	e15	e14	e14	e14	e14	e14	e14	e14	e13	e13	e14	e14
29	e15	e14	e14	e14		e14	e14	e14	e13	e13	e14	e14
30	e15	e14	e14	e14		e14	e14	e15	e13	e13	e14	e14
31	e15		e14	e14		e14		e15		e13	e14	
TOTAL	458	429	438	434	385	434	420	462	412	407	425	420
MEAN	14.8	14.3	14.1	14.0	13.7	14.0	14.0	14.9	13.7	13.1	13.7	14.0
MAX	15	15	15	14	14	14	14	16	15	14	14	14
MIN	14	14	14	14	13	14	14	14	13	13	13	14
AC-FT	908	851	869	861	764	861	833	916	817	807	843	833

WTR YR 1989 TOTAL 5124 MEAN 14.0 MAX 16 MIN 13 AC-FT 10160

e Estimated

#### 06430898 SQUAW CREEK NEAR SPEARFISH, SD

LOCATION.--Lat 44°24'04", long 103°53'35", in NE\nE\s sec.17, T.5 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on right bank 200 ft upstream from mouth and 8.0 mi south of Spearfish.

DRAINAGE AREA. -- 6.95 mi 2.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 4,480 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 20 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height		Time	Discharge	Gage height
Date	lime	(IL-/S)	(ft)	Date	Time	(ft <sup>3</sup> /s)	(ft)
Mar. 6	1615	a	*4.95	May 7	2345	*41	4.81

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 0.20 ft<sup>3</sup>/s, Dec. 28, 29, Jan. 2, 3, 8-10, Feb. 4.

			A.S. 2800.	10-14-1-15	Þ	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.4	.77	.66	e.30	e.70	e.50	e1.5	9.3	2.7	1.4	.74	.31
2	1.2	.80	.65	e.20	e.60	e.40	e1.5	11	2.4	1.3	.74	.31
3	1.0	.80	.62	e.20	e.50	e.40	e1.5	15	2.3	1.2	.72	.28
4	.94	.71	. 64	e.30	e.20	e.30	e2.0	18	2.2	1.1	.61	.29
5	. 93	.68	.68	e.40	e.40	e.30	e2.0	25	2.0	1.0	. 57	.29
		7.52								775		100
6	. 88	.77	.68	e.40	e.40	e.40	e2.0	27	2.0	. 94	. 57	.25
7	. 87	1.0	.69	e.30	e.50	e.50	2.2	35	1.9	. 94	. 57	.27
8	. 83	.79	.74	e.20	e.50	e.60	2.4	36	1.8	. 85	. 57	.45
9	.80	.76	.70	e.20	e.50	e.70	2.4	28	1.8	.79	. 57	.45
10	.78	.72	.67	e.20	e.50	e.80	3.5	21	1.7	.74	. 58	.51
11	.78	.77	.64	e.30	e.60	e1.0	3.4	16	1.6	.93	. 57	. 53
12	79	.77	.72	e.30	e.70	e1.0	2.8	13	1.7	.85	. 56	.46
13	72	.72	.75	e.30	e.70	e1.5	2.3	13	1.6	.81	. 44	.43
14	.69	.78	.92	e.30	e.70	e2.0	2.4		1.8	2.5	.34	.43
15	.76	e.70								2.5	.31	.42
13	.76	e./U	e.70	e.30	e.70	e2.0	2.7	10	1.6	2.5	.31	.42
16	.75	e.70	e.70	e.30	e.60	e1.5	3.8	10	1.5	1.6	.45	.39
17	2.5	e.70	e.40	e.40	e.60	e1.5	4.2	9.4	1.6	1.3	. 50	.39
18	1.4	e.60	e.50	e.40	e.50	e1.0	4.3	8.9	1.5	1.2	.32	.39
19	1.2	e.60	e.80	e.50	e.60	e1.0	4.4	7.8	1.3	1.1	.31	.35
20	1.1	e.60	e.70	e.50	e.60	e1.0	5.1	7.0	1.3	1.0	.34	1.7
21	1.0	e.70	e.60	e.50	e.60	e1.0	5.5	6.4	1.4	.92	.31	2.2
22	.95	.71	e.50	e.40	e.60	e1.0	5.7	5.5	1.4	.80	.31	1.0
23	.94	.79	e.50	e.40	e.70	e1.0	5.5	5.1	1.5	.80	.31	.84
24	. 89	.75								.74	.28	.73
			e.40	e.30	e.80	e1.5	5.2	4.6	3.3			
25	. 82	1.3	e.40	e.40	e1.0	e2.0	4.9	4.3	2.8	.74	.31	.68
26	. 84	.87	e.30	e.50	e1.0	e2.0	5.8	3.8	2.3	.72	.31	.68
27	.91	.62	e.30	e.60	e.90	e3.0	10	3.5	1.9	. 66	. 28	. 62
28	.76	.66	e.20	e.60	e.70	e3.0	9.9	3.2	1.7	1.4	.45	. 58
29	.78	.63	e.20	e.70		e2.5	8.8	3.2	1.6	1.3	.34	. 57
30	.77	.66	e.30	e.70		e2.0	7.7	3.3	1.5	1.1	.31	. 57
31	.78		e.30	e.80		e1.5		3.0		.84	.30	
TOTAL	31.76	22.43	17.56	12.20	17.40	38.90	125.4	377.3	55.7	34.07	13.89	17.37
MEAN	1.02								1.86	1.10	.45	.58
		.75	. 57	.39	.62	1.25	4.18	12.2				
MAX	3.4	1.3	.92	. 80	1.0	3.0	10	36	3.3	2.5	.74	2.2
MIN	.69	.60	.20	.20	. 20	.30	1.5	3.0	1.3	.66	. 28	.25
AC-FT	63	44	35	24	35	77	249	748	110	68	28	34

WTR YR 1989 TOTAL 763.98 MEAN 2.09 MAX 36 MIN .20 AC-FT 1520

e Estimated

#### 06430900 SPEARFISH CREEK ABOVE SPEARFISH, SD

LOCATION.--Lat 44°24'06", long 103°53'40", in NWkNEkNEk sec.17, T.5 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on left bank immediately below confluence of Squaw Creek near Maurice and 8.0 mi south of Spearfish.

DRAINAGE AREA. -- 139 mi<sup>2</sup>.

134

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 4,440 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Upstream diversions out of drainage basin to Whitewood Creek basin by Homestake Mining Co. average about 12 ft /s. Figures of daily discharge do not include diversion by Homestake Mining Co. Several observations of water quality were made during the year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR, -- Maximum discharge, 117 ft<sup>3</sup>/s at 1030 hours, May 8, gage height, 4.24 ft; minimum daily discharge, 34 ft<sup>3</sup>/s, Feb. 3, Mar. 22, Aug. 4, 5, 30.

	MEÁN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
1	44	41	43	47	e38	e40	47	62	44	41	38	38	
2	43	40	41	43	e36	e36	48	70	43	41	38	37	
3	43	39	42	44	e34	e36	47	82	49	41	37	37	
3	41	41	43	43	e36	e37	43	85	49	40	34	37	
5	41	41	42	43	e39	e37	42	95	48	40	34	36	
6	41	43	41	43	42	e37	50	97	43	38	38	35	
7	41	46	40	e41	43	e41	45	103	45	38	35	35	
8	41	42	37	e41	42	45	45	104	44	39	37	39	
9	40	42	41	e39	41	48	48	96	46	40	38	39	
10	41	43	42	46	42	51	42	89	47	38	38	39	
11	40	43	43	45	42	54	45	83	48	39	37	39	
12	39	43	43	39	44	55	45	79	49	38	37	40	
13	39	44	41	39	42	51	43	82	50	38	36	39	
14	41	44	42	45	39	50	46	79	48	42	37	38	
15	45	44	36	37	37	47	47	76	47	43	36	39	
16	46	41	41	43	e36	e43	51	74	46	42	36	38	
17	56	41	42	38	e36	e42	50	72	46	40	38	38	
18	48	40	43	40	e36	e38	51	69	47	42	35	38	
19	47	42	44	40	e36	e40	49	67	47	42	37	37	
20	45	41	43	39	e37	e39	50	64	43	36	44	44	
21	45	41	43	41	e37	e38	52	62	44	38	40	50	
22	45	42	43	42	e39	e34	54	60	46	41	38	42	
23	44	42	38	40	e38	e36	55	58	49	42	35	42	
24	44	45	41	40	e41	42	54	56	56	41	37	42	
25	43	42	e40	e40	e41	47	54	53	50	38	38	43	
26	46	42	e40	e40	e43	50	57	51	48	38	35	37	
27	43	38	e38	e40	e41	52	72	49	47	39	35	40	
28	42	e38	e38	39	e40	48	73	52	43	41	37	39	
29	41	39	e39	40		45	66	48	42	40	35	38	
30	43	41	e46	41		49	62	51	42	40	34	39	
31	44		e46	39		49		47		38	36		
TOTAL	1342	1251	1282	1277	1098	1357	1533	2215	1396	1234	1140	1174	
MEAN	43.3	41.7	41.4	41.2	39.2	43.8	51.1	71.5	46.5	39.8	36.8	39.1	
MAX	56	46	46	47	44	55	73	104	56	43	44	50	
MIN	39	38	36	37	34	34	42	47	42	36	34	35	
AC-FT	2660	2480	2540	2530	2180	2690	3040	4390	2770	2450	2260	2330	

WTR YR 1989 TOTAL 16299 MEAN 44.7 MAX 104 MIN 34 AC-FT 32330

e Estimated

06431500 SPEARFISH CREEK AT SPEARFISH, SD

LOCATION.--Lat 44°28'57", long 103°51'40", in SEkNWk sec.15, T.6 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on right bank in city park in Spearfish, 500 ft downstream from fish hatchery and nearest tributary, and 9.8 mi upstream from mouth.

DRAINAGE AREA. -- 168 mi 2

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

REVISED RECORDS .-- WSP 1116: Drainage area.

GAGE. -- Water-stage recorder. Elevation of gage is 3,640 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Dec. 5, 1946, nonrecording gage at same site and datum.

REMARKS.--Records good. Regulation by fish hatchery and by hydroelectric plant 0.5 mi upstream causes diurnal fluctuation, but since storage capacity is small, daily flows are not appreciably affected. Upstream diversions out of drainage basin to Whitewood Creek basin by the Homestake Mining Co. average about 12 ft<sup>3</sup>/s. Figures of daily discharge do not include diversion by Homestake Mining Co. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 43 years, 51.9 ft 3/s, 37,600 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 4,240 ft<sup>3</sup>/s, May 15, 1965, gage height, 10.53 ft, from rating curve extended above 520 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; maximum gage height, 10.54 ft, June 15, 1976; no flow for part of Oct. 18, 1970.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 5, 1904, reached a stage of 7.00 ft, site and datum of former gage near Spearfish, 1.0 mi upstream, drainage area, 157 mi<sup>2</sup>; discharge about 5,000 ft<sup>3</sup>/s.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 106 ft<sup>3</sup>/s at 0430 hours, May 9, gage height, 6.66 ft; maximum gage height, 8.26 ft, Feb. 5, backwater from ice; minimum daily discharge, 27 ft<sup>3</sup>/s, Dec. 28.

AIIG SEP DAY OCT NOV DEC JAN FEB MAR APR MAY TIIN TITT. e31 e30 e30 e30 e28 e29 e28 e29 e32 e29 e38 e36 e31 e30 e32 e32 e32 e30 e30 2.2 e33 ------TOTAL MEAN 40.0 39.9 38.4 33.5 32.6 37.4 43.0 72.5 44.6 38.4 39 2 39.3 MAX MIN 

TOTAL 15095 MEAN 41.2 MAX 98 MIN 26 AC-FT 29940 WTR YR 1989 TOTAL 15197 MEAN 41.6 MAX 100 MIN 27 AC-FT 30140

e Estimated

#### 06432020 SPEARFISH CREEK BELOW SPEARFISH, SD

LOCATION.--Lat 44°34'48", long 103°53'37", in SWkNEkSEk sec.8, T.7 N., R.2 E., Lawrence County, Hydrologic Unit 10120203, on right bank 2.3 mi above mouth and 5.0 mi north of Spearfish.

DRAINAGE AREA. -- 204 mi 2.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 3,280 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow is regulated by Homestake Mining Co. power plant, located 10.0 mi upstream. Diversions for irrigation of about 3,200 acres above station. Several observations of water quality were made during the year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 15, 1965, reached stage of about 9.0 ft, according to local residents. Flood of June 5, 1904, probably reached a higher stage.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 110 ft<sup>3</sup>/s at 2030 hours, Apr. 26, gage height, 5.15 ft; maximum gage height, 5.86 ft, Feb. 9, backwater from ice; minimum daily discharge, 1.7 ft<sup>3</sup>/s, July 9, 10.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JAN FEB APR MAY JUN JUL AUG SEP MAR 1 2 3.9 8.6 e42 e44 3.7 e36 e43 4.5 3.4 e33 e40 3.2 6.5 e32 e40 3.4 6.5 e32 e40 2.2 7.6 e45 e32 e40 2.8 7.3 e40 e33 e45 2.2 5.2 e38 e33 e33 1.7 7.6 2.6 9.0 1.8 9.5 2.0 7.2 5.4 6.5 5.5 4.3 6.0 e33 7.6 4.1 e33 e53 3.3 e36 e53 3.4 e37 e53 3.9 3.3 3.5 4.0 e43 e50 9.9 4.1 e45 8.4 5.3 5.9 6.5 6.1 7.1 ---6.2 \_\_\_ 6.8 TOTAL 272.6 179.7 MEAN 49.5 56.5 49.5 54.9 63.0 31.7 8.79 5.80 30.5 37.1 52.2 45.4 MAX 1.7 MIN 3.3 AC-FT 

WTR YR 1989 TOTAL 14751.3 MEAN 40.4 MAX 98 MIN 1.7 AC-FT 29260

e Estimated

#### 06433000 REDWATER RIVER ABOVE BELLE FOURCHE. SD

LOCATION.--Lat 44°40'02", long 103°50'20", in NWkSEk sec.11, T.8 N., R.2 E., Butte County, Hydrologic Unit 10120203, on right bank at upstream side of bridge on U.S. Highway 212 in Belle Fourche, 0.5 mi upstream from Hay Creek, and 0.9 mi upstream from mouth.

DRAINAGE AREA. -- 920 mi 2.

PERIOD OF RECORD. -- November 1945 to current year. Records for water year 1946 incomplete, yearly discharge published in WSP 1309. Prior to October 1960, published as Redwater Creek above Belle Fourche.

REVISED RECORDS. -- WSP 1389: 1954 (maximum gage height only).

GAGE.--Water-stage recorder. Elevation of gage is 3,000 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Dec. 13, 1946, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Diversions for irrigation of about 13,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 44 years, 134 ft3/s, 97,080 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 16,400 ft<sup>3</sup>/s, June 16, 1962, gage height, 11.69 ft, from rating curve extended above 6,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in 1960, 1968-69, 1981-62, 1988.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft3/s and maximum (\*):

20.65	20.5	Discharge	Gage height	2.55	12000	Discharge	Gage height
Date	Time	$(ft^3/s)$	(ft)	Date	Time	(ft <sup>3</sup> /s)	(ft)
Mar. 3	2145	a	*5.33	May 3	1345	*241	2.89

a Backwater from ice. Minimum daily discharge, 2.5 ft<sup>3</sup>/s, July 9, 10.

		DISCHARGE,	IN CUB	IC FEET		, WATER YEAR AN VALUES	R OCTOBER	1988	TO SEPTEMBE	R 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	105	139	129	e90	e100	e120	137	173	90	19	11	11
2	103	141	130	e85	e90	98	137	196	80	13	9.9	11
3	104	139	128	e90	e80	e95	139	217	81	11	9.7	11
4	99	139	126	e90	e85	e90	134	222	78	10	6.9	10
5	97	140	127	e90	e90			204	62	9.9	7.2	11
3	97	140	12/	690	690	e85	129	204	02	3.3	1.2	11
6	101	139	128	e95	e90	e90	135	205	42	8.4	6.8	15
7	102	140	131	e95	e95	e95	134	204	37	3.6	7.7	15
8	102	139	123	e90	e95	e125	131	206	37	2.8	7.0	15
9	105	133	128	e90	e90	e140	127	207	36	2.5	6.9	21
10	102	133	129	e90	e95	143	124	194	38	2.5	6.3	28
						1.1						
11	104	133	128	e90	e100	146	124	186	37	4.3	6.4	37
12	106	134	135	e90	e110	149	125	183	34	2.9	6.2	54
13	106	135	130	e110	e110	145	126	190	38	3.1	7.8	66
14	104	137	114	e115	e100	150	120	184	44	5.1	7.2	71
15	118	140	120	e125	e100	138	124	178	40	4.7	6.6	75
16	127	133	126	e130	e100	138	130	178	39	7.5	6.5	80
17	137	128	125	e135	e95	134	133	176	41	4.9	6.9	80
18	147	130	127	e130	e90	e130	134	173	42	5.9	7.2	76
19	149	132	126	e120	e90	e130	133	172	43	6.1	7.4	69
20	148	134	128	94	e95		131	176	38	10	7.9	82
20	140	134	120	94	693	133	131	1/6	36	10	7.9	02
21	141	133	135	98	e100	128	131	172	38	9.8	8.0	126
22	142	135	136	111	e100	130	134	168	38	8.3	9.5	92
23	142	138	134	92	e100	129	133	159	35	7.3	8.6	90
24	143	139	134	e90	e125	130	123	153	50	6.5	9.5	92
25	142		e130	e85	e140	139	123	149	73	4.6	11	91
26	138	134	101	e90	121	143	137	141	54	3.3	11	95
27	135	135	93	e100	122	143	197	120	52	4.1	10	96
									47	4.3	9.5	103
28	137	132	e85	103	121	146	196	107			8.6	103
29	138	126	e85	95		138	177	111	41	5.0		
30	140	125	e90	106		135	171	117	32	9.7	9.6	103
31	143		e90	106	1,227	138	7.75	112		14	8.3	
TOTAL	3807	4052	3751	3120	2829	3973	4129	5333	1437	214.1	253.1	1830
MEAN	123	135	121	101	101	128	138	172	47.9	6.91	8.16	61.0
MAX	149	141	136	135	140	150	197	222	90	19	11	126
MIN	97	125	85	85	80	85	120	107	32	2.5	6.2	10
AC-FT	7550		7440	6190	5610			0580	2850	425	502	3630

CAL YR 1988 TOTAL 33314.72 MEAN 91.0 MAX 263 MIN .72 AC-FT 66080 WTR YR 1989 TOTAL 34728.2 MEAN 95.1 MAX 222 MIN 2.5 AC-FT 68880

e Estimated

#### 06433500 HAY CREEK AT BELLE FOURCHE. SD

LOCATION.--Lat 44°40'01", long 103°50'46", in NWkSWk sec.11, T.8 N., R.2 E., Butte County, Hydrologic Unit 10120203, on right bank at intersection of Tenth Avenue and Jackson Street in Belle Fourche, 0.5 mi upstream from mouth.

DRAINAGE AREA. -- 121 mi 2.

PERIOD OF RECORD .-- October 1953 to current year.

GAGE.--Water-stage recorder. Datum of gage is 3,005.18 ft above National Geodetic Vertical Datum of 1929 (City of Belle Fourche bench mark). Prior to Dec. 8, 1953, nonrecording gage at site 300 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Minor diversion to the stream at times from city reservoir overflow, which enters stream upstream from gage. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--36 years, 1.47 ft<sup>3</sup>/s, 1,070 acre-ft/yr; median of yearly mean discharges, 1.0 ft<sup>3</sup>/s, 720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 930 ft<sup>3</sup>/s, June 19, 1972, gage height, 9.15 ft; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 50 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 1	1200	*26	*4.51				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.10	.00	.22	19	.70	.03	.00	.00
2	.00	.00	.00	.00	e.01	.00	.07	18	. 93	.06	.00	.00
3	.00	.00	.00	.00	e.00	.00	.05	15	.99	.00	.00	.00
4	.00	.00	.00	e.01	e.00	.00	.03	14	.79	.00	.00	.00
5	.00	.00	.00	e.05	e.00	.00	.00	7.4	.40	.00	.00	.00
3	.00	.00	.00	9.05	9.00	.00	.00		.40	.00	.00	.00
6	.00	.00	.00	e.04	.00	.00	.10	5.4	.28	.00	.00	.00
7	.00	.00	.00	e.01	.00	.00	.02	4.0	.21	.00	.00	.00
8	.00	.00	.00	.00	.00	e.01	.01	3.2	.08	.00	.00	.00
9	.00	.00	.00	.00	.00	e.10	.00	2.1	.03	.00	.00	.00
10	.00	.00	.00	.00	.00	e.50	.00	1.9	.02	.00	.00	.00
	00										00	
11	.00	.00	.00	.00	.00	e1.0	.00	1.8	.05	1.0	.00	.00
12	.00	.00	.00	.00	e.01	e.50	.00	2.1	.00	.00	.00	.00
13	.00	.00	.00	.00	e.05	e.30	.00	2.0	.00	.00	.00	.00
14	.00	.00	e.05	.00	e.01	e.50	.00	1.5	.01	1.6	.00	.00
15	.00	.21	e.05	.00	e.01	e2.0	.00	1.5	.00	.33	.00	.00
16	.00	.01	e.05	.00	e.00	e.50	.22	1.7	.19	.03	.00	.00
17	.18	.00	e.05	e.01	e.00	e.40	.31	2.3	.10	.00	.00	.00
18	.10	.00	e.05	e.50	e.00	e.40	.95	1.2	.00	.00	.00	.00
19	.00	.00	e.04	e.60	.00	e.40	.08	.93	.00	.00	.00	.00
20	.00	.00	e.03	e.10	.00	e1.0	.24	.74	.00	.00	.00	2.7
20	.00	.00	6.03	6.10	.00	91.0	.24	. / 4	.00	.00	.00	4.7
21	.00	.00	e.03	e.10	.00	e2.0	.19	.79	.04	.00	.00	4.2
22	.00	e.01	e.05	e.50	.00	e3.0	.07	.75	.00	.00	.00	.73
23	.00	e.02	e.05	e.50	.00	e3.0	.03	. 56	.17	.00	.00	.02
24	.00	e.05	e.03	e.01	e.00	e3.0	.01	. 50	2.4	.00	.00	.00
25	.00	e.01	e.02	.00	e.01	e2.0	.05	.41	. 97	.00	.00	.00
26	.00	.00	e.01	.00	.00	e1.5	2.1	.91	.37	.00	.00	.00
27	.00	.00	e.01	.00	.00	1.8	6.9	.33	.11	.00	.00	.00
28				.00				.20	.02	.00	.00	.00
	.00	.00	e.01		.00	1.2	13					
29	.00	.00	.00	e.01		1.2	7.9	.24	.00	.60	.00	.00
30	.00	.00	.00	e1.0		.76	9.4	1.3	.21	.00	.00	.00
31	.00		.00	e.50		.40		1.5		.00	.00	
TOTAL	0.28	0.31	0.53	3.94	0.20	27.47	41.95	113.26	9.07	3.65	0.00	7.65
MEAN	.009	.010	.017	. 13	.007	.89	1.40	3.65	.30	.12	.00	.25
MAX	.18	.21	.05	1.0	.10	3.0	13	19	2.4	1.6	.00	4.2
MIN	.00	.00	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00
AC-FT	.6	.6	1.1	7.8	. 4	54	83	225	18	7.2	.0	15
AC-FI	. 0	. 0	1.1	7.0	. 4	34	03	443	10	1.4		13

CAL YR 1988 TOTAL 115,38 MEAN .32 MAX 8.7 MIN .00 AC-FT 229 WTR YR 1989 TOTAL 208.31 MEAN .57 MAX 19 MIN .00 AC-FT 413

e Estimated

#### 06434500 INLET CANAL NEAR BELLE FOURCHE. SD

LOCATION.--Lat 44°42'14", long 103°49'23", in NE\nW\ sec.36, T.9 N., R.2 E., Butte County, Hydrologic Unit 10120202, on right bank 0.5 mi downstream from Crow Creek, 0.9 mi downstream from diversion dam on Belle Fourche River, and 2.5 mi northeast of Belle Fourche.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. --October 1945 to current year. Monthly diversions from Inlet Canal between station and reservoir for some periods, published in WSP 1309.

GAGE.--Water-stage recorder. Datum of gage is 2,985.22 ft above National Geodetic Vertical Datum of 1929.
Prior to Dec. 10, 1946, nonrecording gage, and Dec. 10, 1946, to Nov. 26, 1949, water-stage recorder at site 0.8 mi upstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Records show actual diversions to Belle Fourche Reservoir (see station 06435000), from Belle Fourche River and Crow Creek, except for 5,550 acre-ft which was diverted for irrigation from the canal between the station and reservoir.

COOPERATION .-- Records of diversion from the canal provided by the Belle Fourche Irrigation District.

AVERAGE DISCHARGE. -- 44 years, 166 ft 3/s, 120,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 1,410 ft<sup>3</sup>/s, May 16, 1982; no flow for some days in 1946-49, 1963, 1966, 1971-76, 1978-79, 1982-84, 1987-88.

CORRECTIONS. -- The correct amount of acre-feet diverted for irrigation from the canal between the station and reservoir for water year 1987 is 2,611 acre-ft. The previously published figure was not correct.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

					N	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	153	149	138	e100	e100	e130	207	812	e120	87	80	70
2	145	147	141	e95	e90	e110	191	808	122	70	77	80
3	142	147	141	e100	e80	e100	184	735	128	58	84	69
3	132	147	140	e100	e85	e95	179	650	125	49	81	69 75
5	126	147	142	e100	e90	e90	172	507	101	47	77	77
6	126	146	142	e105	e90	e95	172	e440	70	41	74	77
7	128	148	142	e105	e95	e100	173	e400	59	39	77	80
8	125	149	139	e90	e95	e140	167	e360	58	32	76	73
9	124	147	142	e90	e90	e160	164	e330	56	31	76	80
10	122	147	142	e90	e95	e220	162	e310	49	32	77	91
11	121	146	142	e90	e110	e530	158	e280	45	47	76	94
12	125	145	143	e90	e120	e810	157	e265	42	49	75	88
13	124	146	143	e110	e120	e770	156	e310	45	45	78	88
14	123	149	140	e115	e110	603	153	e290	55	45	80	86
15	129	150	139	e125	e110	453	152	e300	56	112	73	85
16	138	146	e140	e130	e110	352	156	e340	51	161	73	90
17	150	145	e140	e135	e100	191	167	e325	60	106	77	87
18	162	147	141	e130	e95	e190	168	e270	53	96	98	87 80
19	161	145	140	e130	e95	e180	163	e240	54	81	76	76
20	156	144	141	e110	e100	175	158	e270	43	90	75	91
21	151	144	140	e110	e110	179	157	e240	103	98	72	148
22	148	144	141	e125	e110	240	155	e210	133	103	67	132
23	150	146	138	e100	e110	227	154	e200	135	95	65	117
24	147	147	e135	e95	e135	259	149	e180	159	96	60	119
25	145	144	e140	e90	e150	255	144	e175	202	96	57	117
26	143	143	e110	e95	e135	278	171	e160	179	98	58	118
27	149	143	e100	e110	e130	304	388	e160	164	98	68	116
28	148	e140	e95	e110	e130	328	624	e150	144	93	73	124
29	148	140	e95	e110		299	457	e150	128	90	68	126
30	146	138	e100	e120		274	600	e160	108	92	68	129
31	149		e100	e120		242		e150		94	61	
TOTAL	4336	4366	4112	3325	2990	8379	6358	10177	2847	2371	2277	2883
MEAN	140	146	133	107	107	270	212	328	94.9	76.5	73.5	96.1
MAX	162	150	143	135	150	810	624	812	202	161	98	148
MIN	121	138	95	90	80	90	144	150	42	31	57	69
AC-FT	8600	8660	8160	6600	5930	16620	12610	20190	5650	4700	4520	5720

CAL YR 1988 TOTAL 49012 MEAN 134 MAX 419 MIN 22 AC-FT 97220 WTR YR 1989 TOTAL 54421 MEAN 149 MAX 812 MIN 31 AC-FT 107900

e Estimated

#### 06434500 INLET CANAL NEAR BELLE FOURCHE, SD--Continued

#### WATER-QUALITY RECORDS

PERIOD OF RECORD . -- October 1968 to current year.

PERIOD OF DAILY RECORD. -

SPECIFIC CONDUCTANCE: October 1968 to current year. WATER TEMPERATURE: October 1968 to current year.

REMARKS. -- Specific conductance and temperature data collected once daily by observer. Additional water-quality data at this site are available from special projects.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum observed daily, 3,100 microsiemens, Feb. 13, 1969; minimum daily,

335 microsiemens, Feb. 12, 1971.
WATER TEMPERATURE: Maximum observed daily, 30.0°C, Aug. 28-30, 1987, June 19, 1988; minimum daily, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR. --

SPECIFIC CONDUCTANCE: Maximum observed daily (more than 20 percent missing record), 1,960 microsiemens, June 21; minimum observed daily (more than 20 percent missing record), 1,990 microsiemens, Nov. 18.

WATER TEMPERATURE: Maximum observed daily (more than 20 percent missing record), 27.0°C, July 12; minimum observed daily (more than 20 percent), 0.0°C on many days during winter periods.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)
OCT	1/20	161	1000	0.50			700	200	53	31	9
19 NOV	1430	161	1300	8.50	14.5	11.5	720	200	33	31	9
29 JAN	1345	142	1260	8.40	2.5	2.5	710	200	50	21	6
19 MAR	1315	133	1190	8.40	5.0	0.0	660	190	45	15	5
13 APR	1530	704	670	8.20	4.0	1.0	310	87	22	20	12
25 JUN	1200	143	1380	8.40	8.0	11.0	760	220	52	30	8
06	1445	73	1600	8.40	29.0	24.5	800	220	59	68	16
27 SEP	1630	169	1410	8.30	31.0	26.0	530	140	43	99	29
13	1030	89	1500	8.52	21.5	11.0	670	180	53	81	21
DATE	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, 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)
OCT											
19 NOV	0.5	3.6	192	550	9.9	0.30	10	974	1.32	423	0.160
29 JAN	0.3	2.9	214	570	4.8	0.30	9.7	989	1.35	379	0.480
19 MAR	0.3	2.6	217	500	3.8	0.30	10	901	1.22	323	0.820
13 APR	0.5	5.2	107	240	3.8	0.30	5.5	451	0.61	857	0.350
25 JUN	0.5	3.9	191	630	4.6	0.30	8.3	1060	1.45	411	0.170
06	1	6.3	161	800	6.5	0.50	7.5	1270	1.72	250	<0.100
27 SEP	2	7.7	165	600	21	0.50	6.6	1020	1.38	464	<0.100
13	1	6.7	150	660	17	0.50	7.2	1100	1.49	263	0.110

# 06434500 INLET CANAL NEAR BELLE FOURCHE, SD--Continued

DATE	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	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)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	CYANIDE TOTAL (MG/L AS CN) (00720)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
OCT											
19 NOV	0.040	0.030	0.030		100						
29 JAN	0.050	0.040	0.030		80						
19 MAR	0.050	0.040	0.040		70						
13 APR	0.350	0.050	<0.010	<1	70	<1	2	<1	4	<0.010	39
25 JUN	0.030	0.020	0.020		110						
06	0.020	<0.010	0.010	1	170	<1	2	1	2	<0.010	12
27 SEP	0.040	0.020	0.020	77	150						
13	0.050	0.020	<0.010		140						
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 TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	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											
19 NOV											
29 JAN											
19 MAR											
13 APR	<5	23	69	<0.10	4	10	<1	<1.0	1100	2	35
25 JUN				(22)							
06	<1	65	48	<0.10	7	2	2	<1.0	3000	2	21
27 SEP											
13											

06434500 INLET CANAL NEAR BELLE FOURCHE, SD--Continued

SPECI	FIC CONDU	CTANCE,	IN MICROSI				*CELSIUS,			1988 TO	SEPTEMBER	1989
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						1390		1070	242	1450	1550	1610
2			1310			1000		1180		1510	1550	1640
3	1370	1270		1330		1300	1240	1190		1560	1530	1630
4						1000		1100	1520	1570	1540	1630
5	1320		1330	1220			1330	1120	1510	1600	1530	1650
6				1100	1440	1390			1560	1660	1550	1630
7	1350		1270				1200		1550	1640	1560	1550
8		1240			1460	1200		1120	1620	1640	1560	1630
9			1340						1570	1700	1550	1560
10	1350	1210			1410	1290	1160	1080	1600	1650	1560	
11				1370		1160			1580	1610	1560	1560
12	1390		1330			780	1210	1110	1630	1600	1550	
13				1300	1390	740			1520	1600	1540	1360
14	1380	1250	1270			785	1360		1530	1550	1530	
15					1090	795		1240	1570	1530	1560	1320
16			1220						1610	1560	1570	
17	1330			1120	1070	1040	1170	1270	1640	1300	1580	
18		1090							1580	1390	1550	1300
19	1290		1320				1310	1230	1570	1470	1510	
20				1250		1160			1590	1480	1560	1330
21	1270	1110	1300		1310		1310		1960	1500	1560	
22						1170		1090	1780	1510	1580	1240
23		1290	1270	1180					1540	1500	1580	
24	1250				1230	1180	1230	1180	1350	1530	1580	
25									1350	1530	1580	1180
26	1260						1360	1210	1360	1530	1590	
27			1130	1170	1280	1290	1270		1400	1550	1590	1220
28	1110	1260					1060		1400	1550	1580	
29						1370	1180		1420	1550	1590	1210
30		1250	1530	1330		1300	1180		1440	1530	1600	
31	1240									1530	1600	

		WATER	TEMPERATURE,	IN DEGREES		S, WATER		OBER 1988	TO SEPTE	MBER 1989		
DAY	OCT	уол	DEC DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1						.0		6.0		22.0	23.0	18.0
2			3.0					8.0		23.0	24.0	17.0
3	12.0	9.0	)	.0		.0	7.0	11.0		23.0	23.0	16.5
4								9.5	17.0	23.0	22.0	15.0
5	8.0		3.0	.0			5.0	9.0	15.5	24.5	20.5	16.0
6				.0	.0	.0			17.0	23.0	20.5	16.5
7	7.0		7.0				10.0		18.0	23.0	19.5	16.0
8		5.0			. 0	1.0		5.0	21.5	25.0	19.0	15.5
9			. 0	.0					24.5	24.0	19.5	15.0
10	10.0	4.0	)		.0	5.0	5.0	15.0	18.5	21.5	21.0	
11				.0		3.0			22.5	24.5	22.5	12.0
12	10.0		4.0			4.0	9.0	18.5	17.0	27.0	21.0	
13				.0	.0	2.0			13.0	25.0	21.0	12.5
14	11.0	5.0				.0	10.0		14.0	21.5	24.5	
15					.0	.0		14.5	16.5	18.5	20.0	13.0
16									19.5	20.0	25.0	
17	10.0			.0	.0	.0	5.0	15.5	18.5	21.5	20.5	
18		1.0							24.5	20.0	22.0	16.0
19	9.0		2.0				10.0	15.0	26.0	22.5	19.0	
20				.0		.0			21.0	22.5	19.0	15.5
21	9.0	2.0			.0		16.0		17.5	22.0	24.0	
22						.0		18.0	16.5	26.0	20.0	15.0
23		5.0		.0					17.5	22.5	25.0	
24	8.0				.0	4.0	14.0	15.0	15.5	23.5	21.5	
25									16.0	24.5	20.0	13.0
26	7.0						10.0	12.0	17.0	25.0	18.0	
27				.0	.0	8.0	8.0		20.5	25.0	18.5	14.5
28	3.0	. 0					3.0		22.0	25.0	19.0	
29						9.0	4.0		23.0	24.0	18.0	17.0
30		3.0		.0		8.0	4.0		27.0	22.5	18.0	
31	8.0			5.0		10.0				23.5	21.5	

#### 06435000 BELLE FOURCHE RESERVOIR NEAR BELLE FOURCHE. SD

LOCATION.--Lat 44°44'12", long 103°40'27", in SWkSEk sec.18, T.9 N., R.4 E., Butte County, Hydrologic Unit 10120202, at dam on Owl Creek, 9.8 mi northeast of Belle Fourche.

PERIOD OF RECORD . -- January 1912 to current year (monthend contents only).

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929, adjustment of 1912. Prior to June 6, 1967, nonrecording gage at present site and datum.

REMARKS.--Offstream reservoir formed by earthfill dam. Storage began in May 1910; dam completed in April 1911. Conservation capacity, 185,170 acre-ft (1949 survey), between elevations 2,927.0 ft (lowest outlet) and 2,975.0 ft (crest of spillway weir). Dead storage below elevation 2,927.0 ft, 6,800 acre-ft. Figures given herein represent contents above elevation 2,927.0 ft. Water diverted from Belle Fourche River through Inlet Canal (see station 06434500) is stored in Belle Fourche Reservoir for irrigation.

COOPERATION .-- Records of elevation and contents provided by Bureau of Reclamation.

EXTREMES FOR PERIOD OF RECORD. --Maximum contents observed, 197,400 acre-ft, Apr. 30, 1919, May 20, 1920, elevation, 2,974.9 ft; minimum observed, -3,000 acre-ft, Sept. 30, 1936, water was lowered below dead storage level of 2,927.0 ft by opening holes in crib walls.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 129,820 acre-ft, May 31, elevation, 2,966.69 ft; minimum, 21,850 acre-ft, Sept. 30, elevation, 2,939.21 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

						D	at	е								Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept.																2,943.56 2,947.69	24,430 40,723	+16,293
Nov. Dec.	30															2,950.61 2,953.02	49,936 58,835	+9,213 +8,899
CAI	YR.	19	88													-	-	-60,401
Jan.	31															2,955.00	67,078	+8,243
Feb.																2,956.51	73,898	+6,820
far.																2,960.39	93,348	+15,450
pr.																2,963.32	109,804	+16,456
lay	31															2,966.69	129,820	+20,016
June	30															2,963,47	110,690	-19,130
uly	31															2,955.40	68,860	-41,830
lug.	31															2,940.66	24,520	-44,340
Sept.	30															2,939,21	21,850	-2,670
WII	R YR	19	89													-	4	-6,580

#### 06436000 BELLE FOURCHE RIVER NEAR FRUITDALE, SD

LOCATION.--Lat 44°41'27", long 103°44'14", in NWkNEk sec.3, T.8 N., R.3 E., Butte County, Hydrologic Unit 10120202, on left bank near downstream end of bridge on U.S. Highway 212, 2.5 mi northwest of Fruitdale, and 8.8 mi downstream from point of diversion to Belle Fourche Reservoir.

DRAINAGE AREA. -- 4,540 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year. Monthly discharge only for October 1945, published in WSP 1309.

GAGE.--Water-stage recorder. Elevation of gage is 2,925 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 9, 1947, nonrecording gage and Apr. 10, 1947, to Oct. 14, 1948, water-stage recorder, at site 100 ft upstream at same datum. Oct. 15, 1948, to Dec. 30, 1958, water-stage recorder and Dec. 31, 1958, to Sept. 23, 1959, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Keyhole Dam since Feb. 12, 1952, usable capacity, 191,600 acre-ft, 180 mi upstream. At a point 8.8 mi above station, water is diverted to Belle Fourche Reservoir (see station 06435000) through Inlet Canal (see station 06434500), with other smaller diversions from the main stem and tributaries for irrigation. Total diversions for irrigation of about 60,000 acres upstream from station. Several observations of water temperature and specific conductance were made during the year. Gage-height telemeter at station.

AVERAGE DISCHARGE.--44 years, 80.0 ft<sup>3</sup>/s, 57,960 acre-ft/yr; median of yearly mean discharges, 50 ft<sup>3</sup>/s, 36,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 12,700 ft<sup>3</sup>/s, May 20, 1982, gage height, 14.32 ft; no flow at times in 1945, 1948, 1959-62, 1977.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 30 ft<sup>3</sup>/s at 1445 hours, July 20, gage height, 2.48 ft; minimum daily discharge, 1.1 ft<sup>3</sup>/s, July 10.

		DISCHARGE,	IN C	UBIC FEET		WATER YE N VALUES	AR OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.5	4.2	4.1	e3.0	e3.6	3.0	3.8	7.4	1.4	3.5	14	6.7
2	5.9	4.2	4.0	e2.8	e2.8	3.1	3.5	5.9	1.4	3.4	16	5.7
3	5.6	4.1	4.0	e3.0	e2.0	e3.0	3.2	5.2	1.5	3.5	15	7.6
4	5.7	4.1	3.9	e3.0	e2.0	e2.9	3.2	5.2	1.5	4.0	14	7.0
5	5.7	4.1	4.0	e3.0	e2.3		3.1	4.7	1.2	3.9	14	8.4
3	3.7	4.1	4.0	e3.0	e2.3	e2.7	3.1	4./	1.2	3.5	14	0.4
6	5.4	4.1	4.0	e3.0	e2.6	e2.9	3.3	4.4	1.2	3.1	14	7.9
7	5.2	4.3	3.7	e2.8	e2.9	e3.6	3.2	3.9	4.0	3.3	15	8.0
8	5.3	4.3	3.7	e2.6	e2.9	e4.0	3.3	3.5	3.9	4.5	13	7.8
9	5.1	4.2	3.7	e2.6	e2.9	3.9	2.9	3.6	4.4	3.2	12	7.1
10	4.9	4.1	3.7	e2.8	e3.1	4.1	2.9	3.7	6.2	1.1	12	6.4
11	4.9	4.1	3.7	e2.8	e3.2	4.4	3.0	3.5	4.7	1.4	12	8.3
12	4.9	4.2	3.7	e2.8				3.4	4.1	1.9	11	8.9
					e3.3	4.2	3.0					
13	4.9	4.1	3.7	e3.1	e3.4	3.9	2.9	3.7	3.5	3.3	12	7.1
14	4.8	4.1	3.6	e3.1	3.5	e3.7	2.8	4.0		10	12	6.7
15	4.8	4.1	3.6	e3.1	3.5	e3.7	2.9	3.9	6.1	15	11	6.7
16	4.7	e4.0	3.6	e3.1	3.4	3.9	2.9	3.8	3.9	12	11	6.6
17	4.8	4.1	3.6	e3.1	3.4	3.8	2.8	3.6	9.0	9.0	9.8	6.3
18	5.0	4.1	3.5	e3.1	e3.3	3.7	3.0	3.5	5.3	9.2	8.4	5.6
19	5.0	4.1	3.4	3.2	e3.2	3.6	3.3	3.4		23	9.1	5.1
20	4.8	4.1	3.4	3.1	e3.2	3.2	3.2	3.3		27	9.8	5.9
20	4.0	4.1	3.4	3.1	65.2	3.2	3.2	3.3	4.0	۷,	3.0	3.3
21	4.6	4.1	3.4	3.1	e3.2	3.1	2.8	3.1	3.5	24	9.4	10
22	4.4	4.1	3.4	3.0	3.3	3.1	2.5	2.8		14	7.4	9.1
23	4.5	4.1	3.4	3.0	3.3	3.2	2.2	2.8	3.2	7.5	6.0	6.8
24	4.5	4.1	3.3	3.1	3.4	3.3	2.0	2.6	4.3	7.1	8.2	5.5
25	4.6	4.1	3.2	3.1	3.3	3.9	2.0	2.5	5.8	6.2	8.1	4.8
25	4.0	4.1	3.4	3.1	3.3	3.9	2.0	2.5	3.0	0.2	0.1	4.0
26	4.6	4.1	3.1	3.2	3.2	5.4	2.7	2.6	4.2	4.7	8.8	4.4
27	4.4	e4.0	e3.0	3.1	3.1	6.6	6.7	2.6	4.3	4.4	10	4.4
28	4.3	4.1	e2.7	3.0	3.1	5.7	8.8	2.5	3.8	5.0	9.8	4.2
29	4.6		e2.6	3.0		5.1	7.0	2.3	3.7	7.5	10	4.2
30	4.7		e2.8	3.1		4.5	7.7	2.7	3.6	8.9	9.3	4.3
31	4.4		e3.0	4.1		4.4		2.6		9.1	7.5	
MOMAT	150 5	100.0		00.0	00.4		100 0 .	10 7	116 0 0	43.7	339.6	197.5
TOTAL	153.5		.08.5	93.9				12.7				
MEAN	4.95		3.50	3.03	3.09	3.86		3.64		7.86	11.0	6.58
MAX	6.5	4.3	4.1	4.1	3.6	6.6	8.8	7.4	9.0	27	16	10
MIN	4.3	4.0	2.6	2.6	2.0	2.7	2.0	2.3	1.2	1.1	6.0	4.2
AC-FT		245	215	186	171	237	211	224	232	483	674	392

CAL YR 1988 TOTAL 2337.7 MEAN 6.39 MAX 44 MIN 2.0 AC-FT 4640 WTR YR 1989 TOTAL 1802.4 MEAN 4.94 MAX 27 MIN 1.1 AC-FT 3580

e Estimated

#### 06436156 WHITETAIL CREEK AT LEAD, SD

LOCATION.--Lat 44°20'36", long 103°45'57", in NE%NE%NW% sec.4, T.4 N., R.,3 E., Lawrence County, Hydrologic Unit 10120202, on right bank 0.5 mi upstream from confluence of Whitewood Creek and 0.25 mi upstream from Kirk Power Plant.

DRAINAGE AREA. -- 6,15 mi2.

PERIOD OF RECORD. --October 1988 to September 1989.

GAGE.--Water-stage recorder and 24-in. Parshall flume. Elevation of gage is 5,080 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 10 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft 3/s)	Gage height (ft)
Apr. 26	1900	12	2.42	May 7	2245	*22	*2.91
Minimur	n daily d	lischarge, 0.80	ft <sup>3</sup> /s, Feb. 4-8, 16.				

		DISCHARGE	, IN	CUBIC FEE	T PER S	SECOND MEA	WATER IN VALU	YEAR ES	OCTOBE	R 1988	TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	I	EB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1	1.4	1.0	1.0	.99		95	e.90	-	1.9	7.5		5.0	2.6	1.5	1.0
2	1.3	1.0	1.0			90	e.85		2.0	10		4.8	2.6	1.5	.97
3	1.2	1.0	1.0			85	e.85		1.9	13		4.6	2.5	1.4	.98
4	1.2	.99	1.0			80	e.85		1.8	17		4.4	2.5	1.4	.99
5	1.1		1.0										2.3	1.3	.94
3	1.1	.99	1.1	1.0	е.	.80	e.90		1.7	20		4.1	2.3	1.3	. 94
6	1.1	1.2	1.0	1.0	е.	.80	e1.0		8.5	20		3.8	2.3	1.3	.99
7	1.1	1.3	1.0	e1.0	e.	.80	1.5		2.9	20		3.5	2.2	1.3	.94
8	1.1	1.1	e1.0	e1.0	е.	80	1.6		2.8	21		3.4	2.1	1.2	1.0
9	1.0	1.1	1.:			85	2.3		2.4	20		3.2	2.0	1.3	1.0
10	1.0	1.1	1.:			88	2.8		2.4	19		3.2	2.0	1.2	1.1
11	1.1	1.2	1.:			.88	2.6		2.4	17		3.1	2.0	1.1	1.1
12	1.0	1.1	1.			88	2.4		2.5	15		3.5	1.9	1.1	1.0
13	1.0	1.1	1.							17		3.4	2.0	1.1	1.1
						.84	2.2		2.7						
14	1.0	1.2	1.:			82	1.6		2.7	14		3.5	3.8	1.2	1.0
15	1.1	1.2	e1.0	.99		82	1.8		2.7	13		3.2	3.2	1.1	1.0
16	1.1	1.1	e1.0		е.	80	1.5		3.1	12		3.1	2.9	1.4	.94
17	2.9	1.1	1.0	. 98	e.	85	e1.4		3.3	11		3.3	2.7	1.3	.96
18	1.7	1.1	1.1	. 94		88	1.5		3.3	10		3.0	2.4	1.2	. 98
19	1.5	1.1	1.0	. 93		90	1.5		3.5	9.5		2.7	2.2	1.5	. 96
20	1.4	1.1	1.0	. 94		93	1.4		8.8	8.9		2.6	2.1	1.5	1.5
21	1.2	1.1	1.:	. 95		88	1.5		4.3	8.3		2.7	2.0	1.3	2.1
22	1.2	1.0	1.			89	1.5		. 7	7.8		2.8	1.9	1.2	1.5
23	1.1	1.1	1.				1.4		5.0	7.3		3.3	1.9	1.2	1.3
24	1.1	1.1	1.				1.5		5.0	6.8		4.9	1.8	1.1	1.2
25														1.1	1.2
25	1.1	1.1	1.0	. 92	1.	U	1.7		4.9	6.3		3.9	1.7	1.1	1.2
26	1.0	1.1	e1.0	. 92		97	2.2		5.2	6.0		3.4	1.7	1.1	1.1
27	1.1	e1.0	e1.(	.91		93	2.3	1	)	5.7		3.2	1.6	1.1	1.2
28	1.1	1.1	e1.0	. 89	e.	90	2.3		3.5	5.5		3.0	1.9	1.2	1.1
29	1.1	1.1	1.0				2.2		7.9	5.4		2.8	1.9	1.1	1.1
30	1.1	1.1	1.0				2.0		7.0	5.7		2.7	1.8	1.0	1.1
31	1.0	7	1.0				1.9			5.3			1.6	1.1	
TOTAL	37.4	32.88	32.	30.04	24.	60	51.95	111	3.1	365.0	1	04.1	68.1	38.4	33.35
MEAN	1.21	1.10	1.04			88	1.68		87	11.8			2.20	1.24	1.11
MAX	2.9							3				5.0	3.8	1.5	2.1
		1.3	1.1			1.0	2.8		10	21			1.6	1.0	
MIN	1.0	.99	1.0			.80	.85		1.7	5.3		2.6			. 94
AC-FT	74	65	64	60		49	103		230	724		206	135	76	66

WTR YR 1989 TOTAL 934.02 MEAN 2.56 MAX 21 MIN .80 AC-FT 1850

e Estimated

#### 06436170 WHITEWOOD CREEK AT DEADWOOD, SD

LOCATION.--Lat 44°22'48", long 103°43'25", in NWkNEkSWk sec.23, T.5 N., R.3 E., Lawrence County, Hydrologic Unit 10120202, on left bank 1,000 ft downstream from box culvert where stream leaves city and at the junction of lower Main Street and truck route of highways U.S. 85 and A.H. 14 in Deadwood.

DRAINAGE AREA. -- 40.6 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- October 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 4,500 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Apr. 25, 1983, at datum 2.00 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Homestake Mining Co. 3.5 mi upstream. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 27.4 ft3/s, 19,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 2,660 ft<sup>3</sup>/s, May 15, 1982, gage height, 7.54 ft, present datum; minimum daily discharge, 3.5 ft<sup>3</sup>/s, Jan. 10, 1982.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 161 ft<sup>3</sup>/s at 0215 hours, May 5, gage height, 4.20 ft; minimum daily discharge, 11.0 ft<sup>3</sup>/s, Dec. 26, 27, Jan. 2, 7-9, 18, 20.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		210011102,	11. 00210		1	MEAN VA	LUES	1000	10 00110	<b></b>		
DAY	OCT	NOV	DEC	JAN	FEB	MA	R APR	MAY	JUN	JUL	AUG	SEP
1	14	14	13	13	e14	e1	6 16	40	28	18	13	14
2	14	15	13	11	e13	e1	5 15	55	27	18	13	14
1 2 3	14	15	14	12	e12	e1		74	25	18	13	15
4	14	15	13	12	e12	' el		93	24	18	14	14
5	14	14	13	12	e13	e1		137	23	17	14	14
6	14	15	13	12	e13	e1	7 20	115	22	16	15	13
6 7 8	14	15	13	11	e13	e1	8 21	106	22	17	15	14
8	15	15	13	11	e13	e2		98	20	17	13	15
9	14	14	14	11	e13	2		86	21	17	12	16
10	14	14	14	12	e14	2	5 18	74	20	17	13	16 15
11	13	15	13	12	e14	2	4 19	63	20	17	12	14
12	13	15	14	12	e15	2		63	21	17	14	13
13	13	14	14	13	e15	2		. 69.	21	18	14	13
14	14	15	13	13	e15	1		58	22	31	14	14
15	15	15	12	12	e14	ī		51	19	24	15	14
16	13	13	13	13	e14	1	6 22	51	22	20	17	14
17	23	14	13	14	e13	1		51	23	19	16	15
18	15	14	14	11	e13	1		48	17	17	15	14
19	14	14	13	12	e13	ī		41	18	18	18	14
20	13	13	13	11	e13	ī		40	17	18	17	23
21	12	14	12	12	e14	1	5 25	39	18	18	14	24
22	14	14	13	12	e14	1		35	18	18	13	15
23	14	14	12	13	e14	ī		34	20	19	13	14
24	14	15	12	13	e18	ī		33	31	18	13	14
25	14	13	12	12	e20	ī		30	23	15	13	13
26	14	14	11	14	e20	1	9 35	29	20	13	15	13
27	15	13	11	14	e19	1		29	19	13	16	12
28	14	14	12	14	e18	ī		27	18	16	15	12
29	15	14	12	15		ī		26	17	17	15	12
30	15	14	12	14		ī		28	17	16	14	13
30 31	14		12	15		ī		28	-11	14	13	
TOTAL	442	427	396	388	406	53	4 709	1751	633	549	441	434
MEAN	14.3	14.2	12.8	12.5	14.5	17.		56.5	21.1	17.7	14.2	14.5
MAX	23	15	14	15	20	2		137	31	31	18	24
MIN	12	13	11	11	12	1		26	17	13	12	12
AC-FT		847						3470	1260	1090	875	861
AC-FI	877	04/	785	770	805	106	0 1410	34/0	1200	1090	0/3	001

CAL YR 1988 TOTAL 7140.8 MEAN 19.5 MAX 170 MIN 7.0 AC-FT 14160 WTR YR 1989 TOTAL 7110 MEAN 19.5 MAX 137 MIN 11 AC-FT 14100

e Estimated

#### 06436180 WHITEWOOD CREEK ABOVE WHITEWOOD, SD

LOCATION. --Lat 44°26'32", long 103°37'44", in SE\SE\NE\NE\x sec.33, T.6 N., R.4 E., Lawrence County, Hydrologic Unit 10120202, on left bank 90 ft downstream from Crook Mountain Road and 1.1 mi south of Whitewood.

DRAINAGE AREA. -- 56.3 mi2.

PERIOD OF RECORD . -- October 1982 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 3.680 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow affected by transbasin diversions for industrial and municipal water supplies. Several observations of water quality were made during the year. Gage-height telemeter at station.

AVERAGE DISCHARGE. -- 6 years, 22.8 ft3/s, 16,520 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 684 ft<sup>3</sup>/s, May 7, 1983, gage height, 4.60 ft; minimum daily discharge, 5.0 ft<sup>3</sup>/s, Dec. 1, 1985.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 17	2345	a *174	*4.75	May 12	2330	100	2.90

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 8.5 ft<sup>3</sup>/s, Feb. 3.

					M	EAN VALUE	3					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	15	e14	e10	12	e12	21	41	32	17	12	12
2	15	16	15	e9.5	e9.0	e12	21	59	31	17	12	12
3	15	16	15	e10	e8.5	e11	21	84	29	16	12	12
4	15	16	15	e12	e9.0	e9.5	21	100	27	16	12	12
5	14	15	15	e12	e10	e9.5	21	141	25	15	12	11
-	14	13	13	612	910	85.5	21	141	23	13	12	
6	15	15	15	e12	e11	e9.5	27	121	25	14	12	11
7	16	19	e14	e11	e12	e16	26	110	25	14	14	12
8	16	16	e14	e10	e12	e21	26	104	23	14	11	14
9	17	16	e14	e9.0	e12	e26	23	88	23	14	11	16
10	16	15	e14	e9.5	e14	27	22	74	22	14	11	17
	10		014	65.5	914	2,	22	/ -		-		
11	16	16	e13	e9.5	e14	26	22	63	21	15	11	14
12	14	18	15	e9.5	e15	24	22	59	21	14	12	13
13	15	16	17	e10	e15	22	21	70	22	16	11	11
14	15	16	16	e10	e15	20	21	60	24	29	11	12
15	16	18	e15	e11	e14	e20	20	52	20	26	12	11
	10	10	613	911	914	620	20	32	20	20	12	**
16	15	17	e13	e11	e14	19	23	52	20	19	13	12
17	34	15	e13	e12	e13	e19	24	53	25	19	16	13
18	21	16	e15	e13	e12	e18	24	50	17	16	14	12
19	18	16	e14	e13	e13	e19	24	44	16	16	15	12
20	16	e16	15	e13	e13	18	24	42	16	15	19	28
21	14	e16	15	e13	e14	19	25	40	16	15	13	30
22	15	15	16	e15	e14	18	26	39	17	14	11	13
23												
	15	15	e15	e15	e16	18	25	37	18	15	10	11
24	14	16	e13	15	e20	18	25	35	31	14	12	11
25	14	e14	e12	e14	e21	19	25	34	25	13	12	11
26	14	e15	e10	e15	e20	21	32	34	21	13	14	11
27	15	e14	e10	e15	15	22	56	34	19	13	15	11
28	15	e15	e9.5	15	e14	22	46	32	17	14	18	9.9
29	16	e15	e9.5	15	914	22	40	32	16	18	14	10
30	16	e15	e10	15		21	36	35	16	16	13	10
31		612	e10	15				32		14	10	10
31	15		610	13		20		32		14	10	
TOTAL	498	473	421.0	379.0	381.5	578.5	790	1851	660	495	395	394.9
MEAN	16.1	15.8	13.6	12.2	13.6	18.7	26.3	59.7	22.0	16.0	12.7	13.2
MAX	34	19	17	15	21	27	56	141	32	29	19	30
MIN	14	14	9.5	9.0	8.5	9.5	20	32	16	13	10	9.9
AC-FT	988	938	835	752	757	1150	1570	3670	1310	982	783	783
110 11	300	300	000	132	131	1130	13/0	3070	1010	302	,00	, 00

TOTAL 7873.5 MEAN 21.5 MAX 136 MIN 8.0 AC-FT 15620 TOTAL 7316.9 MEAN 20.0 MAX 141 MIN 8.5 AC-FT 14510 CAL YR 1988 WTR YR 1989

e Estimated

#### 06436190 WHITEWOOD CREEK NEAR WHITEWOOD, SD

LOCATION.--Lat 44°32'30", long 103°34'16", in SE\hammanusE\hammanusE\hammanusE\hammanus sec.25, T.7 N., R.4 E., Lawrence County, Hydrologic Unit 10120202, on right bank 30 ft downstream from county highway bridge and 6.9 mi northeast of Whitewood.

DRAINAGE AREA. -- 77.4 mi<sup>2</sup>, approximately.

PERIOD OF RECORD . -- October 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,175 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Small diversions upstream for irrigation of 256 acres. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 29.3 ft3/s, 21,230 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,050 ft<sup>3</sup>/s, May 20, 1982, gage height, 4.52 ft; minimum daily, 2.9 ft<sup>3</sup>/s, July 12, 1985.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Oischarge (ft <sup>3</sup> /s)	Gage height (ft)
May 5	0800	*161	*1.84	No other pe	ak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 7.6 ft<sup>3</sup>/s, Aug. 23.

					M	EAN VALUE	S					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.9	22	15	10	16	e14	24	34	31	13	9.0	10
2	8.8	22	13	10	e12	e11	23	55	30	14	8.1	10
2 3 4	8.7	21	13	11	e11	e12	21	86	28	12	9.3	11
4	8.5	20	13	12	e12	e11	21	103	27	12	9.1	11
5	9.0	20	13	12	e13	e10	21	147	24	11	9.8	9.4
6	9.5	22	12	12	e13	e11	28	137	23	9.8	9.8	8.6
7	11	25	12	12	e14	e15	28	127	23	11	12	8.6
8	12	22	e11	11	e14	e20	29	117	21	11	9.2	. 11
9	12	21	14	e10	e13	e30	25	103	20	11	9.6	11
10	12	21	15	e10	e15	e40	23	89	20	12	9.0	12
11	13	20	13	e10	16	39	25	78	19	13	8.9	12
12	13	24	12	e10	16	32	23	71	19	12	10	10
13	15	22	13	11	16	28	21	83	21	12	11	11
14	16	22	14	11	15	24	21	72	22	22	9.9	9.6
15	17	24	e13	12	18	24	21	64	20	29	10	9.9
16	20	20	e13	11	19	23	20	61	18	18	11	10
17	34	18	12	13	e18	e22	21	61	24	19	14	10
18	21	20	16	14	e17	e22	22	59	18	15	11	10
19	17	19	15	11	e18	e24	e22	52	15	15	12	9.6
20	16	16	14	12	e19	24	e22	49	15	14	15	12
21	16	18	14	12	19	24	e22	47	16	14	10	23
22	17	17	14	14	20	22	e22	44	16	12	8.6	12
23	19	17	12	14	20	23	e22	42	16	13	7.6	9.8
24	17	16	11	14	22	22	e23	39	30	12	8.4	10
25	17	13	e10	15	22	24	e24	37	27	11	9.2	8.8
26	19	14	e9.5	15	21	28	e30	35	22	10	11	9.3
27	21	e13	e9.5	20	18	29	49	33	19	9.3	11	8.8
28	21	15	11	20	e16	29	37	32	18	8.3	12	9.0
29	21	16	e10	20		27	36	30	15	13	11	9.4
30	22	15	e10	22		27	32	35	13	14	11	9.8
31	22		11	21		24		32		11	8.5	
TOTAL	494.4	575	388.0	412	463	715	758	2054	630	413.4	316.0	316.6
MEAN	15.9	19.2	12.5	13.3	16.5	23.1	25.3	66.3	21.0	13.3	10.2	10.6
MAX	34	25	16	22	22	40	49	147	31	29	15	23
MIN	8.5	13	9.5	10	11	10	20	30	13	8.3	7.6	8.6
AC-FT	981	1140	770	817	918	1420	1500	4070	1250	820	627	628

CAL YR 1988 TOTAL 8622.4 MEAN 23.6 MAX 197 MIN 4.7 AC-FT 17100 WTR YR 1989 TOTAL 7535.4 MEAN 20.6 MAX 147 MIN 7.6 AC-FT 14950

e Estimated

CHEYENNE RIVER BASIN 149 06436198 WHITEWOOD CREEK ABOVE VALE, SD

LOCATION.--Lat 44°37'04", long 103°28'52", in SE\hw\he\ne\hw\k sec.35, T.8 N., R.5 E., Butte County, Hydrologic Unit 10120202, on left bank at point where South Canal crosses creek, 3.2 mi above mouth, and 3.7 mi west of Vale.

DRAINAGE AREA. -- 102 mi 2.

PERIOD OF RECORD . -- November 1982 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 2.840 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Diversions upstream from station for irrigation of about 800 acres. Several observations of water quality were made during the year.

AVERAGE DISCHARGE. -- 6 years, 25.6 ft3/s, 18.550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,680 ft<sup>3</sup>/s, Sept. 24, 1986, gage height, 4.32 ft; from rating curve extended above 1,300 ft<sup>3</sup>/s on basis of slope-area estimate of peak flow; no flow July 21, 22 and

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 170 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 9	2030	a	*2.57	May 3	2130	*160	1.48

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

Minimum daily discharge, 2.6 ft3/s, Aug. 24.

DAY OCT NOV DEC FEB MAR APR JUL AUG SEP JAN MAY JUN 1 13 e17 e11 e15 A14 22 61 36 13 6.7 4.4 2 12 15 15 e10 21 76 33 15 5.3 4.8 e10 e10 3 12 14 e8.5 32 12 6.1 4.4 14 e12 e10 22 110 10 14 e14 30 4.9 5 e13 e9.0 e9.5 22 118 10 5.3 10 28 8 7 5 2 13 14 e14 e10 e9.0 21 137 4.5 6 10 13 25 9.4 5.9 3.6 14 e13 e9.5 130 26 11 15 14 e11 e12 e10 25 115 25 10 8.2 3.6 8 11 14 13 e9.0 e11 108 24 8.6 6.4 5.2 e13 e10 9 12 13 e14 e9.0 23 98 23 7.9 4.6 7.0 e17 10 e15 e9.5 82 20 7.9 4.1 8.6 e32 11 10 14 e13 e9.5 e50 20 74 20 12 3.7 10 e13 12 10 18 e13 e9.5 e13 66 20 9.3 3.5 7.9 e40 21 13 10 e13 e10 9.0 8.2 16 e14 e30 20 83 21 14 9.2 15 15 e10 e13 19 71 25 16 6.0 6.7 e27 15 8.9 15 13 22 35 6.7 e10 e23 19 64 4.4 e13 16 10 e15 13 e21 20 61 20 21 4.3 5 6 e10 e14 17 16 15 23 9.5 e10 e13 e20 24 59 26 21 5.6 18 25 20 15 e11 e12 e20 24 61 21 15 7.2 5.6 19 15 16 25 e10 e12 e22 53 17 16 7.0 5.0 20 15 16 19 e9.5 e13 e22 23 49 15 13 10 6.2 21 12 17 17 e10 e17 e22 23 48 15 9.8 8.7 28 22 11 16 16 e13 e24 23 16 7.2 4.9 19 e17 45 23 13 16 13 e12 23 6.9 2.8 e25 42 16 e17 12 15 e12 26 21 28 7.9 2.6 12 e11 e19 41 25 15 e9.0 30 3.7 10 e10 924 28 23 39 6.3 26 12 15 e8.5 e11 A23 31 26 38 24 5.9 4.4 9.0 27 7.9 13 e13 e8.5 e14 e18 31 50 38 18 5.7 5.4 28 14 e13 e9.0 e17 e15 31 51 37 17 4.9 5.8 6.7 29 14 e16 e9.0 e17 27 46 34 16 7.7 6.9 6.6 30 15 e16 e10 24 45 38 6.6 6.6 e18 13 31 14 e11 e19 22 36 9.6 4.8 TOTAL 378.1 446 439.0 363.0 388.5 700.0 771 2112 677 355.7 175.9 238.3 MEAN 5.67 12.2 14.9 14.2 11.7 13.9 22.6 25.7 68.1 22.6 11.5 7.94 MAX 20 18 25 24 50 51 137 36 35 10 28 19

9.0

1390

19

1530

34

4190

4.9

706

13

1340

2.6

349

3.6

473

TOTAL 6958.8 MEAN 19.0 MAX 126 MIN 2.4 AC-FT 13800 TOTAL 7044.5 MEAN 19.3 MAX 137 MIN 2.6 AC-FT 13970 **CAL YR 1988** WTR YR 1989

9.0

720

8.5

771

8.5

871

13

885

8.9

750

MIN

AC-FT

e Estimated

#### 06436760 HORSE CREEK ABOVE VALE, SD

LOCATION.--Lat 44°39'08", long 103°21'59", in SE\nE\sE\ sec.15, T.8 N., R.6 E., Butte County, Hydrologic Unit 10120202, on left bank 2.6 mi upstream from Dry Creek, 5.5 mi upstream from mouth, 3.0 mi northeast of Vale, and 4.5 mi southeast of Newell.

DRAINAGE AREA. -- 464 mi 2.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- October 1980 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,710 ft above National Geodetic Vertical Datum of 1929, from topographic map. April 1962 to September 1980, water-stage recorder, at site 2.7 mi downstream, at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Natural flow of stream affected by diversions for irrigation upstream from station and by return flow from Belle Fourche Irrigation Project.

AVERAGE DISCHARGE. -- 9 years, 52.6 ft3/s, 38,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,700 ft<sup>3</sup>/s, May 21, 1982, gage height, 24.80 ft; minimum daily discharge, 0.07 ft<sup>3</sup>/s, Nov. 7, 1985.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 31	2130	200	4.35	May 2	2130	*1,190	*9.87
Anr 20	1815	763	7 80	7.75			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 1.6 ft3/s, Dec. 26.

			•		M	EÁN VALUI	ES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.4	2.7	2.4	e2.0	e3.0	1.9	142	413	1.8	25	36	49
2	6.8	2.6	2.4	e1.8	e2.5	e2.0	58	815	1.8	29	38	46
3	6.0	2.7	2.4	e2.0	e2.0	e1.8	38	840	1.8	27	40	38
4	5.1	2.7	2.2	e2.0	e1.7	e1.8	24	551	5.1	24	33	33
5	4.8	2.6	2.2	e2.0	e1.7	e1.7	16	310	3.5	26	32	45
6	4.8	2.4	2.2	e2.0	e2.0	e1.8	13	164	5.0	21	42	45
7	4.7	2.5	2.3	e1.8	e2.0	e2.0	9.1	98	16	30	42	45
8	4.3	2.5	2.2	e1.7	e2.0	2.4	6.7	63	27	35	38	45
9	3.7	2.4	2.1	e1.7	e2.0	4.3	5.2	41	21	37	37	50
10	3.2	2.4	2.1	e2.0	e2.0	8.5	4.2	27	32	38	43	59
11	3.2	2.4	2.2	e2.0	e2.0	9.9	3.8	19	71	52	47	47
12	3.1	2.5	2.3	e2.0	e2.0	9.5	3.4	15	36	64	44	24
13	3.0	2.6	2.5	e2.0	2.1	7.6	3.6	13	30	57	46	14
14	3.0	2.7	2.4	e2.0	2.0	4.4	3.7	11	36	55	45	11
15	3.0	2.9	e2.0	e2.0	1.8	e4.0	3.5	8.9	35	58	43	8.5
16	3.0	e2.5	2.1	2.2	1.8	e3.0	3.2	7.6	38	59	44	7.9
17	3.4	2.9	2.1	2.3	1.7	e2.5	3.3	6.7	39	60	40	6.5
18	3.3	2.6	2.1	2.4	1.7	e2.5	3.2	5.7	41	54	43	5.9
19	3.1	2.7	2.1	2.5	1.7	e2.5	2.9	5.4	37	47	47	5.2
20	3.0	2.4	2.1	2.2	1.7	e2.5	2.6	4.2	32	40	54	5.1
21	3.0	2.4	2.1	2.0	1.7	e2.5	2.3	3.6	34	40	50	8.6
22	3.1	2.4	2.1	2.1	1.7	e3.0	2.1	4.0	30	46	48	11
23	3.0	2.4	2.0	2.1	2.0	e4.0	1.9	4.9	18	50	42	8.3
24	2.7	2.4	1.9	2.1	2.4	e5.0	1.7	3.7	23	47	52	5.6
25	2.6	2.3	1.8	2.2	2.7	e10	1.7	2.9	37	46	55	4.3
26	2.5	2.2	1.6	e2.2	2.9	e15	2.2	2.5	37	40	52	3.4
27	2.6	e2.0	1.8	2.2	2.6	e20	5.1	2.2	36	39	49	3.1
28	2.4	2.4	e2.0	2.0	2.0	25	58	2.0	29	47	50	2.9
29	2.3	2.4	e2.0	2.2		59	593	1.8	26	51	52	2.9
30	2.6	2.4	e2.0	2.7		39	487	1.9	22	49	54	2.9
31	2.6		e2.0	3.3		126		1.9		45	51	
TOTAL	112.3	75.0	65.7	65.7	57.4	385.1	1504.4	3449.9	802.0	1338	1389	643.1
MEAN	3.62	2.50	2.12	2.12	2.05	12.4	50.1	111	26.7	43.2	44.8	21.4
MAX	8.4	2.9	2.5	3.3	3.0	126	593	840	71	64	55	59
MIN	2.3	2.0	1.6	1.7	1.7	1.7	1.7	1.8	1.8	21	32	2.9
AC-FT	223	149	130	130	114	764	2980	6840	1590	2650	2760	1280

CAL YR 1988 TOTAL 8614.16 MEAN 23.5 MAX 206 MIN .67 AC-FT 17090 WTR YR 1989 TOTAL 9887.6 MEAN 27.1 MAX 840 MIN 1.6 AC-FT 19610

e Estimated

## WATER-QUALITY RECORDS

PERIOD OF RECORD. -- October 1987 to current year.

REMARKS. -- Additional water-quality data at this site are available from special projects.

				. 40			,				0101		.000	10 00.							
DATE	TIME	DISCHARGED INSTITUTE CUBIC FEET PER SECOLUSION (0006)	E, SPI C COI F DUC ANO	FIC N- CT-	PH (STAN ARI UNITS (0040	)		URE IR G C	A: W/	MPEI FURI ATEI EG (	E R C)	HAR NES TOT (MG AS CAC	SAL F/L SO3)	CALC: DIS- SOL' (MG AS (	VED /L CA)	MAG SI DI SOL (MG AS I	UM, SODI S- DIS VED SOLV /L (MG MG) AS	ED /L NA)	SODIUM PERCEN' (00932	SO 1 1 RA	DDIUM AD- ORP- TION ATIO
NOV 30	1030	2.	6	4980	R	10		5.	5	•	. 0		200	360		310	590		3	,	6
JAN 20	1045	2.4																			7
FEB				5600		98		12.			.0		2500	400		360	850		4:		
28 MAR	1630	2.:		5350		20		-8.			. 5		2200	350		330	630		3		6
31 APR	1030	132		2290	8.	10		12.	0	5	. 0		790	160		96	230		3	3	4
28 JUN	1400	16		3860	8.	40		1.	5	4	. 0	1	.500	240		230	450		3	9	5
07 SEP	1600	14	1	2310	8.	30		21.	5	23	. 5		990	230		100	190		2	9	3
13	1315	14		2350	8.	42		19.	5	13	.0	1	100	240		110	170		20	5	2
DATE	SOI (MA	IS- LVED G/L K)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	DI SO (M AS	FATE S- LVED G/L SO4) 945)	RI DI SO (M AS	LO- DE, S- LVED G/L CL) 940)		FLUO- RIDE, DIS- SOLVEI (MG/L AS F)	)	SILI DIS SOL (MG AS SIO	VED	CON TUE D SC (M	LIDS, 1 OF ISTI- ENTS, DIS- DLVED MG/L)	SOLI DI SOL (TO PE AC- (703	S- VED NS R FT)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NIT GE NO2+ DI SOL (MG AS	N, NO3 I S- PI VED : /L	PHOS- HOROU TOTAL (MG/I AS P)	JS
NOV 30	10	, ,	804	310	0	8	5		0.40	)	4	. 8		4720	6	. 41	30.6	0.	860	0.01	10
JAN 20	1	1 :	513	370	0	10	0		0.30	)	6	.2		5740	7	.81	37.2	1.	20	0.02	20
FEB 28	1:	1 4	35	320	0	8	9		0.30	)	6	.2		4880	6	.64	27.7	0.	990	0.02	20
MAR 31		3.2	133	120	0	5	4		0.30	)	4	.5		1840	2	.50	655	0.	830	0.06	30
APR 28	1:	1 2	247	220	0	6	3		0.40	)		. 2		3350		.55	145	0.	180	0.10	00
JUN 07			174	120		2			0.40			. 4		1870		.54	70.5	<0.		0.03	
SEP 13	10		182	120		2:								1870			70.6	<0.		0.04	
10	1		.02	120		2.	4		0.50	,	0	.0		10/0	2	. 54	70.6	-0.	100	0.04	U
DATE	PHOI DI SOI (MX AS	ROUS IS- LVED S G/L ( P) A	PHOS-PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SOI (UC AS	ENIC IS- LVED G/L AS)	SOI (UC AS	RON, IS- LVED G/L B)		ADMIUN DIS- SOLVEI (UG/L AS CD)		CHR MIU DIS SOL (UG AS	M, VED /L CR)	SOL (U AS	ALT, S- VED G/L (CO)	COPP DIS SOL (UG AS	VED /L CU)	CYANIDE TOTAL (MG/L AS CN) (00720)	IRO DI SOL (UG AS (010	S- VED S /L ( FE) A	EAD, DIS- OLVE UG/L S PE	ED 3)
NOV 30	<0	.010	<0.010		<1		1100		<1			2		<1		1	<0.010		40	<	:5
JAN 20	<0	010	<0.010				1300		22		1	-			11-	_		-			
FEB 28	0	.010	<0.010		<1		1100					2			_			_	_		
MAR 31		010	<0.010				290				-				_			4	4		
APR 28		.030	<0.010				700				-			22				-			
JUN 07		010	<0.010				390				_			22							
SEP 13		.010	<0.010				370								_			74			
10	U.	010	-0.010				3/0				-	_			-			-			

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## CHEYENNE RIVER BASIN

# 06436760 HORSE CREEK ABOVE VALE, SD--Continued

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	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											
30 JAN	320	60	<0.10		1	3	13	1.0	5000	2	<10
20 FEB											
28 MAR				<0.1			14				10
31 APR											4-
28 JUN											
07 SEP											
13											

#### 06437000 BELLE FOURCHE RIVER NEAR STURGIS, SD

LOCATION.--Lat 44°30'47", long 103°08'11", in SE\nw\ sec.3, T.6 N., R.8 E., Meade County, Hydrologic Unit 10120202, on right bank near upstream end of bridge on State Highway 34, 0.5 mi upstream from Bear Butte Creek, and 20 mi northeast of Sturgis.

DRAINAGE AREA. -- 5,870 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. --October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

GAGE. -- Water-stage recorder. Datum of gage is 2,526.13 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 31, 1946, nonrecording gage at same site and datum.

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Flow regulated by Keyhole Dam, usable capacity, 191,600 acre-ft, 246 mi upstream since February 1952. At a point 75 mi upstream, water is diverted to Belle Fourche Reservoir (see station 06435000), through Inlet Canal (see station 06434500), with other small diversions from the main stem and tributaries for irrigation. Total diversion for irrigation of about 60,000 acres upstream from station. Several observations of water quality were made during the year.

AVERAGE DISCHARGE. -- 44 years, 269 ft3/s, 194,900 acre-ft/yr; median of yearly mean discharges, 232 ft3/s, 168,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 36,400 ft 3/s, May 21, 1982, gage height, 19.10 ft; no flow for many days in 1945, 1950, and Aug. 9, 1961.

EXTREMES FOR CURRENT YEAR, --Maximum discharge, 1,470 ft<sup>3</sup>/s at 0600 hours, May 3, gage height, 5.84 ft; minimum daily discharge, 18 ft<sup>3</sup>/s, Feb. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT SEP NOV DEC JAN FEB MAR APR MAY JUN .TIIT. AUG e30 A22 e32 e35 e20 e30 e30 A22 e18 e30 e22 e20 e26 e45 e25 e20 e25 e45 e22 e20 e25 e40 e22 e20 e28 e30 e20 e20 e35 e24 e20 e20 e35 e26 e20 e23 e40 e26 e20 e25 e50 e27 e20 e25 e29 A22 e28 e30 e23 e25 e25 e27 e25 e30 e52 e25 e27 e28 e30 e50 e25 e27 e25 e30 e50 e28 e30 e25 **a28** e48 e35 e37 e25 e30 e48 e30 e33 e30 e48 e30 e35 e30 e30 e50 e30 e40 e30 e32 e50 e25 e30 e55 e2.5 A35 e40 e50 e50 e25 e30 e70 e37 e20 e30 e40 e150 e30 e20 e32 e35 e400 e22 e20 e35 e32 e500 e25 e20 e35 e400 e25 e22 \_\_\_ e40 e200 e22 e45 TOTAL MEAN 43.8 44.0 29.0 28.3 27.5 86.5 MAX MIN AC-FT 

TOTAL 46812.5 MEAN 128 MAX 1140 MIN 2.9 AC-FT 92850 WTR YR 1989 TOTAL 38959 MEAN 107 MAX 1310 MIN 18 AC-FT 77280

e Estimated

#### 06437000 BELLE FOURCHE RIVER NEAR STURGIS, SD--Continued

#### WATER-QUALITY RECORDS

PERIOD OF RECORD. --October 1953 to September 1958, October 1968 to current year.

PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: August 1954 to September 1958, October 1968 to September 1971, October 1973 to current year.

WATER TEMPERATURE: August 1954 to September 1958, October 1968 to September 1971, October 1974 to current year.

REMARKS. -- Water temperature and specific conductance samples are collected once daily by an observer.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum daily, 7,000 microsiemens, May 16, 1981; minimum daily, 650 microsiemens, Feb. 15, 1971.
WATER TEMPERATURE: Maximum daily, 30.5°C, July 5, 1981; minimum daily, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR. --

SPECIFIC CONDUCTANCE: Maximum observed daily, 3,420 microsiemens, Dec. 31; minimum observed daily, 980 microsiemens, May 4.

WATER TEMPERATURE: Maximum observed daily, 25.5°C, June 24; minimum observed daily, 0.0°C on many days during winter period.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)
OCT												
20 NOV	1200	49	2480	8.40	18.5	13.5	1300	270	140	170	22	2
28 JAN	1115	22	2870	8.40	0.0	0.0	1400	290	160	240	27	3
20 MAR	1535	33	3000	8.07	10.0	0.0	1400	320	150	200	23	2
01	1545	32	2350	8.10	-10.0	0.0	1100	240	120	170	25	2
30	1240	198	2350	8.30	11.0	8.0	810	160	100	270	42	
05 JUN	1400	665	995	8.10	13.0	13.0	330	73	36	88	36	
07 SEP	1045	68	2360	8.40	24.0	22.5	970	190	120	210	32	3
13	1545	159	2000	8.41	21.5	16.5	870	210	84	120	23	2

							SOLIDS,			NIIRO-		
	POTAS- SIUM.	ALKA- LINITY	SULFATE	CHLO- RIDE.	FLUO- RIDE.	SILICA, DIS-	SUM OF CONSTI-	SOLIDS, DIS-	SOLIDS, DIS-	GEN, NO2+NO3	PHOS-	
	DIS-	LAB	DIS-	DIS-	DIS-	SOLVED	TUENTS.	SOLVED	SOLVED	DIS-	PHOROUS	
	SOLVED	(MG/L	SOLVED	SOLVED	SOLVED	(MG/L	DIS-	(TONS	(TONS	SOLVED	TOTAL	
DATE	(MG/L	AS	(MG/L	(MG/L	(MG/L	AS	SOLVED	PER	PER	(MG/L	(MG/L	
DATE												
	AS K)	CACO3)	AS SO4)	AS CL)	AS F)	SIO2)	(MG/L)	AC-FT)	DAY)	AS N)	AS P)	
	(00935)	(90410)	(00945)	(00940)	(00950)	(00955)	(70301)	(70303)	(70302)	(00631)	(00665)	
OCT												
20	22	182	1400	25	0.50	3.7	2150	2.92	284	0.920	0.010	
NOV						• • • •						
28	10	274	1600	36	0.60	5.6	2530	3.44	150	4.40	<0.010	
JAN												
20	11	322	1500	29	0.50	7.2	2420	3.29	216	2.60	0.010	
MAR												
01	9.4	250	1200	30	0.60	6.4	1940	2.64	168	2.80	<0.010	
30	9.7	140	1200	34	0.50	10	1900	2.58	1010	6.20	0.130	
MAY												
05	6.4	90	420	9.6	0.40	8.0	699	0.95	1260	0.890	0.030	
JUN												
07	10	147	1200	34	0.50	2.4	1870	2.54	343	2.50	0.010	
SEP								-3.71	101			
13	9.6	149	1000	19	0.50	5.3	1540	2.10	662	0.730	0.040	

06437000 BELLE FOURCHE RIVER NEAR STURGIS, SD--Continued WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	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)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	CYANIDE TOTAL (MG/L AS CN) (00720)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
				Alexander Control							
OCT 20 NOV	0.010	<0.010	10	420	<1	1	<1	1	<0.010	20	<5
28 JAN	<0.010	<0.010		400							
20 MAR	<0.010	<0.010		420							
01	<0.010	<0.010	5	310		2					
30	0.010	<0.010	<1	260	<1	<1	1	2	<0.010	20	<5
05 JUN	0.020	0.010		140				75			
07 SEP	<0.010	<0.010		330							
13	0.010	<0.010		260							
DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY TOTAL RECOV- ERABLE (UG/L AS HG) (71900)	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											
20 NOV	140	20	<0.10		4	3	4	1.0	3100	<1	<10
28 JAN			44								
20 MAR		:27	₹7					57			
01				<0.1			6				10
30 MAY	160	20	0.20		1	13	14	<1.0	2000	<1	<10
05 JUN											
07 SEP											
13											

06437000 BELLE FOURCHE RIVER NEAR STURGIS, SD--Continued

SPECIFI	C CONDUCTAN	ICE, IN	MICROSIEMENS	PER	CENTIMETER INSTANTA		WATER YEA	R OCTOBER	1988	TO SEPTEMBER	1989
212							7.11.2				1000

OCT 2270 2080 2090 2180 2180 2180 2210	NOV 2410 2430 2460 2370 2380	DEC 2770 2590 2600 2520 2520	JAN 3300 3130 3260 3200 3150	FEB 2280 2360 2460 2610	MAR 2160 2270 2290	APR 2380 2130 2100	MAY 1660 1330	JUN 1700 1730	JUL 1820 1830	AUG 1800 1840	SEP 1980 2000
2080 2090 2180 2180	2430 2460 2370 2380	2590 2600 2520	3130 3260 3200	2360 2460 2610	2270 2290	2130	1330				
2090 2180 2180 2180	2460 2370 2380	2600 2520	3260 3200	2460 2610	2270 2290			1730	1830	1940	2000
2180 2180 2180	2370 2380	2520	3200	2610		2100				1040	2000
2180 2180	2380		3200	2610		2100	1150	1680	1830	1830	2020
2180					2440	1970	980	1690	1890	1840	2010
	2480			2670	2530	2000	1030		1890	1830	2020
2210		2510	3100	2790	2720	2040	1150	1800	1950	1900	2040
	2420	2410	2930	2960	2620	2130	1120	2210	1900	1890	2020
2190	2380	2670	2960	2910	2610	2150	1190	2540	1960	1910	2030
	2450	2760	3000	2970	2500	2200	1310	2170	1980	1880	2020
2230	2380	2780	2940	3130	2220	2170	1290	2440	1960	1880	2010
2270	2410	2770	2920	3340	1980	2130	1330	2090	1750	1850	2020
2290	2360	2790	2980	3040	1980	2130	1360	2070	1820	1910	1940
2330	2340	2520	2990	3020	2700	2140	1320	2040	1880	1920	1910
2310	2340	2520	2960	3000	2450	2190	1380	2060	1860	1930	2020
2340	2340	2640	3000	2970	2390	2170	1400	1910	1880	1920	2050
2350	2670	2810	3150	2830	2380	2190	1440	1760	1870	1890	2090
2270	2530	2770	3140				1540	1800	1790	1920	2180
2310	2430	2800	3020	2590	2350	2190	1640	1780	1800	1930	2200
2350	2500	2930	2870					1830	1840	1930	2250
2370	2700	2880	2870	2580	2200	2130	1740	1850	1830	1930	2280
2370	2690	2880	2750	2600	2450	2150	1740	1840	1850	1950	2120
2320	2560	2720	2640	2580	2400	2280	1620	1770	1870	1940	2220
2270	2610	2770	2460	2480	2220	2460	1620	1800	1830	1950	2160
2280	2490	2750	2460	2420	2150	2550	1700	1730	1850	1950	2180
2320	2520	2880	2510	2350	2010	2450	1730	1720	1850	1960	2270
2330	2510	2860	2530	2250	1780	2230	1800	1650	1810	1940	2350
2320	2700	3040	2520	2350	2380	1960	1800	1680	1890	1900	2270
2370	2790	3290	2510	2310	3320	2560	1780	1760	1850	1950	2290
2340	2840	3340	2540		1970	1960	1760	1750	1850	1930	2310
2380											2290
2380		3420	2300		2390		1680		1800	1930	
	2230 2230 2230 2270 2290 2330 2310 2340 2350 2370 2370 2320 2270 2280 2320 2320 2320 2320 2320 2320 2330 2320 2330 2330	2230 2450 2230 2380  2270 2410 2290 2360 2330 2340 2310 2340 2340 2340 2350 2670 2270 2530 2310 2430 2350 2500 2370 2700  2370 2690 2370 2560 2270 2610 2280 2490 2320 2560 2320 2520 2330 2510 2320 2700 2370 2790 2340 2340 2380 2750	2230         2450         2760           2230         2380         2780           2270         2410         2770           2290         2360         2790           2330         2340         2520           2310         2340         2520           2340         2640         2350           2370         2530         2770           2310         2430         2800           2370         2500         2930           2370         2500         2930           2370         2690         2880           2320         2560         2720           2270         2610         2770           2280         2490         2750           2320         2520         2880           2330         2510         2860           2320         2700         3040           2370         2790         3290           2340         2840         340           2340         2840         340           2350         2700         3290           2340         2840         340           2350         2700         3040 <tr< td=""><td>2230         2450         2760         3000           2230         2380         2780         2940           2270         2410         2770         2920           2290         2360         2790         2980           2330         2340         2520         2990           2310         2340         2520         2960           2340         2640         3000           2350         2670         2810         3150           2270         2530         2770         3140           2310         2430         2800         3020           2370         2500         2930         2870           2370         2700         2880         2870           2370         2690         2880         2750           2320         2560         2720         2640           2270         2610         2770         2460           2280         2490         2750         2460           2320         2520         2880         2510           2330         2510         2860         2530           2320         2520         2880         2510           2330</td><td>2230         2450         2760         3000         2970           2230         2380         2780         2940         3130           2270         2410         2770         2920         3340           2290         2360         2790         2980         3040           2330         2340         2520         2990         3020           2310         2340         2520         2960         3000           2340         2640         3000         2970           2350         2670         2810         3150         2830           2270         2530         2770         3140         2670           2310         2430         2800         3020         2590           2310         2430         2800         3020         2590           2370         2500         2930         2870         2540           2370         2700         2880         2870         2580           2370         2690         2880         2750         2600           2320         2560         2720         2640         2580           2270         2610         2770         2460         2480</td><td>2230         2450         2760         3000         2970         2500           2230         2380         2780         2940         3130         2220           2270         2410         2770         2920         3340         1980           2290         2360         2790         2980         3040         1980           2330         2340         2520         2990         3020         2700           2310         2340         2520         2960         3000         2450           2340         2340         2640         3000         2970         2390           2350         2360         270         2390         230         230           2350         2670         2810         3150         2830         2380           2270         2530         2770         3140         2670         2660           2310         2430         2800         3020         2590         2350           2370         2500         2930         2870         2540         2370           2370         2700         2880         2750         2600         2450           2320         2560         2720         &lt;</td><td>2230         2450         2760         3000         2970         2500         2200           2230         2380         2780         2940         3130         2220         2170           2270         2410         2770         2920         3340         1980         2130           2290         2360         2790         2980         3040         1980         2130           2330         2340         2520         2990         3020         2700         2140           2310         2340         2520         2960         3000         2450         2190           2340         2340         2640         3000         2970         2390         2170           2350         2670         2810         3150         2830         2380         2190           2370         2530         2770         3140         2670         2660         2130           2310         2430         2800         3020         2590         2350         2190           2370         2530         2930         2870         2540         2370         2150           2370         2700         2880         2870         2580         2200</td><td>2230         2450         2760         3000         2970         2500         2200         1310           2230         2380         2780         2940         3130         2220         2170         1290           2270         2410         2770         2920         3340         1980         2130         1330           2290         2360         2790         2980         3040         1980         2130         1360           2330         2340         2520         2990         3020         2700         2140         1320           2310         2340         2520         2980         3000         2450         2190         1380           2340         2520         2980         3000         2450         2190         1380           2340         2340         2640         3000         2970         2390         2170         1400           2350         2670         2810         3150         2830         2380         2190         1440           2270         2530         2770         3140         2670         2660         2130         1540           2310         2430         2800         3020         2590<td>2230         2450         2760         3000         2970         2500         2200         1310         2170           2230         2380         2780         2940         3130         2220         2170         1290         2440           2270         2410         2770         2920         3340         1980         2130         1330         2090           2290         2360         2790         2980         3040         1980         2130         1360         2070           2330         2340         2520         2990         3020         2700         2140         1320         2040           2310         2340         2520         2960         3000         2450         2190         1380         2060           2340         2520         2960         3000         2450         2190         1380         2060           2340         2340         2640         3000         2970         2390         2170         1400         1910           2350         2670         2810         3150         2830         2380         2190         1440         1760           2310         2430         2800         3020         2590</td><td>2230         2450         2760         3000         2970         2500         2200         1310         2170         1980           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880           2310         2340         2520         2990         3020         2700         2140         1320         2060         1860           2340         2520         2980         3000         2450         2190         1380         2060         1860           2340         2520         2980         3000         2380         2190         1440         1760         1870           2350         2670         2810         3150         2830         2380         2190         1</td><td>2230         2450         2760         3000         2970         2500         2200         1310         2170         1980         1880           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960         1880           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750         1850           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820         1910           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880         1920           2310         2340         2520         2980         3000         2450         2190         1380         2060         1860         1930           2340         2340         2640         3000         2970         2390         2170         1400         1910         1880         1920           2350         2670         2810         3150         2830         2380         2190         1440         1760         <t< td=""></t<></td></td></tr<>	2230         2450         2760         3000           2230         2380         2780         2940           2270         2410         2770         2920           2290         2360         2790         2980           2330         2340         2520         2990           2310         2340         2520         2960           2340         2640         3000           2350         2670         2810         3150           2270         2530         2770         3140           2310         2430         2800         3020           2370         2500         2930         2870           2370         2700         2880         2870           2370         2690         2880         2750           2320         2560         2720         2640           2270         2610         2770         2460           2280         2490         2750         2460           2320         2520         2880         2510           2330         2510         2860         2530           2320         2520         2880         2510           2330	2230         2450         2760         3000         2970           2230         2380         2780         2940         3130           2270         2410         2770         2920         3340           2290         2360         2790         2980         3040           2330         2340         2520         2990         3020           2310         2340         2520         2960         3000           2340         2640         3000         2970           2350         2670         2810         3150         2830           2270         2530         2770         3140         2670           2310         2430         2800         3020         2590           2310         2430         2800         3020         2590           2370         2500         2930         2870         2540           2370         2700         2880         2870         2580           2370         2690         2880         2750         2600           2320         2560         2720         2640         2580           2270         2610         2770         2460         2480	2230         2450         2760         3000         2970         2500           2230         2380         2780         2940         3130         2220           2270         2410         2770         2920         3340         1980           2290         2360         2790         2980         3040         1980           2330         2340         2520         2990         3020         2700           2310         2340         2520         2960         3000         2450           2340         2340         2640         3000         2970         2390           2350         2360         270         2390         230         230           2350         2670         2810         3150         2830         2380           2270         2530         2770         3140         2670         2660           2310         2430         2800         3020         2590         2350           2370         2500         2930         2870         2540         2370           2370         2700         2880         2750         2600         2450           2320         2560         2720         <	2230         2450         2760         3000         2970         2500         2200           2230         2380         2780         2940         3130         2220         2170           2270         2410         2770         2920         3340         1980         2130           2290         2360         2790         2980         3040         1980         2130           2330         2340         2520         2990         3020         2700         2140           2310         2340         2520         2960         3000         2450         2190           2340         2340         2640         3000         2970         2390         2170           2350         2670         2810         3150         2830         2380         2190           2370         2530         2770         3140         2670         2660         2130           2310         2430         2800         3020         2590         2350         2190           2370         2530         2930         2870         2540         2370         2150           2370         2700         2880         2870         2580         2200	2230         2450         2760         3000         2970         2500         2200         1310           2230         2380         2780         2940         3130         2220         2170         1290           2270         2410         2770         2920         3340         1980         2130         1330           2290         2360         2790         2980         3040         1980         2130         1360           2330         2340         2520         2990         3020         2700         2140         1320           2310         2340         2520         2980         3000         2450         2190         1380           2340         2520         2980         3000         2450         2190         1380           2340         2340         2640         3000         2970         2390         2170         1400           2350         2670         2810         3150         2830         2380         2190         1440           2270         2530         2770         3140         2670         2660         2130         1540           2310         2430         2800         3020         2590 <td>2230         2450         2760         3000         2970         2500         2200         1310         2170           2230         2380         2780         2940         3130         2220         2170         1290         2440           2270         2410         2770         2920         3340         1980         2130         1330         2090           2290         2360         2790         2980         3040         1980         2130         1360         2070           2330         2340         2520         2990         3020         2700         2140         1320         2040           2310         2340         2520         2960         3000         2450         2190         1380         2060           2340         2520         2960         3000         2450         2190         1380         2060           2340         2340         2640         3000         2970         2390         2170         1400         1910           2350         2670         2810         3150         2830         2380         2190         1440         1760           2310         2430         2800         3020         2590</td> <td>2230         2450         2760         3000         2970         2500         2200         1310         2170         1980           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880           2310         2340         2520         2990         3020         2700         2140         1320         2060         1860           2340         2520         2980         3000         2450         2190         1380         2060         1860           2340         2520         2980         3000         2380         2190         1440         1760         1870           2350         2670         2810         3150         2830         2380         2190         1</td> <td>2230         2450         2760         3000         2970         2500         2200         1310         2170         1980         1880           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960         1880           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750         1850           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820         1910           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880         1920           2310         2340         2520         2980         3000         2450         2190         1380         2060         1860         1930           2340         2340         2640         3000         2970         2390         2170         1400         1910         1880         1920           2350         2670         2810         3150         2830         2380         2190         1440         1760         <t< td=""></t<></td>	2230         2450         2760         3000         2970         2500         2200         1310         2170           2230         2380         2780         2940         3130         2220         2170         1290         2440           2270         2410         2770         2920         3340         1980         2130         1330         2090           2290         2360         2790         2980         3040         1980         2130         1360         2070           2330         2340         2520         2990         3020         2700         2140         1320         2040           2310         2340         2520         2960         3000         2450         2190         1380         2060           2340         2520         2960         3000         2450         2190         1380         2060           2340         2340         2640         3000         2970         2390         2170         1400         1910           2350         2670         2810         3150         2830         2380         2190         1440         1760           2310         2430         2800         3020         2590	2230         2450         2760         3000         2970         2500         2200         1310         2170         1980           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880           2310         2340         2520         2990         3020         2700         2140         1320         2060         1860           2340         2520         2980         3000         2450         2190         1380         2060         1860           2340         2520         2980         3000         2380         2190         1440         1760         1870           2350         2670         2810         3150         2830         2380         2190         1	2230         2450         2760         3000         2970         2500         2200         1310         2170         1980         1880           2230         2380         2780         2940         3130         2220         2170         1290         2440         1960         1880           2270         2410         2770         2920         3340         1980         2130         1330         2090         1750         1850           2290         2360         2790         2980         3040         1980         2130         1360         2070         1820         1910           2330         2340         2520         2990         3020         2700         2140         1320         2040         1880         1920           2310         2340         2520         2980         3000         2450         2190         1380         2060         1860         1930           2340         2340         2640         3000         2970         2390         2170         1400         1910         1880         1920           2350         2670         2810         3150         2830         2380         2190         1440         1760 <t< td=""></t<>

WATER	TEMPERATURE,	IN	DEGREES	CELSIUS,	WATER	YEAR	OCTOBER	1988	TO	SEPTEMBER	1989	
				THETANTAL	MEOUG T	TAT TIES						

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12.0	4.0	.0	.0	.0	.0	6.0	3.0	11.0	21.0	22.0	17.0
2	13.0	5.0	.0	.0	. 0	.0	6.0	6.0	16.5	22.5	23.0	17.0
3	11.0	7.0	.0	.0	.0	.0	4.5	8.0	14.0	21.0	21.0	17.0
4	7.5	5.0	.0	.0	.0	.0	3.0	9.0	15.0	21.0	21.0	16.0
5	5.0	4.0	.0	.0	.0	.0	3.0	9.5	17.0	21.0	20.0	17.0
6	7.0	2.0	.0	.0	.0	.0	6.5	8.0	18.0	21.5	19.0	17.0
7	6.0	4.0	.0	.0	.0	.0	6.5	12.0	19.0	21.5	17.0	16.0
8	7.0	3.0	.0	.0	.0	.0	4.0	14.0	16.5	23.0	17.0	16.0
9	9.0	1.5	.0	.0	.0	.0	2.5	11.5	17.0	23.0	19.5	14.0
10	9.0	.0	.0	.0	.0	.0	.0	12.0	17.0	20.5	20.0	12.0
11	8.0	.0	.0	.0	.0	.0	3.5	13.0	19.0	21.5	21.5	8.5
12	8.0	1.0	.0	.0	.0	.0	5.0	15.5	16.5	24.0	20.5	14.0
13	9.0	2.0	.0	.0	.0	.0	8.0	12.0	14.0	24.0	21.0	9.0
14	10.0	3.0	.0	.0	.0	.0	9.5	12.0	13.5	21.5	20.0	11.0
15	12.0	1.0	.0	.0	.0	.0	8.0	13.0	17.0	19.0	19.0	12.0
16	12.0	.0	.0	.0	.0	.0	11.5	15.0	17.0	19.0	20.0	12.0
17	11.0	.0	.0	.0	.0	.0	5.0	14.0	18.5	20.0	18.5	15.5
18	11.0	.0	.0	.0	.0	.0	5.0	16.0	19.0	20.0	21.5	16.0
19	8.5	.0	.0	.0	.0	.0	9.0	12.0	20.0	20.0	19.0	16.0
20	9.5	.0	.0	.0	.0	.0	12.5	12.0	19.5	21.5	19.0	16.0
21	8.0	.0	.0	.0	.0	.0	14.0	15.0	16.5	20.0	20.0	13.0
22	8.5	.0	.0	.0	.0	.0	15.0	17.0	14.0	19.0	19.0	11.0
23	5.0	.0	.0	.0	.0	.0	14.0	12.5	15.5	21.0	20.0	9.0
24	7.0	.0	.0	.0	.0	.0	13.5	14.5	17.0	20.0	19.0	11.0
25	6.0	.5	.0	.0	.0	1.0	11.0	11.5	17.5	22.0	19.0	12.0
26	5.0	.5	.0	.0	.0	1.0	11.0	10.0	16.0	22.0	18.5	12.0
27	4.0	.0	.0	.0	.0	2.0	8.0	13.0	18.5	22.5	18.0	15:0
28	5.0	.0	.0	.0	.0	4.0	4.0	16.5	16.5	22.5	18.0	18.0
29	.0	.0	.0	.0		5.5	2.5	16.0	22.0	22.5	18.0	16.0
30	1.0	.0	.0	.0		5.0	3.0	12.0	22.0	22.0	18.0	16.0
31	5.0		.0	.0		3.5		12.0		22.5	19.5	

#### 06437020 BEAR BUTTE CREEK NEAR DEADWOOD, SD

LOCATION.--Lat 44°20'08", long 103°38'06", in NE%SE% sec.4, T.4 N., R.4 E., Lawrence County, Hydrologic Unit 10120202, on right bank 0.4 mi northeast of Galena, 0.5 mi downstream from Butcher Gulch, and 5.3 mi southeast of Deadwood.

DRAINAGE AREA. -- 16.6 mi 2.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 4,750 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water quality were made during the year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 20 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 5	1730	*36	*4.64	May 12	2315	26	4.47

Minimum daily discharge, 0.40 ft3/s, Feb. 3.

DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP  1 3.2 1.0 .92 e.80 e.60 e.80 e2.5 8.7 5.0 1.5 .88 .98 2 1.1 1.0 .92 e.84 e.50 e.76 e2.5 14 4.9 1.5 .85 .92 3 .37 1.1 .92 e.90 e.40 e.74 e2.6 20 4.6 1.5 .89 .97 4 .92 1.1 .93 e.94 e.45 e.74 2.8 24 4.3 1.6 .75 .80 5 .92 1.0 e.96 e.90 e.50 e.90 4.1 33 .9 13 .64 .78 6 .92 1.0 e.96 e.90 e.50 e.90 4.1 33 .9 13 .64 .78 6 .92 1.0 e.96 e.90 e.50 e.90 4.1 33 .9 13 .66 1.1 .74 .64 7 .92 e1.1 e.80 e.76 e.66 e1.3 5.4 25 3.1 1.1 .99 1.1 .99 1.0 e.76 e.66 e1.3 5.4 25 3.1 1.1 .99 1.1 .99 1.0 e.76 e.66 e1.3 5.4 25 3.1 1.1 .99 1.1 .99 1.0 e.74 e.70 e3.1 3.9 22 3.2 .96 .60 1.3 10 e.90 e1.1 e.80 e.74 e.70 e3.1 3.9 22 3.2 .96 .60 1.3 10 e.90 e1.1 e.85 e.78 e.80 e6.2 6.4 18 2.8 e.33 .60 1.4 11 .99 1.3 e.94 e.80 e.80 e.80 e.20 e.20 e1.1 e.99 e1.1 e.99 e1.1 e.80 e.74 e.70 e3.1 3.9 22 3.2 .96 .60 1.3 10 .80 e1.1 e.80 e.74 e.70 e3.1 3.9 22 3.2 .96 .80 1.3 10 .80 e1.1 e.80 e.74 e.70 e3.1 3.9 22 3.2 .96 .80 1.3 10 .80 e1.1 e.85 e.78 e.80 e6.2 6.4 18 2.8 e33 .60 1.4 13 .55 1.3 14 .80 e1.1 e.94 e.80 e.80 e.86 e5.0 3.9 15 3.1 1.3 .55 1.3 14 .80 e1.1 e.94 e.82 e.90 e.86 e5.0 3.9 15 3.1 1.3 .55 1.3 14 .80 e1.1 e.94 e.82 e.84 e3.8 3.6 1.2 3.5 1.3 1.1 1.3 .55 1.3 14 .80 e1.0 e.95 e.80 e.80 e.80 e.80 e3.2 3.5 13 2.9 3.1 1.3 .59 1.3 14 .80 e1.0 e.95 e.80 e.80 e.80 e3.2 3.5 13 2.9 3.1 1.3 .59 9.80 1.5 86 e.95 e.90 e.80 e.80 e.80 e3.2 3.5 13 2.9 3.1 1.9 8.1 1.8 2.7 1.9 1.9 8.1 1.8 2.1 1.9 1.6 e1.0 e.95 e.80 e.80 e.80 e3.2 3.5 13 12 2.9 3.1 1.5 1.1 1.9 1.5 2.1 7.7 20 1.3 e1.0 e.95 e.80 e.80 e.80 e.80 e3.0 3.7 9.4 1.8 1.2 1.8 3.9 1.2 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.1 1.3 2.5 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3			DISCHARGE	E, IN C	CUBIC FEET		ID, WATER MEAN VALUE		DBER 1988 1	TO SEPTEM	BER 1989		
2 1.1 1.0 92 e.84 e.50 e.76 e2.5 14 4.9 1.5 85 .92 3 .97 1.1 92 e.90 e.40 e.74 e2.6 20 4.6 1.5 89 .97 4 .92 1.1 .93 e.94 e.45 e.74 e2.6 20 4.6 1.5 .89 .97 4 .92 1.1 .93 e.94 e.45 e.74 e2.6 20 4.6 1.5 .89 .97 5 .92 1.0 e.96 e.90 e.50 e.90 4.1 33 3.9 1.3 .64 .78 8 .92 1.0 e.96 e.90 e.50 e.90 4.1 33 3.9 1.3 .64 .78 8 .92 1.0 e.96 e.90 e.84 e.50 e.11 5.6 29 3.6 1.1 .74 .64 .78 8 .89 e1.1 e.80 e.76 e.66 e1.3 5.4 26 3.3 1.2 .76 .79 8 .89 e1.1 e.80 e.74 e.70 e.64 e1.5 4.7 25 3.1 1.1 .59 1.1 .99 80 e1.1 e.80 e.74 e.70 e3.1 3.9 22 3.2 .96 .80 1.3 10 .80 e1.1 e.85 e.78 e.80 e6.2 6.4 18 2.8 .93 .60 1.4 11 .80 e1.2 e.90 e.82 e.90 e5.6 5.2 15 2.6 1.6 .50 1.5 13 3 .80 e1.1 e.94 e.80 e.86 e5.0 3.9 15 3.1 1.3 .55 1.3 13 .80 e1.1 e.96 e.78 e.86 e4.4 3.7 20 3.4 1.3 .55 1.3 14 .80 e1.0 e.96 e.82 e.84 e3.8 3.6 15 4.0 2.9 .64 1.2 15 .86 e.95 e.90 e.80 e.80 e3.2 3.5 13 2.9 3.1 .59 .98 16 1.1 e.90 e.96 e.82 e.84 e3.8 3.6 15 4.0 2.9 .64 1.2 15 .86 e.95 e.90 e.80 e.80 e3.2 3.5 13 2.9 3.1 .59 .98 16 1.1 e.90 e.96 e.82 e.84 e3.8 3.6 15 4.0 2.9 .64 1.2 2.9 1.7 4.1 e.90 e1.0 e.84 e.76 e2.6 4.4 13 2.7 1.9 1.9 81 18 2.1 e.95 e1.0 e.84 e.76 e2.6 4.4 13 2.7 1.9 1.9 1.9 81 18 2.1 e.95 e1.0 e.84 e.76 e2.6 4.4 13 2.7 1.9 1.9 1.9 81 18 2.1 e.95 e1.0 e.84 e.76 e2.3 4.3 12 2.3 1.6 1.1 e.90 1.3 e1.0 e.95 e.80 e.84 e2.8 3.8 10 1.8 1.3 4.1 1.9 1.5 2.1 7.7 20 1.3 e1.0 e.95 e.80 e.86 e.96 e2.8 3.4 7.9 3.2 11 1.9 1.5 2.1 7.7 20 1.3 e1.0 e.95 e.80 e.86 e.90 e2.8 3.4 7.9 3.2 11 1.9 1.5 2.1 7.7 20 1.3 e1.0 e.75 e.80 e.11 e2.9 3.1 3.2 9 3.1 1.1 1.2 1.5 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.85 e.86 e.86 e.90 e2.8 3.6 6.7 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.85 e.86 e.86 e.90 e2.8 3.6 6.7 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.75 e.80 e.10 e2.8 3.0 3.0 3.7 9.4 1.8 1.3 4.1 1.9 1.5 2.1 7.7 2.0 1.3 e1.0 e.75 e.80 e.10 e2.8 3.6 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.85 e.86 e.86 e.90 e2.8 3.6 6.7 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.75 e.80 e.10 e2.9 3.1 3.2 6.8 4.5 1.3 1.2 1.1 1.4 2.0 2.3 1.0 e1.0 e.75 e.80 e.10 e2.9 3.1 3.4 7.9 3.2 1.1 1.1 2.2 1.5 2.1 1.1 1.4 2.0 2.0 2.3 1.0 e1.0	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
3		3.2		. 92	e.80	e.60	e.80	e2.5	8.7	5.0	1.5	.88	.98
3	2	1.1	1.0	. 92	e.84	e.50	e.76	e2.5	14	4.9	1.5	.85	. 92
5	3	. 97	1.1	.92	e.90	e.40	e.74	e2.6	20	4.6	1.5	.89	. 97
5 92 1.0 e.96 e.90 e.50 e.90 4.1 33 3.9 1.3 64 .78 6 92 1.0 e.90 e.84 e.60 e1.1 5.6 29 3.6 1.1 .74 6.4 7 92 e1.1 e.90 e.76 e.66 e1.3 5.6 29 3.6 1.1 .74 .64 8 .89 e1.1 e.86 e.70 e.64 e1.5 4.7 25 3.1 1.1 .59 1.1 9 .80 e1.1 e.85 e.78 e.80 e6.2 6.4 18 2.8 .93 .60 1.3 10 .80 e1.1 e.85 e.78 e.80 e6.2 6.4 18 2.8 .93 .60 1.4  11 .80 e1.2 e.90 e.82 e.90 e5.6 5.2 15 2.6 1.6 .50 1.5 12 .80 e1.1 e.94 e.80 e.86 e5.0 3.9 15 3.1 1.3 .55 1.3 13 .80 e1.1 e.96 e.78 e.86 e4.4 3.7 20 3.4 1.3 .59 1.3 14 .80 e1.0 e.96 e.82 e.84 e3.8 3.6 15 4.0 2.9 .64 1.2 15 .86 e.95 e.90 e.80 e.80 e.80 e3.2 3.5 13 2.9 3.1 .59 9.8  16 1.1 e.90 e.95 e.84 e.80 e.80 e3.2 3.5 13 2.9 3.1 .59 9.8  16 1.1 e.90 e.95 e.84 e.80 e.80 e3.2 3.5 13 2.9 3.1 .61 1.1 .82 17 4.1 e.90 e.10 e.84 e.76 e2.6 4.4 13 2.7 1.9 1.9 .81 18 2.1 e.95 e1.0 e.84 e.76 e2.6 4.4 13 2.7 1.9 1.9 .81 18 2.1 e.95 e1.0 e.84 e.76 e2.6 3.8 3.8 10 1.8 1.3 .55 2.1 .77 20 1.3 e1.0 e.95 e.80 e.84 e.80 e3.8 3.6 17 1.9 1.9 .81 18 2.1 e.95 e1.0 e.84 e.76 e2.6 3.8 3.8 10 1.8 1.2 1.8 3.9 21 1.2 e1.1 e.90 e.85 e.80 e.84 e.80 e3.8 3.8 10 1.8 1.2 1.8 3.9 22 1.1 e1.1 e.95 e.80 e.86 e.76 e2.7 3.9 11 1.9 1.5 2.1 .77 20 1.3 e1.0 e.95 e.80 e.86 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 23 1.0 e1.0 e.98 e.86 e.76 e2.7 3.9 11 1.9 1.5 2.1 .77 20 1.3 e1.0 e.95 e.80 e.86 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 23 1.0 e1.0 e.95 e.86 e.80 e.86 e2.9 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 24 1.1 e1.1 e.95 e.86 e.86 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 25 1.3 e1.0 e.75 e.80 e1.1 e2.9 3.1 7.3 6.9 1.2 1.1 1.4 2.0 26 1.1 e.95 e.66 e.78 e.96 e.30 4.3 6.4 3.4 1.1 1.1 1.2 1.5 27 .96 e.90 e.64 e.82 e.90 e2.9 9.9 6.0 2.5 .96 9.9 1.2 1.1 1.4 2.0 28 1.1 e.85 e.68 e.80 e.80 e.29 9.9 6.0 2.5 .96 9.9 1.2 1.1 1.1 2.9 1.5 2.1 7.7 2.9 1.3 1.1 1.9 1.5 2.1 7.7 2.9 1.3 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4	. 92	1.1	. 93		e.45	e.74	2.8	24	4.3	1.6	.75	.80
7	5	.92	1.0	e.96	e.90	e.50	e.90	4.1	33	3.9	1.3	.64	.78
8	6				e.84	e.60							.64
9	7												
10		.89											
11													
12	10	.80	e1.1	e.85	e.78	e.80	e6.2	6.4	18	2.8	. 93	.60	1.4
13													
14							e5.0		15			. 55	
15													
16								3.6					1.2
17	15	. 86	e.95	e.90	e.80	e.80	e3.2	3.5	13	2.9	3.1	. 59	.98
18       2.1       e.95       el.0       e.84       e.72       e2.3       4.3       12       2.3       1.6       1.1       .89         19       1.6       el.0       e.98       e.86       e.76       e2.7       3.9       11       1.9       1.5       2.1       .77         20       1.3       el.0       e.95       e.80       e.84       e2.8       3.8       10       1.8       1.3       4.1       1.9         21       1.2       el.1       e.90       e.84       e.80       e3.0       3.7       9.4       1.8       1.2       1.8       3.9         22       1.1       el.1       e.85       e.86       e.90       e2.8       3.6       8.7       2.1       1.1       1.4       2.0         23       1.0       el.0       e.80       e.86       el.0       e2.8       3.4       7.9       3.2       1.1       1.2       1.5         24       1.1       el.0       e.75       e.80       el.1       e2.9       3.1       7.3       6.9       1.2       1.1       1.4         25       1.3       el.0       e.76       e.82       e.90       e2.9													
19		4.1											.81
20 1.3 e1.0 e.95 e.80 e.84 e2.8 3.8 10 1.8 1.3 4.1 1.9  21 1.2 e1.1 e.90 e.84 e.80 e3.0 3.7 9.4 1.8 1.2 1.8 3.9  22 1.1 e1.1 e.85 e.86 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0  23 1.0 e1.0 e.80 e.86 e1.0 e2.8 3.4 7.9 3.2 1.1 1.2 1.5  24 1.1 e1.0 e.75 e.80 e1.1 e2.9 3.1 7.3 6.9 1.2 1.1 1.4  25 1.3 e1.0 e.70 e.74 e1.0 e3.1 3.2 6.8 4.5 1.3 1.2 1.3  26 1.1 e.95 e.66 e.78 e.96 e3.0 4.3 6.4 3.4 1.1 1.1 1.3  27 .96 e.90 e.64 e.82 e.90 e2.9 9.9 6.0 2.5 .96 .98 1.2  28 1.1 e.85 e.68 e.80 e.80 e2.9 9.9 6.0 2.5 .96 .98 1.2  29 .99 e.88 e.72 e.82 e2.7 6.6 5.2 1.9 1.3 1.0 1.0  30 1.0 e.92 e.76 e.75 e2.5 5.9 6.0 1.7 1.7 .89 1.1  31 1.1 e.82 e.69 e2.7 5.8 1.1 .87  TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95  MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23  MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9  MMN 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9  MIN .80 .85 .64 .69 .60 .74 2.5 5.2 1.7 .88 .50 .64													
21													
22 1.1 e1.1 e.85 e.86 e.90 e2.8 3.6 8.7 2.1 1.1 1.4 2.0 2.3 1.0 e1.0 e.80 e.86 e1.0 e2.8 3.4 7.9 3.2 1.1 1.2 1.5 2.4 1.1 e1.0 e.75 e.80 e1.1 e2.9 3.1 7.3 6.9 1.2 1.1 1.4 2.5 1.3 e1.0 e.70 e.74 e1.0 e3.1 3.2 6.8 4.5 1.3 1.2 1.3 1.2 1.3 2.6 1.1 e.95 e.66 e.78 e.96 e3.0 4.3 6.4 3.4 1.1 1.1 1.1 1.3 2.7 .96 e.90 e.64 e.82 e.90 e2.9 9.9 6.0 2.5 .96 .98 1.2 2.8 1.1 e.85 e.68 e.80 e.80 e.80 e2.8 6.9 5.5 2.2 .88 1.2 1.1 2.9 .99 e.88 e.72 e.82 e2.7 6.6 5.2 1.9 1.3 1.0 1.0 3.0 1.0 e.92 e.76 e.75 e2.5 5.9 6.0 1.7 1.7 .89 1.1 3.1 1.1 e.82 e.69 e2.7 5.8 1.1 .87 TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95 MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23 MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9 MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64	20	1.3	e1.0	e.95	e.80	e.84	e2.8	3.8	10	1.8	1.3	4.1	1.9
23									9.4				
24								3.6					
25 1.3 e1.0 e.70 e.74 e1.0 e3.1 3.2 6.8 4.5 1.3 1.2 1.3  26 1.1 e.95 e.66 e.78 e.96 e3.0 4.3 6.4 3.4 1.1 1.1 1.3  27 .96 e.90 e.64 e.82 e.90 e2.9 9.9 6.0 2.5 .96 .98 1.2  28 1.1 e.85 e.68 e.80 e.80 e2.8 6.9 5.5 2.2 88 1.2 1.1  29 .99 e.88 e.72 e.82 e2.7 6.6 5.2 1.9 1.3 1.0 1.0  30 1.0 e.92 e.76 e.75 e2.5 5.9 6.0 1.7 1.7 .89 1.1  31 1.1 e.82 e.69 e2.7 5.8 1.1 .87  TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95  MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23  MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9  MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64													
26  1.1  e.95  e.66  e.78  e.96  e3.0  4.3  6.4  3.4  1.1  1.1  1.3  27  .96  e.90  e.64  e.82  e.90  e2.9  9.9  6.0  2.5  .96  .98  1.2  28  1.1  e.85  e.68  e.80  e.80  e2.8  6.9  5.5  2.2  .88  1.2  1.1  29  .99  e.88  e.72  e.82   e2.7  6.6  5.2  1.9  1.3  1.0  1.0  30  1.0  e.92  e.76  e.75   e2.5  5.9  6.0  1.7  1.7  .89  1.1  31  1.1   e.82  e.69   e2.7   5.8   1.1  .87   1.1  87   1.1  87   1.1  87  88  1.2  1.1  87  88  1.2  1.1  87  88  1.1  1.1  87  89  1.1  87  89  1.1  88  1.1  87  89  1.1  88  1.1  89  1.1													
29	25	1.3	e1.0	e.70	e.74	e1.0	e3.1	3.2	6.8	4.5	1.3	1.2	1.3
29							e3.0	4.3					
29							e2.9	9.9					
30 1.0 e.92 e.76 e.75 e2.5 5.9 6.0 1.7 1.7 .89 1.1 31 1.1 e.82 e.69 e2.7 5.8 1.1 .87 TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95 MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23 MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9 MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64		1.1					62.0	0.5					
31 1.1 e.82 e.69 e2.7 5.8 1.1 .87  TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95  MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23  MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9  MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64													
TOTAL 37.65 30.40 26.78 25.16 21.45 83.54 131.5 431.7 96.1 44.23 33.21 36.95 MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23 MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9 MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64								5.9		1.7			
MEAN 1.21 1.01 .86 .81 .77 2.69 4.38 13.9 3.20 1.43 1.07 1.23 MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9 MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64	31	1.1		e.82	e.69		e2.7		5.8		1.1	. 87	
MAX 4.1 1.2 1.0 .94 1.1 6.2 9.9 33 6.9 3.1 4.1 3.9 MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64	TOTAL	37.65	30.40	26.78	25.16	21.45	83.54	131.5	431.7	96.1	44.23	33.21	36.95
MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64					.81	.77	2.69	4.38					
MIN .80 .85 .64 .69 .40 .74 2.5 5.2 1.7 .88 .50 .64							6.2						
AC-FT 75 60 53 50 43 166 261 856 191 88 66 73			. 85			.40	.74						
	AC-FT	75	60	53	50	43	166	261	856	191	88	66	73

WTR YR 1989 TOTAL 998.67 MEAN 2.74 MAX 33 MIN .40 AC-FT 1980

e Estimated

# 06438000 BELLE FOURCHE RIVER NEAR ELM SPRINGS, SD (National stream-quality accounting network station)

LOCATION.--Lat 44°22'11", long 102°33'56", in NE%nE% sec.29, T.5 N., R.13 E., Meade County, Hydrologic Unit 10120202, on right bank 50 ft downstream from highway bridge, 4.3 mi northwest of Elm Springs, and 4.7 mi downstream from Hay Creek.

DRAINAGE AREA. -- 7,210 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- August 1928 to June 1932, March 1934 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS. -- WSP 786: Drainage area. WSP 926: 1929, 1931(M), 1935, 1937.

GAGE.--Water-stage recorder. Datum of gage is 2,171.60 ft above National Geodetic Vertical Datum of 1929. Prior to July 27, 1939, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Keyhole Dam, usable capacity, 191,600 acre-ft, 304 mi upstream since Feb. 12, 1952. At a point 133 mi above station, water is diverted to Belle Fourche Reservoir (see station 06435000), through Inlet Canal near Belle Fourche (see station 06434500), with other smaller diversions from the main stem and tributaries for irrigation. Total diversion for irrigation of about 60,000 acres upstream from station.

AVERAGE DISCHARGE.--58 years (water years 1929-31, 1935-89), 354 ft<sup>3</sup>/s, 256,500 acre-ft/yr; median of yearly mean discharges, 340 ft<sup>3</sup>/s, 246,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 45,100 ft<sup>3</sup>/s, June 8, 1964, gage height, 15.90 ft, from rating curve extended above 23,000 ft<sup>3</sup>/s; maximum gage height, 18.22 ft, May 21, 1982; no flow for many days in 1936-37, 1939-40, 1961-62, 1981.

EXTREMES OUTSIDE PERIOD OF RECORD. --Flood of May 1927 reached a stage of 21.8 ft. Flood in spring of 1933 reached a stage of about 20 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR.—Maximum discharge, 1,270 ft<sup>3</sup>/s at 0045 hours, May 1, gage height, 3.06 ft; minimum daily discharge, 8.0 ft<sup>3</sup>/s, Feb. 2.

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL. AUG SEP 1060 e70 680 160 171 64 46 e35 e13 e12 e10 e270 2 73 48 e40 e8.0 e10 e200 1080 e65 e70 144 172 e13 e35 e10 e150 1100 e60 e90 143 169 63 53 47 e120 1050 e125 e85 154 159 e40 e10 5 50 e130 e80 163 152 e40 e104 e97 e80 129 138 e12 638 140 156 43 45 e30 e11 e9.5 e13 486 60 e65 177 153 8 45 e27 355 42 e95 e9.0 e13 78 44 e11 37 e95 9 43 269 192 156 44 e24 e10 e14 73 e12 188 163 10 42 43 71 207 61 e100 e25 e13 e11 e20 171 177 11 40 45 e25 e17 68 164 64 e125 e13 e11 104 e160 160 201 12 38 49 e26 e14 e11 e17 66 134 137 227 13 39 49 e28 e15 e10 e17 62 e130 160 165 38 47 e28 e10 e16 57 e145 126 176 163 153 15 40 e24 e10 e14 56 e130 142 183 173 115 16 42 e45 e24 e12 e9.5 e13 51 e130 197 171 17 45 e45 e24 e12 e9.0 e12 48 e115 172 237 171 66 18 53 e39 e26 e12 e9.0 e12 51 e110 161 240 153 51 57 e23 e105 135 244 155 19 e40 e12 e9.0 e13 51 20 56 e25 e130 198 161 41 e95 e40 e12 e10 e13 49 e120 171 54 21 e25 e13 e10 e15 e90 144 61 940 37 154 22 57 e50 e23 e13 e10 e20 46 e85 e120 155 e120 158 166 23 53 e50 e21 e12 e12 e50 40 e80 31 157 24 49 e50 e20 e10 e13 e100 35 e75 e140 163 67 157 25 46 e36 e16 e200 34 e75 e180 150 72 e10 e14 57 26 38 e65 e210 154 150 e13 e300 27 e190 154 204 47 45 e25 e11 e15 e12 e400 42 e65 e145 135 223 40 43 e22 e11 e650 56 e60 e14 e11 e120 127 213 35 29 42 e25 e550 663 e60 e11 e15 47 e65 e105 30 e30 e13 e18 e250 912 e70 167 184 31 46 e14 e17 e200 3214 TOTAL 402 9129 3531 4450 5191 1499 1259 762 289 5 3001 3742 167 107 MEAN 48.4 42.0 24.6 13.0 10.3 96.8 125 294 118 144 MAX 73 50 40 18 14 650 912 1100 210 244 223 227 MIN 38 22 11 10 8.0 10 34 60 37 65 129 28 2970 2500 1510 797 574 5950 7420 18110 7000 8830 10300 6370

CAL YR 1988 TOTAL 51483.0 MEAN 141 MAX 1230 MIN 3.0 AC-FT 102100 WTR YR 1989 TOTAL 36469.5 MEAN 99.9 MAX 1100 MIN 8.0 AC-FT 72340

e Estimated

# (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

06438000 BELLE FOURCHE RIVER NEAR ELM SPRINGS, SD--Continued

PERIOD OF RECORD .-- October 1968 to current year.

PERIOD OF DAILY RECORD.--SPECIFIC CONDUCTANCE: November 1974 to September 1981. WATER TEMPERATURE: October 1974 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD .--

SPECIFIC CONDUCTANCE: Maximum daily, 5,000 microsiemens, Jan. 31, Feb. 7-11, 1979; minimum daily,

800 microsiemens, June 19, 1976.
WATER TEMPERATURE: Maximum daily, 33.5°C, June 25, 1977; minimum, 0.0°C on many days during winter periods.

WATER CHALLTY DATA WATER VEAR OCTORED 1988 TO SEPTEMBER 1989

		WATE	R QUALITY	DATA, W	ATER YEA	R OCTOBE	R 1988	TO SE	PTEMBER 1	.989		
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	MG/L A CACO3	T TEMPE ATUR S AIR (DEG	RE AT R WA C) (DI	APER- TURE ATER EG C)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVEI (MG/L)	CENT D SATUR ) ATION
V												
21	1430	46	2700	8.32	20	7	•	0.5	3.9	745	14.4	4 10
N 18	1145	12	3850	7.90	41	5 11	1.5	0.0	0.50			
R										70.5		
29 Y	1330	518	2350	7.90	12	0 13	3.5	8.5	1000	705	10.6	5 9
10	1500	198	1370	8.40	11	8 26	5.0	18.5	260	703	8.7	7 10
L 12	1230	137	2110	8.30	11	9 33	3.5	29.0	18	712		
P	1330											
12	1330	202	2150	8.40	13	8 20	0.5	16.0	13	713	10.1	1 11
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	DIS- SOLVE (MG/L AS MG	DIS- D SOLVE (MG/	ED L SO IA) PER	DDIUM RCENT 1932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	LINITY LAB (MG/L AS CACO3)	
v												
21 N		75	1200	260	140	220		28	3	11	202	1500
18	<1	33	1800	390	210	340		29	3	13	379	2300
9	K140	K6000	670	140	78	260		45	4	8.6	116	1100
0	170	150	500	110	54	120		34	2	7.3	119	580
2	K260	160	940	210	100	140		24	2	13	117	1100
2	K35	К8	900	210	91	130		24	2	9.0	135	1100
I	DATE (N	IDE, RI IS- D DLVED SO MG/L (M S CL) AS	DE, DI IS- SO LVED (M IG/L A IF) SI	ICA, RE S- AT LVED D IG/L S S O2) (	SIDUE S 180 C EG. C T DIS- OLVED MG/L)	OLIDS, UM OF ONSTI- UENTS, DIS- SOLVED (MG/L) 70301)	SOLIDS, DIS- SOLVEI (TONS PER AC-FT) (70303)	D: SOI (TO PI	IDS, GIS- NIT LVED D ONS SO ER (MAY) AS	EN, RITE NI DIS- DLVED S IG/L ( S N) A	GEN, TRATE NO DIS- OLVED S MG/L ( S N) A	NITRO- GEN, D2+NO3 DIS- SOLVED (MG/L AS N)
NOV			2022		20.0	100000						
21. JAN	3	33	0.50	3.3	2610	2310	3.55	32	4 0	.020	2.08	2.10
18	4	8	0.50	3.9	3790	3570	5.15	12	3 0	.030	3.17	3.20
MAR 29	3	32	0.50	9.5	1750	1750	2.38	245	0 0	.140	9.86 1	10.0
MAY 10				0.01	1070	965	1.46			.010		1.10
JUL												
SEP	2	20	1.5	4.0	1840	1660	2.50	68	1 <0	.010		0.290
	1		0.50	4.3	1710	1660	2.33	93:		.010		0.340

# 06438000 BELLE FOURCHE RIVER NEAR ELM SPRINGS, SD--Continued WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	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)
NOV 21	0.100	0.120	0.15	0.60	0.010	<0.010	<0.010	10	5	100
JAN 18	0.180	0.190	0.24	0.60	<0.010	<0.010	<0.010			
MAR 29	0.180	0.220	0.28	2.8	0.990	0.050	0.010	10	3	200
MAY 10	0.050	<0.010		0.40	0.030	0.010	<0.010	<10	11	26
JUL 12 SEP	0.050	0.040	0.05	0.60	0.010	0.020	<0.010			
12	0.040	0.040	0.05	0.50	0.030	<0.010	<0.010	<10	9	34
DATE	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	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)
NOV										
21 JAN	<10	<1	3	<1	1	30	<5	140	30	<0.1
18 MAR										
29 MAY	<10	<1	<1	<1	6	20	<5	150	<10	<0.1
10	<0.5	5	1	<3	4	6	<1	88	1	0.2
12 SEP										
12	<0.5	<1	2	<1	2	85	<1	95	7	
DATE	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)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
NOV										
21 JAN	3	2	5	1.0	3300	<1	<10	3	0.37	98
18 MAR								131	4.2	41
29 MAY	1	6	22	<1.0	1800	<1	<10	591	827	100
10	<10	4	3	<1.0	1100	<6	5	2780	1490	100
12 SEP								89	33	100
12	4	4	3	1.0	2700	<1	23	70	38	100

#### 06439000 CHERRY CREEK NEAR PLAINVIEW, SD

LOCATION.--Lat 44°44'35", long 102°03'11", in SWkNEk sec.16, T.9 N., R.17 E., Meade County, Hydrologic Unit 10120113, on left upstream wingwall of bridge on State Highway 73, 0.2 mi downstream from small right-bank tributary, 6.2 mi downstream from Red Owl Creek, and 11 mi northeast of Plainview.

DRAINAGE AREA. -- 1,190 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year. Monthly discharge only for October and November 1945, published in WSP 1309.

REVISED RECORDS .-- WDR SD-85-1: Location and datum.

GAGE.--Water-stage recorder. Datum of gage is 2,157.91 ft above National Geodetic Vertical Datum of 1929, datum in error since 1945 based on NGVD levels of 1963. Prior to June 8, 1948, nonrecording gage at same site and datum. Prior to Sept. 27, 1985, recording gage at site 100 ft downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years, 46.3 ft<sup>3</sup>/s, 33,540 acre-ft/yr; median of yearly mean discharges, 25 ft<sup>3</sup>/s, 18,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 17,500 ft<sup>3</sup>/s, Apr. 1, 1952, gage height, 22.63 ft; no flow for long periods in each year.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
May 4	1245	*762	*8.53			137.131	,

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

No flow for many days.

DAY   OCT   NOV   DEC   JAN   FEB   MAR   AFR   MAY   JUN   JUL   AUG   SEP				77.			MEAN VALUE	S					
2	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
2	1	.00	.00	.00	.00	.00	.00	96	286	3.3	.00	.00	3.0
3													2.0
4 .00 .00 .00 .00 .00 e.00 .00 \$54 \$590 2.4 .00 .00 .76 \$5 .00 .00 .00 .00 .49 \$5 .00 .00 .00 .00 .00 .49 \$5 .00 .00 .00 .00 .00 .49 \$5 .00 .00 .00 .00 .00 .00 .00 .00 .00 .0													
5 .00 .00 .00 .00 .00 .00 .00 .00 .00 .46 .379 .2.1 .00 .00 .49 6 .00 .00 .00 .00 .00 .00 .00 .39 182 1.5 .00 .00 .00 .27 7 .00 .00 .00 .00 .00 .00 .00 .00 .30 114 1.1 .00 .00 .18 8 .00 .00 .00 .00 .00 .00 .00 .27 9 .00 .00 .00 .00 .00 .00 .00 .27 10 .00 .00 .00 .00 .00 .00 .00 .17 59 .95 .00 .00 .00 .12 9 .00 .00 .00 .00 .00 .00 .00 .17 59 .95 .00 .00 .00 .04 11 .00 .00 .00 .00 .00 .00 .00 .13 42 .69 .00 .00 .00 12 .00 .00 .00 .00 .00 .00 .00 .11 35 .46 .00 .00 .00 13 .00 .00 .00 .00 .00 .00 .00 .11 35 .46 .00 .00 .00 13 .00 .00 .00 .00 .00 .00 .00 .00 .00 .11 35 .46 .00 .00 .00 14 .00 .00 .00 .00 .00 .00 .00 .00 .00 .11 35 .00 .00 .00 15 .00 .00 .00 .00 .00 .00 .00 .00 .00 .0													
6													
7	,	.00	.00	.00	.00	8.00	.00	40	3/3	2.1	.00	.00	.40
8	6	.00	.00	.00	.00	e.00	.00	39	182	1.5	.00	.00	
8	7	.00	.00	.00	.00	e.00	e.00	30	114	1.1	.00	.00	.18
9	8	.00	.00	.00	.00		.00	22	79	. 86	.00	.00	.12
10													
12													
12													
13													
14													
15													
16		.00	.00	.00	.00	e.00	.00	8.4				.00	
17	15	.00	.00	.00	.00	e.00	.00	7.7	22	. 25	.00	.00	.00
17	16	00	00	00	00	e 00	00	7 2	20	18	00	.00	.00
18													
19													
20													
21													
22	20	.00	.00	.00	.00	0.00	.00	4.9	12	.01	.00	.00	.00
23													
24	22	.00	.00	.00	.00	e.00	.00	4.3	11	.00	.00	.00	.00
25 .00 .00 .00 .00 e.00 .00 3.3 6.5 .06 .00 .00 .00 .00 .00 .00 .00 .00 .00	23	.00	.00	.00	.00	e.00	.00	4.2	9.3	.00	.00	.00	.00
25 .00 .00 .00 .00 e.00 .00 3.3 6.5 .06 .00 .00 .00 .00 .00 .00 .00 .00 .00	24	.00	.00	.00	.00	e.00	.00	3.4	7.5	.00	.00	.00	.00
27	25	.00	.00	.00	.00	e.00	.00	3.3	6.5	.06	.00	.00	.00
27	26	00	00	00	00	. 00	5.7	3 8	5.7	0.7	00	506	00
28													
29 .00 .00 .00 .00 51 5.9 4.0 .05 .00 7.8 .00 30 .00 .00 .00 .00 74 30 3.6 .00 .00 .00 7.2 .00 31 .0000 .00 132 3.200 4.5 TOTAL 0.00 0.00 0.00 0.00 0.00 344.10 623.0 2840.6 21.41 0.00 620.50 8.01 MEAN .00 .00 .00 .00 .00 .00 11.1 20.8 91.6 .71 .00 20.0 .27													
30													
31 .0000 .00 132 3.200 4.5 TOTAL 0.00 0.00 0.00 0.00 344.10 623.0 2840.6 21.41 0.00 620.50 8.01 MEAN .00 .00 .00 .00 .00 11.1 20.8 91.6 .71 .00 20.0 .27													
TOTAL 0.00 0.00 0.00 0.00 0.00 344.10 623.0 2840.6 21.41 0.00 620.50 8.01 MEAN .00 .00 .00 .00 .00 11.1 20.8 91.6 .71 .00 20.0 .27													
MEAN .00 .00 .00 .00 .00 11.1 20.8 91.6 .71 .00 20.0 .27	31	.00		.00	.00		132		3.2		.00	4.5	
MEAN .00 .00 .00 .00 .00 11.1 20.8 91.6 .71 .00 20.0 .27	TOTAL	0.00	0.00	0.00	0.00	0.00	344.10	623.0	2840.6	21.41	0.00	620.50	8.01
	MEAN	.00	.00	.00	.00	.00			91.6	.71	.00	20.0	.27
	MAX	.00	.00	.00	.00	.00	132	96	590	3.3	.00	506	3.0
MIN .00 .00 .00 .00 .00 .00 3.3 3.2 .00 .00 .00 .00													
AC-FT .0 .0 .0 .0 .0 683 1240 5630 42 .0 1230 16													

CAL YR 1988 TOTAL 4181.02 MEAN 11.4 MAX 827 MIN .00 AC-FT 8290 WTR YR 1989 TOTAL 4457.62 MEAN 12.2 MAX 590 MIN .00 AC-FT 8840

e Estimated

# 06439300 CHEYENNE RIVER AT CHERRY CREEK, SD (National stream-quality accounting network station)

LOCATION.--Lat 44°35'59", long 101°29'51", in SE%NE% sec.5, T.7 N., R.22 E., Ziebach County, Hydrologic Unit 10120112, on left bank at village of Cherry Creek, 500 ft downstream from Cherry Creek, and 2.1 mi upstream from Plum Creek.

DRAINAGE AREA. -- 23,900 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,702.87 ft above National Geodetic Vertical Datum of 1929.
Prior to Oct. 18, 1960, nonrecording gage and Oct. 19, 1960, to Oct. 29, 1986, at site 0.5 mi downstream at present datum. U.S. Army Corps of Engineers satellite data-collection platform at station.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Angostura Dam 197 mi upstream (see station 06401000) since October 1949 and upstream on Rapid Creek since 1956 and Belle Fourche River since 1952. Flow also affected by diversions for irrigation of about 70,000 acres and return flow from irrigated areas. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--29 years, 824 ft<sup>3</sup>/s, 597,000 acre-ft/yr; median of yearly mean discharges, 740 ft<sup>3</sup>/s, 536,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 55,900 ft<sup>3</sup>/s, May 22, 1982, gage height, 15.77 ft; no flow Jan. 6 to Feb. 2, 1962.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,070 ft<sup>3</sup>/s at 1730 hours, Sept. 22, gage height, 7.11 ft; minimum daily, 35 ft<sup>3</sup>/s, Feb. 3.

DAY   OCT   NOV   DEC   JAN   FEB   MAR   AFR   MAY   JUN   JUL   AUG   SEP				-,			MEAN VALUE	S					
2 222 130 e96 e45 e46 e35 e80 478 2310 83 144 133 166 4 188 131 e98 e46 e35 e80 478 2310 83 144 133 166 5 172 130 e100 e46 e50 e70 423 2680 93 107 121 153 6 159 131 e98 e45 e60 e70 423 2680 93 107 121 153 6 159 131 e98 e45 e60 e70 423 2680 93 107 121 153 6 159 131 e98 e45 e60 e70 e76 318 1240 79 102 139 149 8 144 138 e80 e41 e80 e80 277 835 71 91 128 149 9 143 138 e70 e40 e86 e84 251 e01 88 85 124 156 10 141 138 e68 e45 e80 e90 233 465 77 75 143 166 11 143 138 e68 e45 e80 e90 233 465 77 75 143 166 11 143 138 e68 e52 e84 e100 224 395 68 74 159 204 12 137 138 e70 e60 e94 e200 208 328 61 76 161 552 13 132 141 e70 e64 e90 e500 193 295 67 86 154 563 14 132 144 e66 e66 e86 e84 e1300 179 274 88 213 149 360 15 130 e140 e62 e70 e80 e2000 167 255 121 310 147 285 16 128 e128 e60 e76 e78 e1900 160 320 141 264 152 190 18 133 e110 e62 e88 e74 e1700 158 251 160 284 155 158 19 137 e105 e88 e92 e88 e74 e1700 158 251 160 284 155 158 19 137 e105 e64 e90 e70 e1650 159 292 166 295 164 139 20 211 e100 e62 e88 e76 e1700 163 294 159 336 156 129  21 197 e105 e58 e92 e86 e1700 163 294 159 336 156 129 21 197 e105 e58 e92 e86 e1700 163 294 159 336 156 129 21 197 e105 e58 e92 e86 e90 e1700 163 294 159 336 156 129 21 197 e105 e58 e92 e86 e90 e1700 163 294 159 336 156 129 21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170 22 1175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930 23 156 e110 e50 e86 e90 e102 e900 157 192 163 225 160 1930 24 150 e106 e48 e82 e110 e2600 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 157 93 228 144 143 180 26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 150 27 143 e90 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 135 147 25 146 e100 e45 e80 e105 e2800 155 144 135 157 149 27 143 e90 e45 e80 e70 e70 e70 e70 e70 e70 e70 e70 e70 e7	DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
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9 143 138 e70 e40 e86 e84 251 601 88 85 124 156 10 141 138 e68 e45 e80 e90 233 665 77 75 143 166  11 143 138 e68 e52 e84 e100 224 395 68 74 159 204 12 137 138 e70 e60 e94 e200 208 328 61 76 161 552 13 132 141 e70 e64 e90 e500 193 295 67 86 154 563 14 132 144 e66 e66 e84 e1300 179 274 88 213 149 360 15 130 e140 e62 e70 e80 e2000 167 255 121 310 147 285  16 128 e128 e60 e76 e78 e1900 161 319 125 196 145 227 17 130 e120 e60 e80 e76 e1800 160 320 141 264 152 190 18 133 e110 e62 e88 e74 e1700 158 251 160 284 155 158 19 137 e105 e64 e90 e70 e1650 159 292 166 295 164 139 20 211 e100 e62 e90 e76 e1700 163 294 159 336 156 129  21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170 22 175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930 23 156 e110 e50 e86 e90 e1900 167 165 151 183 150 1710 24 150 e106 e48 e82 e110 e2600 157 93 228 149 150 170 24 150 e106 e48 e82 e110 e2600 157 93 228 149 150 170 25 146 e100 e45 e80 e105 e2600 157 93 228 159 322 149 170 25 146 e100 e45 e80 e105 e2600 157 192 163 225 160 1930 23 156 e110 e50 e86 e90 e1900 167 166 151 183 150 1710 24 150 e106 e48 e82 e110 e2600 157 193 228 149 150 146 306 26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 219 27 143 e90 e45 e90 e102 e900 157 93 228 149 150 146 306 26 143 e94 e47 e84 e105 709 171 85 236 131 189 155 29 134 e92 e45 e98 e92 e80 e102 e900 157 93 228 149 150 146 306 26 143 e94 e48 e80 e106 e 799 551 87 233 126 238 132 30 135 e94 e48 e106 e 799 551 87 233 126 238 133 30 135 e94 e48 e106 e 799 551 87 233 126 238 133 30 135 e94 e48 e106 e 799 551 87 233 126 238 133 30 135 e94 e48 e106 e 799 551 87 233 126 238 133 30 135 e94 e48 e106 e 799 551 87 233 126 238 133 31 130 e e50 e90 e 652 e 87 e 122 203 e  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795 MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123		144	138	e80	e41	e80		277		71	91	128	149
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13 132 141 e70 e64 e90 e500 193 295 67 86 154 563 14 132 144 e66 e66 e84 e1300 179 274 88 213 149 360 15 130 e140 e62 e70 e80 e2000 167 255 121 310 147 285  16 128 e128 e60 e76 e78 e1900 161 319 125 196 145 227 17 130 e120 e60 e80 e76 e1800 180 320 141 264 152 190 18 133 e110 e62 e88 e74 e1700 158 251 160 284 155 158 19 137 e105 e64 e90 e70 e1650 159 292 166 295 164 139 20 211 e100 e62 e90 e76 e1700 163 294 159 336 156 129  21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170 22 175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930 23 156 e110 e54 e90 e82 e1550 195 192 163 225 160 1930 24 150 e106 e48 e82 e110 e2600 155 144 135 157 135 447 25 146 e100 e45 e80 e105 e2800 145 122 149 150 146 306  26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 219 27 143 e90 e45 e90 e102 e900 157 93 228 149 180 28 137 e90 e43 e94 e105 709 171 85 236 131 189 155 29 134 e92 e45 e98 896 192 82 253 132 288 133 30 135 e94 e48 e106 799 551 87 233 126 288 133 30 135 e94 e48 e106 799 551 87 233 126 238 123  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123													
14       132       144       e66       e66       e84       e1300       179       274       88       213       149       360         15       130       e140       e62       e70       e80       e2000       167       255       121       310       147       285         16       128       e128       e60       e76       e78       e1900       160       319       125       196       145       227         17       130       e120       e60       e80       e76       e1800       160       320       141       264       152       190         18       133       e110       e62       e88       e74       e1700       158       251       160       284       155       158         19       137       e105       e64       e90       e70       e1650       159       292       166       295       164       139         20       211       e100       e62       e90       e76       e1700       163       294       159       336       156       129         21       197       e105       e58       e92       e86       e1700       163 <td></td>													
15 130 e140 e62 e70 e80 e2000 167 255 121 310 147 285  16 128 e128 e60 e76 e78 e1900 161 319 125 196 145 227  17 130 e120 e60 e80 e76 e1800 160 320 141 264 152 190  18 133 e110 e62 e88 e74 e1700 158 251 160 284 155 158  19 137 e105 e64 e90 e70 e1650 159 292 166 295 164 139  20 211 e100 e62 e90 e76 e1700 163 294 159 336 156 129  21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170  22 175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930  23 156 e110 e54 e90 e82 e1550 195 192 163 225 160 1930  24 150 e106 e48 e82 e110 e2600 155 144 135 157 135 447  25 146 e100 e45 e80 e105 e2800 145 122 149 150 146 306  26 143 e94 e47 e84 e100 e2000 157 144 135 157 135 447  27 143 e90 e45 e90 e102 e900 157 93 228 142 143 180  28 137 e90 e43 e94 e105 709 171 85 236 131 189 155  29 134 e92 e45 e98 896 192 82 253 132 288 138  30 135 e94 e48 e106 799 551 87 233 126 238 133  10TAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123													
16         128         e128         e60         e76         e78         e1900         161         319         125         196         145         227           17         130         e120         e60         e80         e76         e1800         160         320         141         264         152         190           18         133         e110         e62         e88         e74         e1700         158         251         160         284         155         158           19         137         e105         e64         e90         e76         e1700         163         294         159         336         156         295         164         139           20         211         e100         e62         e90         e76         e1700         163         294         159         336         156         129           21         197         e105         e58         e92         e86         e1650         204         232         159         322         149         170           21         197         e105         e58         e92         e86         e1650         204         232         159         322 </td <td></td>													
17	15	130	e140	e62	e70	e80	e2000	167	255	121	310	147	285
17	16	128	e128	e60	e76	e78	e1900	161	319	125	196	145	227
18       133       e110       e62       e88       e74       e1700       158       251       160       284       155       158         19       137       e105       e64       e90       e70       e1650       159       292       166       295       164       139         20       211       e100       e62       e90       e76       e1700       163       294       159       336       156       129         21       197       e105       e58       e92       e86       e1650       204       232       159       322       149       170         22       175       e110       e54       e90       e82       e1550       195       192       163       225       160       1930         23       156       e110       e50       e86       e90       e1900       167       166       151       183       150       1710         24       150       e106       e48       e82       e110       e2600       155       144       135       157       135       447         25       146       e100       e45       e80       e105       e2800		130	e120	e60	e80	e76	e1800			141	264	152	190
19 137 e105 e64 e90 e70 e1650 159 292 166 295 164 139 20 211 e100 e62 e90 e76 e1700 163 294 159 336 156 129   21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170 22 175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930 23 156 e110 e50 e86 e90 e1900 167 166 151 183 150 1710 24 150 e106 e48 e82 e110 e2600 155 144 135 157 135 447 25 146 e100 e45 e80 e105 e2800 145 122 149 150 146 306   26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 219 27 143 e90 e45 e90 e102 e900 157 93 228 142 143 180 28 137 e90 e43 e94 e105 709 171 85 236 131 189 155 29 134 e92 e45 e98 e94 e105 709 171 85 236 131 189 155 29 134 e92 e45 e98 e96 e105 e2800 145 122 233 126 238 138 30 135 e94 e48 e106 e 896 192 82 253 132 288 138 30 135 e94 e48 e106 e 799 551 87 233 126 238 123 31 130 e e50 e90 e 652 e 87 e 122 203 e TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795 MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123											284		158
20 211 e100 e62 e90 e76 e1700 163 294 159 336 156 129  21 197 e105 e58 e92 e86 e1650 204 232 159 322 149 170  22 175 e110 e54 e90 e82 e1550 195 192 163 225 160 1930  23 156 e110 e50 e86 e90 e1900 167 166 151 183 150 1710  24 150 e106 e48 e82 e110 e2600 155 144 135 157 135 447  25 146 e100 e45 e80 e105 e2800 145 122 149 150 146 306  26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 219  27 143 e90 e45 e90 e102 e900 157 93 228 142 143 180  28 137 e90 e43 e94 e105 709 171 85 236 131 189 155  29 134 e92 e45 e98 896 192 82 253 132 288 138  30 135 e94 e48 e106 799 551 87 233 126 238 123  31 130 e50 e90 652 87 122 203  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MMX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123													
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23	21	197	e105	e58	e92	e86	e1650	204	232	159			170
24     150     e106     e48     e82     e110     e2600     155     144     135     157     135     447       25     146     e100     e45     e80     e105     e2800     145     122     149     150     146     306       26     143     e94     e47     e84     e100     e2000     139     102     211     152     149     219       27     143     e90     e45     e90     e102     e900     157     93     228     142     143     180       28     137     e90     e43     e94     e105     709     171     85     236     131     189     155       29     134     e92     e45     e98      896     192     82     253     132     288     138       30     135     e94     e48     e106      799     551     87     233     126     238     123       31     130      e50     e90      652      87      122     203        TOTAL     4736     3587     2067     2173     2197     30106 <td< td=""><td>22</td><td>175</td><td>e110</td><td>e54</td><td>e90</td><td>e82</td><td>e1550</td><td>195</td><td>192</td><td>163</td><td>225</td><td>160</td><td>1930</td></td<>	22	175	e110	e54	e90	e82	e1550	195	192	163	225	160	1930
24     150     e106     e48     e82     e110     e2600     155     144     135     157     135     447       25     146     e100     e45     e80     e105     e2800     145     122     149     150     146     306       26     143     e94     e47     e84     e100     e2000     139     102     211     152     149     219       27     143     e90     e45     e90     e102     e900     157     93     228     142     143     180       28     137     e90     e43     e94     e105     709     171     85     236     131     189     155       29     134     e92     e45     e98      896     192     82     253     132     288     138       30     135     e94     e48     e106      799     551     87     233     126     238     123       31     130      e50     e90      652      87      122     203        TOTAL     4736     3587     2067     2173     2197     30106 <td< td=""><td>23</td><td>156</td><td>e110</td><td>e50</td><td>e86</td><td>e90</td><td>e1900</td><td>167</td><td>166</td><td>151</td><td>183</td><td>150</td><td>1710</td></td<>	23	156	e110	e50	e86	e90	e1900	167	166	151	183	150	1710
25 146 e100 e45 e80 e105 e2800 145 122 149 150 146 306  26 143 e94 e47 e84 e100 e2000 139 102 211 152 149 219  27 143 e90 e45 e90 e102 e900 157 93 228 142 143 180  28 137 e90 e43 e94 e105 709 171 85 236 131 189 155  29 134 e92 e45 e98 896 192 82 253 132 288 138  30 135 e94 e48 e106 799 551 87 233 126 238 123  31 130 e50 e90 652 87 122 203  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123												135	447
27     143     e90     e45     e90     e102     e900     157     93     228     142     143     180       28     137     e90     e43     e94     e105     709     171     85     236     131     189     155       29     134     e92     e45     e98      896     192     82     253     132     288     138       30     135     e94     e48     e106      799     551     87     233     126     238     123       31     130      e50     e90      652      87      122     203        TOTAL     4736     3587     2067     2173     2197     30106     7766     20026     3916     5173     4780     9795       MEAN     153     120     66.7     70.1     78.5     971     259     646     131     167     154     326       MAX     222     144     100     106     110     2800     551     2680     253     336     288     1930       MIN     128     90     43     40     35     70     139	25												
27     143     e90     e45     e90     e102     e900     157     93     228     142     143     180       28     137     e90     e43     e94     e105     709     171     85     236     131     189     155       29     134     e92     e45     e98      896     192     82     253     132     288     138       30     135     e94     e48     e106      799     551     87     233     126     238     123       31     130      e50     e90      652      87      122     203        TOTAL     4736     3587     2067     2173     2197     30106     7766     20026     3916     5173     4780     9795       MEAN     153     120     66.7     70.1     78.5     971     259     646     131     167     154     326       MAX     222     144     100     106     110     2800     551     2680     253     336     288     1930       MIN     128     90     43     40     35     70     139	26	142	404	-47	-04	-100	-2000	120	102	211	152	140	210
28 137 e90 e43 e94 e105 709 171 85 236 131 189 155 29 134 e92 e45 e98 896 192 82 253 132 288 138 30 135 e94 e48 e106 799 551 87 233 126 238 123 31 130 e50 e90 652 87 122 203  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795 MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123													
29     134     e92     e45     e98      896     192     82     253     132     288     138       30     135     e94     e48     e106      799     551     87     233     126     238     123       31     130      e50     e90      652      87      122     203        TOTAL     4736     3587     2067     2173     2197     30106     7766     20026     3916     5173     4780     9795       MEAN     153     120     66.7     70.1     78.5     971     259     646     131     167     154     326       MAX     222     144     100     106     110     2800     551     2680     253     336     288     1930       MIN     128     90     43     40     35     70     139     82     61     74     120     123													
30 135 e94 e48 e106 799 551 87 233 126 238 123 31 130 e50 e90 652 87 122 203   TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123						1							
31 130 e50 e90 652 87 122 203  TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795  MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326  MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930  MIN 128 90 43 40 35 70 139 82 61 74 120 123													
TOTAL 4736 3587 2067 2173 2197 30106 7766 20026 3916 5173 4780 9795 MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123			e94										
MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123	31	130		e50	e90		652		87		122	203	
MEAN 153 120 66.7 70.1 78.5 971 259 646 131 167 154 326 MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123	TOTAL	4736	3587	2067	2173	2197	30106	7766	20026	3916	5173	4780	9795
MAX 222 144 100 106 110 2800 551 2680 253 336 288 1930 MIN 128 90 43 40 35 70 139 82 61 74 120 123													
MIN 128 90 43 40 35 70 139 82 61 74 120 123													

CAL YR 1988 TOTAL 100066 MEAN 273 MAX 3170 MIN 20 AC-FT 198500 WTR YR 1989 TOTAL 96322 MEAN 264 MAX 2800 MIN 35 AC-FT 191100

e Estimated

#### 06439300 CHEYENNE RIVER AT CHERRY CREEK, SD--Continued (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

PERIOD OF RECORD . -- October 1971 to current year.

PERIOD OF DAILY RECORD . --

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976.

SPECIFIC CONDUCTANCE: January 1975 to September 1976.

WATER TEMPERATURE: January 1975 to September 1976, October 1977 to September 1978.

INSTRUMENTATION. -- Water-quality monitor June 16, 1977, to September 1979.

EXTREMES FOR PERIOD OF DAILY RECORD.-SEDIMENT CONCENTRATION: Maximum daily mean, 66,000 mg/L, May 25, 1976; minimum daily mean, 80 mg/L,

Nov. 15-17, 1972.

SEDIMENT LOAD: Maximum daily, 2,530,000 tons, June 12, 1972; minimum daily, 15 tons, Dec. 14, 1973.
SPECIFIC CONDUCTANCE: Maximum daily, 3,400 microsiemens, Jan. 27, 28, 1975; minimum daily, 620 microsiemens,

WATER TEMPERATURE: Maximum daily, 35.0°C, Aug. 26, 1975; minimum daily, 0.0°C on many days during winter periods.

		WAII	EK QUALIT	I DATA,	WAIER IE	AR OCTOB	K 1988	IU SEP	I EMDER I	909		
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400	MG/L CACO	Y TH TET TEMP! D ATUI AS AII O DEG	RE AT R WA C) (DE	PER- URE TER G C) 010)	TUR- BID- ITY (NTU) (00076)	BARO- METRI PRES- SURE (MM OF HG) (00025	C OXYGEN DIS- SOLVEI (MG/L	CENT D SATUR- ) ATION)
OCT 20	1230	207	2640	8.0	3	91 1	3.5	8.0	97	71	1 10.:	3 94
JAN	1230	46	3190					0.5	12	71	3 13.	1 98
04 APR	1230	40	3190	8.0			1.0	0.5	12	/1	.5 15.	1 90
19 SEP	1200	148	2490	8.03	2 1	.24 20	0.5	12.0	11	72	20 10.	1 100
01	1300	195	2000	8,20	) 1	.03 29	9.0	25.0	170	72	20 7.1	6 98
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVEI (MG/L AS CA (00915	DIS SOLV (MG/	M, SODIO - DIS- ED SOLVO L (MG) IG) AS I	ED /L SO NA) PER	DIUM CENT 932)	SODIUM AD- SORP- TION RATIO	POTAS SIUM DIS- SOLVE (MG/L AS K)	LAB (MG/L AS CACO3	SULFATE DIS- SOLVED (MG/L ) AS SO4)
OCT 20	400	K160	1000	240	100	260		36	4	13	116	1400
JAN 04	кз	K18	1300	310	120	340		37	4	15	235	1700
APR 19	кз	K27	910	210	94	270		39	4	11	125	1200
SEP 01	200	K83	820	190	82	160		30	2	12	99	1100
6.534.4			-			-		70	,A			25.77
D	RI DI SC ATE (M AS	DE, RI S- I DLVED SO IG/L (N	DE, DIS- SOLVED (IMG/L SF) S	LICA, RI IS- A' OLVED I MG/L AS S IO2)	SIDUE 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	PEI DA	DS, G S- NIT VED D NS SO R (M Y) AS	EN, RITE N IS- LVED G/L N)	GEN, IITRATE NO DIS- SOLVED S (MG/L AS N)	NITRO- GEN, D2+NO3 DIS- SOLVED (MG/L AS N)
OCT												12 22
20. JAN	9	7	0.40	2.4	2240	2170	3.05	1250	<0	.010		<0.100
04.	12	0	0.50	9.7	2860	2790	3.89	355	0	.020	1.98	2.00
APR 19.	8	4	0.40	<0.50	2090	1950	2.84	835	<0	.010		<0.100
SEP 01.	2	9	0.50	6.4	1710	1640	2.33	900	<0	.010		<0.100
			50.55		2, 21	27.77	-100					March Control

# 06439300 CHEYENNE RIVER AT CHERRY CREEK, SD--Continued

	NITRO- GEN, AMMONIA TOTAL	NITRO- GEN, AMMONIA DIS- SOLVED	NITRO- GEN, AMMONIA DIS- SOLVED	NITRO- GEN, AM- MONIA + ORGANIC TOTAL	PHOS- PHOROUS TOTAL	PHOS- PHOROUS DIS- SOLVED	PHOS- PHOROUS ORTHO, DIS- SOLVED	ALUM- INUM, DIS- SOLVED	ARSENIC DIS- SOLVED	BARIUM, DIS- SOLVED
DATE	(MG/L AS N) (00610)	(MG/L AS N) (00608)	(MG/L AS NH4) (71846)	(MG/L AS N) (00625)	(MG/L AS P) (00665)	(MG/L AS P) (00666)	(MG/L AS P) (00671)	(UG/L AS AL) (01106)	(UG/L AS AS) (01000)	(UG/L AS BA) (01005)
OCT 20 JAN	0.030	0.030	0.04	0.90	0.020	0.010	<0.010	<10	6	<100
04 APR	0.100	0.100	0.13	0.50	0.050	0.040	0.030	<10	4	100
19 SEP	0.090	0.060	0.08	0.40	0.040	0.040	<0.010	<10	2	100
01	0.180	0.060	0.08	0.90	0.010	<0.010	<0.010	<10	4	110
	BERYL-	CARATIRA	CHRO-						MANGA-	MEDGUDY
DATE	LIUM, DIS- SOLVED	CADMIUM DIS- SOLVED	MIUM, DIS- SOLVED	DIS- SOLVED	COPPER, DIS- SOLVED	IRON, DIS- SOLVED	DIS- SOLVED	DIS- SOLVED	NESE, DIS- SOLVED	MERCURY DIS- SOLVED
DATE	(UG/L AS BE) (01010)	(UG/L AS CD) (01025)	(UG/L AS CR) (01030)	(UG/L AS CO) (01035)	(UG/L AS CU) (01040)	(UG/L AS FE) (01046)	(UG/L AS PB) (01049)	(UG/L AS LI) (01130)	(UG/L AS MN) (01056)	(UG/L AS HG) (71890)
OCT 20	<10	2	2	1	1	<10	<5	150	10	<0.1
JAN 04	<10	<1	2	1	3	20	<5	180	40	<0.1
APR 19	<10	<1	2	<1	4	10	<5	160	20	<0.1
SEP 01	<0.5	<1	1	<3	1	3	<1	110	4	<0.1
	MOLYB- DENUM,	NICKEL,	SELE- NIUM.	SILVER,	STRON- TIUM,	VANA- DIUM,	ZINC,	SEDI-	SEDI- MENT, DIS-	SED. SUSP. SIEVE
DATE	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	DIS- SOLVED (UG/L	MENT, SUS- PENDED	CHARGE, SUS- PENDED	DIAM. Z FINER THAN
	AS MO) (01060)	AS NI) (01065)	AS SE) (01145)	AS AG) (01075)	AS SR) (01080)	AS V) (01085)	AS ZN) (01090)	(MG/L) (80154)	(T/DAY) (80155)	.062 MM (70331)
OCT 20	4	<1	2	1.0	120	<1	<10	549	307	100
JAN 04 APR	4	1	5	1.0	400	2	10	122	15	97
19 SEP	5	7	3	1.0	2700	<1	<10	69	28	98
01	10	2	2	<1.0	2600	<6	14	626	330	100

#### 06439430 COTTONWOOD CREEK NEAR CHERRY CREEK, SD

LOCATION.--Lat 44°40'28", long 101°24'16", in NWkNWkNEk sec.12, T.8 N., R.22 E., Ziebach County, Hydrologic Unit 10120112, on right bank at upstream side of highway bridge, 2.1 mi upstream from mouth, and 6.7 mi northeast of Cherry Creek.

DRAINAGE AREA. -- 120 mi 2, approximately.

PERIOD OF RECORD . -- October 1982 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 1,810 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records poor .

AVERAGE DISCHARGE. -- 7 years, 11.2 ft3/s, 8,110 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 3,640 ft3/s, Mar. 30, 1987, gage height, 12.58 ft; no flow for long periods in each year.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Maximum discharge, 4,200 ft3/s, May 18, 1982, gage height, 13.03 ft, from slope-area measurement of peak flow.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft 3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 26	1730	*68	*4.87				

No flow for many days.

		DISCHARGE,	IN	CUBIC F	EET	PER	SECOND MEA	, WATER AN VALUI	YEAR ES	остові	ER 1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	J	AN		FEB	MAR		APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00		00		.00	.00	3	. 8	1.5	.00	.00	.00	.00
	.00	.00	.00		00		.00	.00		. 8	.69	.00	.00	.00	.00
2 3															.00
	.00	.00	.00		00		.00	.00		. 4	.20	.00	.00	.00	
4	.00	.00	.00		00		.00	.00		. 1	.09	.00	.00	.00	.00
5	.00	.00	.00		00		.00	.00	1	. 5	.03	.00	.00	.00	.00
6	.00	.00	.00		00		.00	.00		. 88	.00	.00	.00	.00	.00
7	.00	.00	.00		00		.00	.00		.38	.00	.00	.00	.00	.00
8	.00	.00	.00		00		.00	.00		.08	.00	.00	.00	.00	.00
9	.00	.00	.00		00		.00	.00		.01	.00	.00	.00	.00	.00
10	.00														.00
10	.00	.00	.00		00		.00	.27		. 02	.00	.00	.00	.00	.00
11	.00	.00	.00		00		.00	2.2		.00	.00	.00	.00	.00	.00
12	.00	.00	.00	h S	00		.00	1.6		.00	.00	.00	.00	.00	.00
13	.00	.00	.00		00		.00	1.6		.00	.00	.00	.00	.00	.00
14	.00	.00	.00		00		.00	1.6		.00	.00	.00	.00	.00	.00
15												.00		.00	.00
15	.00	.00	.00		00		.00	.32		.00	.00	.00	.00	.00	.00
16	.00	.00	.00		00		.00	.00		.00	.00	.00	.00	.00	.00
17	.00	.00	.00	h .	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	.00	.00	.00	.00
20	.00	.00	.00		00		.00	.00		.00	.00	.00	.00	.00	.00
20	.00	.00	.00	•	UU		.00	.00		.00	.00	.00	.00	.00	.00
21	.00	.00	.00		00		.00	.00		.00	.00	.00	.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	.96		.00	.00	.00	.00	.00	.00
25	.00	.00	.00									.00	.00	.00	.00
45	.00	.00	.00		00		.00	4.3		.00	.00	.00	.00	.00	.00
26	.00	.00	.00		00		.00	24		.00	.00	.00	.00	.00	.00
27	.00	.00	.00		00		.00	25		.00	.00	.00	.00	.00	.00
28	.00	.00	.00		00		.00	15		. 5	.00	.00	.00	.00	.00
29	.00	.00	.00		00			11		2	.00	.00	.00	.00	.00
30	.00	.00	.00		00					9	.00	.00	.00	.00	.00
								8.8							.00
31	.00		.00		00			5.5			.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.	00	(	0.00 1	102.15	19	. 57	2.51	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00		00		.00	3.30		65	.081	.00	.00	.00	.00
MAX	.00	.00	.00		00		.00	25		3.8	1.5	.00	.00	.00	.00
MIN	.00	.00	.00		00		.00	.00		.00	.00	.00	.00	.00	.00
															.00
AC-FT	.0	.0	.0		.0		. 0	203		39	5.0	.0	.0	.0	.0

TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT TOTAL 124.23 MEAN .34 MAX 25 MIN .00 AC-FT CAL YR 1988 WTR YR 1989 MIN .00 AC-FT 246

#### MISSOURI RIVER MAIN STEM

#### 06439980 LAKE OAHE NEAR PIERRE, SD

LOCATION.--Lat 44°27'30", long 100°23'29", in NE's 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 mi<sup>2</sup>, 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, 1958, 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 ft<sup>3</sup>/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. -- Records of elevation and contents provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 22,764,000 acre-ft, May 14, 1986, affected by wind; minimum since initial filling, 12,619,000 acre-ft, Sept. 30, 1989.

EXTREMES FOR CURRENT YEAR. -- Maximum contents, 15,161,000 acre-ft, Apr. 9; minimum contents, 12,619,000 acre-ft, Sept. 30.

REVISIONS.--The monthend elevation for September in water 1988 has been revised to 1,592.78 ft. This figure supersedes that published in the report for 1988.

						Da	te							Elevation (feet)	Contents (acre-feet)	Change in conten (acre-feet)
Sept.	30													1,592.78	14,920,000	-
Oct.														1,590.31	14,276,000	-644.000
lov.	30													1,588.55	13,905,000	-371,000
ec.	31													1,589.09	13,988,000	+83,000
CAI	. YR	19	88											-	-	-4,116,000
an.	31													1,589.52	14,072,000	+84,000
eb.	29													1,591.20	14,523,000	+451,000
ar.														1.593.17	15,021,000	+498.000
pr.	30													1,592.53	14,857,000	-164,000
ay	31													1,590.85	14,433,000	-424.000
une	30													1,589.28	14,065,000	-368,000
uly	31													1.587.53	13,613,000	-452,000
ug.	31													1,584.72	12,912,000	-701,000
ept.	30													1,583,20	12,619,000	-293,000
WTI	R YR	19	989												-	-2.301.000

#### MISSOURI RIVER MAIN STEM

#### 06440000 MISSOURI RIVER AT PIERRE, SD

#### STAGE RECORDS

LOCATION.--Lat 44°22'25", long 100°22'22" in SE½ sec.21, T.5 N., R.31 E., Stanley County, Hydrologic Unit 10140101, near right bank on downstream side of pier of Dakota Minnesota and Eastern Railroad bridge, 1.3 mi upstream from Bad River, 5.8 mi downstream from Oahe Dam, and at mile 1,066.5.

PERIOD OF RECORD. --October 1929 to September 1965, October 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,414.26 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 11, 1932, chain gage at same site at datum 2.00 ft higher.

REMARKS.--Records good. Stage regulated by Oahe Reservoir. Gage heights for period of October 1965 to September 1988 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

DEC JAN FEB MAR APR MAY JUN

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2	8.05	8.29	6.83	7.79	9.26	9.52	6.52	9.04	8.86	9.26	9.63	8.99
2	8.08	8.07	6.62	7.87	10.13	10.19	6.65	8.91	9.36	9.13	9.87	8.70
3	8.83	8.40	6.55	8.03	11.84	10.00	7.03	9.22	8.45	9.52	9.45	7.75
4	8.60	8.88	6.62	8.05	11.38	8.82	7.27	9.14	7.92	9.23	9.64	8.01
5	8.59	8.79	7.18	8.72		7.95	6.86	8.75	8.85	9.78	9.05	8.86
6	8.00	8.79	7.08	9.08		9.37	7.14	8.50	9.33	9.04	8.62	8.95
7	7.49	9.15	7.54	7.26	10.12	8.45	7.79	8.41	9.14	9.11	9.32	8.61
8	7.73	9.72	7.15	7.92	9.06	7.90	7.38	9.74	8.52	9.58	10.14	8.58
9	7.31	9.54	7.37	8.84	8.96	7.52	6.74	9.20	8.31	8.87	9.97	7.62
10	8.01	9.68	7.27	8.62	9.27	7.71	7.95	9.16	8.43	9.85	10.05	7.71
11	7.80	9.36	7.73	8.45	9.19	7.69	8.09	9.41	8.25	9.48	10.08	7.96
12	8.22	8.44	7.49	7.98	8.04	7.48	8.15	8.86	8.94	9.35	9.36	7.40
13	8.05	8.02	7.35	7.85	9.23	8.94	8.11	8.49	8.72	8.35	8.58	6.72
14	7.60	8.43	7.74	7.65	7.93	9.13	8.14	7.87	8.43	7.78	9.37	6.54
15	7.63	7.58	7.78	7.22	7.98	7.77	8.09	9.43	8.53	8.04	10.19	6.71
16	7.82	6.76	7.34	8.08	8.91	7.29	7.34	9.58	8.80	8.48	9.89	6.99
17	8.10	6.96	7.62	7.99	8.50	7.60	9.43	9.05	8.16	9.32	10.05	7.26
18	8.18	6.84	7.21	7.80	7.88	7.00	8.83	9.17	8.10	9.12	10.45	8.01
19	8.61	6.29	7.71	7.31	7.77	6.62	8.58	9.22	9.29	8.49	9.46	7.25
20	8.11	6.69	7.65	7.95	7.99	7.31	8.51	8.99	8.97	9.12	8.97	7.30
21	7.94	6.67	7.88	7.72	7.89	6.93	9.25	8.42	9.04	9.02	9.94	7.26
22	7.78	6.40	7.38	7.43	7.52	6.45	8.37	9.67	8.68	8.77	10.22	6.70
23	7.10	6.41	7.24	8.44	8.16	6.46	8.56	9.49	8.75	8.75	10.13	6.78
24	8.33	5.77	6.88	8.15	6.88	6.31	9.32	8.86	8.60	9.77	10.76	7.11
25	8.34	6.07	7.59	8.30	6.98	6.69	9.37	8.73	8.46	9.85	9.77	7.62
26	8.55	6.03	7.41	7.23	6.75	6.57	9.35	9.11	9.66	9.63	9.30	7.92
27	7.81	4.92	7.87	6.98	8.74	6.90	9.73	9.20	9.43	9.41	9.28	7.99
28	8.02	7.72	7.70	7.91	8.77	6.68	8.71	8.86	9.73	9.25	9.61	8.10
29	8.31	7.51	7.47	7.29		7.45	7.81	9.19	9.16	9.22	9.73	8.35
30	8.17	7.25	6.95	7.34		6.67	8.16	9.04	9.16	9.13	10.18	8.45
31	7.97		7.38	7.73		6.37		8.44		9.47	9.33	
MEAN	8.04	7.65	7.34	7.90		7.67	8.11	9.00	8.80	9.13	9.69	7.74
MAX	8.83	9.72	7.88	9.08		10.19	9.73	9.74	9.73	9.85	10.76	8.99
MIN	7.10	4.92	6.55	6.98		6.31	6.52	7.87	7.92	7.78	8.58	6.54
LITTA	7.10	4.34	0.55	0.50		0.31	0.32	1.01	1.54	1.70	0.50	0.54

168 BAD RIVER BASIN

# 06440200 SOUTH FORK BAD RIVER NEAR COTTONWOOD, SD (Formerly published as Buffalo Creek near Cottonwood)

LOCATION.--Lat 43°53'08", long 101°46'00", in NE\SW\SE\sec.7, T.1 S., R.20 E., Jackson County, Hydrologic Unit 10140102, on right bank at upstream side of bridge on old U.S. Highway 16, 1.0 mi above confluence with Cottonwood Creek, and 7.0 mi east of Cottonwood.

DRAINAGE AREA. -- 250 mi 2.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. --October 1954 to September 1960 (discharge measurements only), October 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,242.96 ft above National Geodetic Vertical Datum of 1929.

October 1954 to September 1960, nonrecording gage at same site at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 604 ft<sup>3</sup>/s, Sept. 22, 1989, gage height, 8.52 ft; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 50 ft 3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 11 Mar. 24	1115 1500	315 73	7.53 5.97	Sept. 22	1830	*604	*8.52

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

			,		i	MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	.02	.01	.00	.00	e.00	.73	13	.03	.00	.00	.00
2	.00	.02	.01	.00	.00	e.02	.54	5.0	.03	.00	.00	.00
3	.00	.02	.01	.00	.00	e.06	.45	6.2	.03	.00	.00	.00
4	.00	.02	.01	.00	.00	e.15	.35	4.3	.03	.00	.00	.00
5	.00	.02	.01	.00	.00	e.40	.27	3.0	.02	.00	.00	.00
	.00	00	01	00	00		21	02	.02	.00	.00	.00
6		.02	.01	.00	.00	e1.1	.21	. 93				
7	.00	.02	.00	.00	.00	e2.7	. 19	. 47	.01	.00	.00	.00
8	.00	.01	.00	.00	.00	e6.8	.15	.29	.01	.00	.00	.00
9	.00	.01	.00	.00	.00	18	. 12	. 16	.01	3.9	.00	.00
10	.00	.01	.00	.00	.00	55	. 10	. 12	.01	1.6	.00	.00
11	.00	.01	.00	.00	.00	85	.10	.09	.01	.37	.00	.00
12	.00	.01	e.01	.00	.00	23	.09	.06	.01	.15	.00	.00
13	.00	.01	e.01	.00	.00	24	.09	.11	.01	.15	.00	2.6
14	.00	.01	e.00	.00	.00	8.0	.07	.11	.01	.08	.00	2.6
15	.00	.00	.00	.00	.00	11	.07	.11	.01	.06	.00	. 97
16	.00	.00	.00	.00	.00	13	.08	3.5	.01	.04	.00	.40
17	.00	.00	e.00	.00	.00	4.7	.08	2.8	.03	.03	.00	.32
18	.00	.00			.00			1.1	.02	.03	.00	.21
			e.01	.00		7.5	.08					.16
19	.00	e.00	e.01	.00	.00	7.5	.08	. 66	.01	.02	.00	
20	.00	e.00	.01	.00	.00	5.6	.08	. 23	.00	.00	.00	. 27
21	.00	e.00	e.01	.00	.00	3.4	.07	.27	.00	.00	.00	2.3
22	.00	e.00	.00	.00	.00	3.4	.07	. 18	.00	.00	.00	194
23	.00	e.00	.00	.00	.00	7.6	.07	.10	.02	.00	.00	68
24	.01	e.00	.00	.00	.00	31	.07	.08	.03	.00	.00	9.1
25	.02	e.00	.00	.00	.00	14	.07	.05	.03	.00	.00	3.2
26	.01	e.00	.00	.00	.00	6.1	.07	.04	.02	.00	.00	2.3
27	.02	.00	.00	.00	.00	3.1	.10	.03	.02	.00	.00	2.3
28	.02	.00	.00	.00	.00	2.8	2.3	.03	.01	.00	.00	1.2
29	.02	.01	.00	.00		2.9	8.7	.02	.00	.00	.00	. 62
30	.01	.01	.00	.00		1.6	15	.03	.00	.00	.00	.40
		.01					13			.00	.00	.40
31	.02		.00	.00		. 97		.03		.00	.00	
TOTAL	0.15	0.23	0.12	0.00	0.00	350.40	30.45	43.10	0.45	6.43	0.00	290.95
MEAN	.005	.008	.004	.00	.00	11.3	1.01	1.39	.015	.21	.00	9.70
MAX	.02	.02	.01	.00	.00	85	15	13	.03	3.9	.00	194
MIN	.00	.00	.00	.00	.00	.00	.07	.02	.00	.00	.00	.00
AC-FT	.3	.5	.2	.0	.0	695	60	85	.9	13	. 0	577
				• •						150	7,20	

WTR YR 1989 TOTAL 722.28 MEAN 1.98 MAX 194 MIN .00 AC-FT 1430

e Estimated

# 06440200 SOUTH FORK BAD RIVER NEAR COTTONWOOD, SD--Continued WATER-QUALITY RECORDS

PERIOD OF RECORD. -- October 1988 to September 1989.

REMARKS. -- Sediment discharge measurements only.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
MAR						
13	1350	34	2.0	7290	669	100
28	1400	4.0	8.0	6330	68	
MAY						
15	1215	0.08	20.0	54	0.01	
JUL						
14	1145	0.08	20.5	218	0.05	
SEP						
21	1500	1.6	11.0	20900	90	
23	1055	104	11.0	16500	4630	100

#### 06441000 BAD RIVER NEAR MIDLAND, SD

LOCATION.--Lat 44°04'01", long 101°09'36", in NEkNWk sec.7, T.1 N., R.25 E., Haakon County, Hydrologic Unit 10140102, on right bank at downstream side of bridge on State Highway 63, 0.4 mi southwest of Midland, 2.0 mi upstream from Mitchell Creek, and 3.7 mi upstream from Ash Creek.

DRAINAGE AREA. -- 1,460 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1945 to current year. Prior to February 1946 monthly discharge only, published in WSP 1309.

REVISED RECORDS. -- WSP 2117: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,849.14 ft above National Geodetic Vertical Datum of 1929. Prior to Feb. 21, 1961, nonrecording gage, and Feb. 21, 1961, to June 14, 1967, water-stage recorder at site 4.2 mi downstream at datum 15.72 ft lower. June 15 to July 26, 1967, nonrecording gage at site 30 ft upstream and July 27, 1967, to June 14, 1971, water-stage recorder at site 60 ft upstream, both at present datum.

REMARKS.--Records fair except for estimated daily discharges, Mar. 13, 14, which are poor. Only daily discharges above 100 ft<sup>3</sup>/s are being published. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 29,400 ft<sup>3</sup>/s, June 15, 1967, gage height, 24.44 ft, from floodmarks, 20.10 ft, from floodmarks, at former site and datum, from rating curve extended above 16,000 ft<sup>3</sup>/s; no flow for many days in each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 24	1100	*379	7.27				

No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

Daily discharge, in cubic feet per second, above 100 ft<sup>3</sup>/s are given herewith:

Mar.	9	146	Mar. 1	2	104	Mar.	14	e110
Mar.	10	133	Mar. 13	3	e179	Sept.	24	154
Mar	11	100						

e Estimated

## 06441500 BAD RIVER NEAR FORT PIERRE, SD

LOCATION.--Lat 44°19'36", long 100°23'02", in NWkNWk sec.10, T.4 N., R.31 E., Stanley County, Hydrologic Unit 10140102, on right bank at downstream side of highway bridge, 2.1 mi south of Fort Pierre, 4.3 mi downstream from Willow Creek, and 6.0 mi upstream from mouth.

DRAINAGE AREA. -- 3, 107 mi 2.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- August 1928 to current year. Monthly discharge only for July 1932 to February 1934, published in WSP 1309.

REVISED RECORDS. -- WSP 786: Drainage area. WSP 856: 1929(M), 1937.

GAGE. --Water-stage recorder. Datum of gage is 1,427.83 ft above National Geodetic Vertical Datum of 1929.

Prior to July 10, 1951, nonrecording gage at same site and datum. U.S. Weather Service gage-height telemeter and U.S. Army Corps of Engineers satellite data-collection platform at station.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--61 years, 151 ft<sup>3</sup>/s, 109,400 acre-ft/yr; median of yearly mean discharges, 99 ft<sup>3</sup>/s, 71,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 43,800 ft<sup>3</sup>/s, June 18, 1967, gage height, 29.55 ft; no flow for long periods in each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1927 reached a stage of 30.89 ft, from floodmarks, discharge, about 55,000 ft<sup>3</sup>/s. Flood in July 1905 reached a stage about 2 ft higher than that in April 1927.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 2,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	0100	*1,210	*8.39				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

		DISCHARGE	, IN CU	BIC FEET I		MEAN VALU		OPER 1900	IO SEPIEM	DEK 1909		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	39	58	e.04	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	28	33	e.04	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	22	20	e.04	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	16	24	e.02	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	12	18	e.02	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	9.5	14	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	7.9	9.5	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	6.2	10	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	e4.5	5.0	10	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	e130	4.0	7.9	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	792	3.6	5.7	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	904	3.2	4.8	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	376	3.0	5.0	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	415	2.4	4.4	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	205	2.2	3.4	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	97	1.6	3.0	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e65	1.6	3.0	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	34	1.5	2.8	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	e39	1.1	2.8	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	45	1.1	2.2	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	42	.88	1.4	.00	.00	.00	447
22	.00	.00	.00	.00	.00	35	.60	1.0	.00	.00	.00	505
23	.00	.00	.00	.00	.00	81	.48	.68	.00	.00	.00	155
24	.00	.00	.00	.00	.00	289	.48	.60	.00	.00	.00	33
25	.00	.00	.00	.00	.00	295	.42	.60	.00	.00	.00	12
26	.00	.00	.00	.00	.00	435	.18	e.24	.00	.00	.00	6.5
27	.00	.00	.00	.00	.00	295	.24	e.20	.00	.00	.00	3.4
28	.00	.00	.00	.00	.00	170	167	e.16	.00	.00	.00	1.5
29	.00	.00	.00	.00		139	373	e.12	.00	.00	.00	.60
30	.00	.00	.00	.00		89	152	e.08	.00	.00	.00	.30
31	.00		.00	.00		57		e.06		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	5033.50	866.18	246.64	0.16	0.00	0.00	1164.30
MEAN	.00	.00	.00	.00	.00	162	28.9	7,96	.005	.00	.00	38.8
MAX	.00	.00	.00	.00	.00	904	373	58	.04	.00	.00	505
MIN	.00	.00	.00	.00	.00	.00	.18	.06	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	9980	1720	489	.3	.0	.0	2310
				. •	. 0	5550	1,20	100				

CAL YR 1988 TOTAL 3218.36 MEAN 8.79 MAX 511 MIN .00 AC-FT 6380 WTR YR 1989 TOTAL 7310.78 MEAN 20.0 MAX 904 MIN .00 AC-FT 14500

e Estimated

#### 06441500 BAD RIVER NEAR FORT PIERRE, SD--Continued

#### WATER-OUALITY RECORDS

PERIOD OF RECORD. --October 1945 to September 1953, October 1971 to current year.

PERIOD OF DAILY RECORD . --

SUSPENDED-SEDIMENT DISCHARGE: October 1971 to current year.

WATER TEMPERATURE: October 1972 to June 1983.

REVISED RECORDS. -- WDR SD-81-1: 1979-80.

REMARKS.--Records fair. No flow Oct. 1 to Mar. 8, June 6 to Sept. 20. Flow affected by ice Mar. 9, 10. Sediment-discharge records prior to Oct. 1, 1971, on file in the District office, U.S. Army Corps of Engineers, Omaha, NE.

EXTREMES FOR PERIOD OF DAILY RECORD .--

SEDIMENT CONCENTRATION: Maximum daily mean, 124,000 mg/L, July 17, 1981; minimum daily mean, 0 mg/L on many days each year.

SEDIMENT LOAD: Maximum daily, 949,000 tons, May 14, 1982; minimum daily, 0 ton on many days each year.

EXTREMES FOR CURRENT YEAR . --

SEDIMENT CONCENTRATION: Maximum daily mean, 60,800 mg/L, Sept. 22; minimum daily mean, 0 mg/L on many days. SEDIMENT LOAD: Maximum daily, 82,900 tons, Sept. 22; minimum daily, 0 ton on many days.

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		MEAN			MEAN		MEAN			
DAY	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	
		OCTOBER			NOVEMBER		i	DECEMBER		
1	.00	0	.00	.00	0	.00	.00	0	.00	
2	.00	ő	.00	.00	ő	.00	.00	ő	.00	
3	.00	ő	.00	.00	ŏ	.00	.00	ő	.00	
4	.00	ŏ	.00	.00	ő	.00	.00	ő	.00	
5	.00	ŏ	.00	.00	ő	.00	.00	ő	.00	
6	.00	0	.00	.00	0	.00	.00	0	.00	
7	.00	0	.00	.00	0	.00	.00	0	.00	
8	.00	0	.00	.00	0	.00	.00	0	.00	
9	.00	0	.00	.00	0	.00	.00	0	.00	
10	.00	0	.00	.00	0	.00	.00	0	.00	
11	.00	0	.00	.00	0	.00	.00	0	.00	
12	.00	0	.00	.00	0	.00	.00	0	.00	
13	.00	0	.00	.00	0	.00	.00	0	.00	
14	.00	0	.00	.00	0	.00	.00	0	.00	
15	.00	. 0	.00	.00	0	.00	.00	0	.00	
16	.00	0	.00	.00	0	.00	.00	0	.00	
17	.00	0	.00	.00	0	.00	.00	0	.00	
18	.00	0	.00	.00	0	.00	.00	0	.00	
19	.00	0	.00	.00	0	.00	.00	0	.00	
20	.00	0	.00	.00	0	.00	.00	0	.00	
21	.00	0	.00	.00	0	.00	.00	0	.00	
22	.00	0	.00	.00	0	.00	.00	0	.00	
23	.00	0	.00	.00	0	.00	.00	0	.00	
24	.00	0	.00	.00	0	.00	.00	0	.00	
25	.00	0	.00	.00	0	.00	.00	0	.00	
26	.00	0	.00	.00	0	.00	.00	0	.00	
27	.00	0	.00	.00	0	.00	.00	0	.00	
28	.00	0	.00	.00	0	.00	.00	0	.00	
29	.00	0	.00	.00	0	.00	.00	0	.00	
30	.00	0	.00	.00	0	.00	.00	0	.00	
31	.00	0	.00				.00	0	.00	
TOTAL	0.00		0.00	0.00		0.00	0.00		0.00	

06441500 BAD RIVER NEAR FORT PIERRE, SD--Continued
SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		JANUARY			FEBRUARY			MARCH	
1 2 3 4 5	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
6 7 8 9	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 e4.5 e130	0 0 200 350 6110	.00 .00 .00 4.3 2140
11 12 13 14 15	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	792 904 376 415 205	12200 15800 12700 16300 7020	26100 38600 12900 18300 3890
16 17 18 19 20	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	97 e65 34 e39 45	2870 1080 300 380 590	752 190 28 40 72
21 22 23 24 25	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00	42 35 81 289 295	200 181 580 8720 12000	23 17 127 6800 9560
26 27 28 29 30 31	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00 .00	.00 .00 .00	0 0 	.00 .00 .00	435 295 170 139 89 57	16600 14300 8260 7430 4680 1430	19500 11400 3790 2790 1120 220
TOTAL	0.00		0.00	0.00		0.00	5033.50		158363.30
		APRIL			MAY			JUNE	
1 2 3 4 5	39 28 22 16 12	680 320 150 81 78	72 24 8.9 3.5 2.5	58 33 20 24 18	3260 780 298 252 142	511 69 16 16 6.9	e.04 e.04 e.02 e.02	34 39 44 46 48	.00 .00 .00 .00
6 7 8 9 10	9.5 7.9 6.2 5.0 4.0	60 48 36 40 43	1.5 1.0 .60 .54	9.5 10 10 7.9	118 90 167 72 115	4.5 2.3 4.5 1.9 2.5	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
11 12 13 14 15	3.6 3.2 3.0 2.4 2.2	38 45 63 61 78	.37 .39 .51 .40	5.7 4.8 5.0 4.4 3.4	76 78 80 81 81	1.2 1.0 1.1 .96	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
16 17 18 19 20	1.6 1.6 1.5 1.1	64 52 43 39 58	.28 .22 .17 .12 .17	3.0 3.0 2.8 2.8 2.2	72 112 73 129 66	.58 .91 .55 .98 .39	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
21 22 23 24 25	.88 .60 .48 .48	77 88 77 66 50	.18 .14 .10 .09	1.4 1.0 .68 .60	60 56 64 70 75	.23 .15 .12 .11	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
26 27 28 29 30 31	.18 .24 167 373 152	40 30 8520 17800 10400	.02 .02 3840 17900 4270	e.24 e.20 e.16 e.12 e.08	50 32 40 48 72 53	.03 .02 .02 .02 .02	.00 .00 .00 .00	0 0 0 0	.00 .00 .00 .00
TOTAL	866.18		26128.70	246.64		643.86	0.16		0.00

e Estimated

06441500 BAD RIVER NEAR FORT PIERRE, SD--Continued

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		MEAN			MEAN			MEAN	
DAY	MEAN DISCHARGE (CFS)	CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
	,,,,,	JULY	(10110, 1111)	(0.0)	AUGUST	(101.0, 111.0,		EPTEMBER	,,
		JULI			AUGUST		5.	EFIEMBER	
1	.00	0	.00	.00	0	.00	.00	0	.00
2	.00	0	.00	.00	0	.00	.00	0	.00
3	.00	0	.00	.00	0	.00	.00	0	.00
4	.00	0	.00	.00	0	.00	.00	0	.00
5	.00	0	.00	.00	0	.00	.00	0	.00
6	.00	0	.00	.00	0	.00	.00	0	.00
7	.00	0	.00	.00	0	.00	.00	0	.00
8	.00	0	.00	.00	0	.00	.00	0	.00
9	.00	0	.00	.00	0	.00	.00	0	.00
10	.00	0	.00	.00	0	.00	.00	0	.00
11	.00	0	.00	.00	0	.00	.00	0	.00
12	.00	0	.00	.00	0	.00	.00	0	.00
13	.00	0	.00	.00	0	.00	.00	0	.00
14	.00	0	.00	.00	0	.00	.00	0	.00
15	.00	0	.00	.00	0	.00	.00	0	.00
16	.00	0	.00	.00	0	.00	.00	0	.00
17	.00	0	.00	.00	0	.00	.00	0	.00
18	.00	0	.00	.00	0	.00	.00	0	.00
19	.00	0	.00	.00	0	.00	.00	0	.00
20	.00	0	.00	.00	0	.00	.00	0	.00
21	.00	0	.00	.00	0	.00	447	35800	43200
22	.00	0	.00	.00	0	.00	505	60800	82900
23	.00	0	.00	.00	0	.00	155	29900	12500
24	.00	0	.00	.00	0	.00	33	5900	526
25	.00	0	.00	.00	0	.00	12	450	15
26	.00	0	.00	.00	0	.00	6.5	300	5.3
27	.00	0	.00	.00	0	.00	3.4	200	1.8
28	.00	0	.00	.00	0	.00	1.5	. 80	.32
29	.00	0	.00	.00	. 0		.60	50	.08
30	.00	0	.00	.00	0	.00	.30	20	.02
31	.00	0	.00	.00	0	.00			
TOTAL	0.00		0.00	0.00		0.00	1164.30		139148.52

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR					
11	1315	727	2.5	11700	100
20	1445	52	0.0	728	100
31	1450	54	11.5	1120	100
JUN					
01	1025	0.02	15.0	90	
SEP					
21	1235	878	12.0	49000	100

#### MISSOURI RIVER MAIN STEM

## 06441590 MISSOURI RIVER AT LA FRAMBOISE ISLAND, AT PIERRE, SD

#### STAGE RECORDS

LOCATION.--Lat 44°21'07", long 100°21'31", in NWkSWkNEk sec.34, T.110 N., R.79 W., Hughes County, Hydrologic Unit 10140101, on left bank of La Framboise Island Recreation Area, 0.2 mi downstream from Bad River, 1.5 mi downstream from U.S. Highways 14 and 83, 7.8 mi downstream from Oahe Dam, and at mile 1,064.5.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE. -- Water-stage recorder. Datum of gage is 1,414.61 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Stage regulated by Oahe Reservoir. Gage heights prior to October 1988 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT,	IN FEET,		AR OCTOBER VALUES	1988 TO	SEPTEMBER	1989
DEC	JAN	FEB	MAR	APR	MAY 3	JUN

OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
21.53	21.90			22.75	23.06	20.27	22.55	22.30	22.66	23.07	22.73
21.66	21.72										22.50
	21.90										21.71
											21.96
22.10	22.10			21.52	21.81	20.63	22.23	22.39	23.16		22.72
21.57	22.29			23.38	23.01	20.82	21.95	22.77	22.45		22.71
21.09	22.63			23.05	22.19	21.32	21.99	22.63	22.50		22.41
21.27	23.13			22.58	21.65	21.04	23.07	22.01	22.89		22.34
21.01	22.92			22.48	21.27	20.58	22.74	21.82	22.35		21.49
21.60	23.01			22.78	21.41	21.66	22.64	21.95	23.28		21.70
21.44	22.80			22.68	21.38	21.69	22.90	21.85	22.94		21.91
	21.91			21.71	21.25	21.81	22.42	22.44	22.77		21.44
21.61	21.69			22.91	22.52	21.68	22.03	22.18	21.91		20.86
21.17	22.18		21.31	21.73	22.64	21.69	21.53	22.01	21.42	23.94	20.68
21.19	21.26		21.02	21.73	21.54	21.69	22.86	22.04	21.57	23.88	20.78
21.46	20.53		21.76	22.56	21.09	21.07	23.03	22.27	22.06	23.63	21.02
	20.79		21.65	22.17	21.33	22.84	22.60	21.62	22.81	23.76	21.37
21.75	20.62		21.44	21.59	20.76	22.33	22.63	21.67	22.57	24.11	22.01
	20.17		20.93	21.50	20.50	22.05	22.66	22.74	22.02	23.18	21.37
21.61	20.55		21.55	21.75	21.08	22.00	22.43	22.41	22.54	22.81	21.41
21.45	20.54		21.33	21.63	20.73	22.54	22.01	22.41	22.44	23.68	21.30
	20.29		21.20	21.28	20.34	21.92	23.09	22.10	22.23	23.91	20.80
20.78			22.10	21.86	20.32	22.03	22.97	22.15	22.27	23.82	20.86
21.91			21.81	20.70	20.22	22.72	22.32	22.05	23.19	24.40	21.14
21.86			21.90	20.76	20.54	22.77	22.17	21.95	23.24	23.50	21.60
22.08			20.96	20.60	20.47	22.77	22.48	23.03	23.01	23.03	21.92
21.20			20.67	22.36	20.70	23.15	22.59	22.82	22.81	23.11	21.90
21.48			21.45	22.40	20.52	22.20	22.41	23,10	22.64	23.41	21.95
21.85			21.06		21.06	21.45	22.66	22.54	22.61	23.51	22.18
21.81			21.15		20.45	21.78	22.59	22.54	22.60	23.88	22.30
21.64			21.38		20.23		21.99		22.96	23.07	
21.60				21.84	21.42	21.69	22.50	22.27	22.59		21.70
22.35				23.38	23.67	23.15	23.09	23.10	23.28		22.73
20.78	(			19.89	20.22	20.27	21.53	21.61	21.42		20.68
	21.53 21.66 22.35 22.13 22.10 21.57 21.09 21.27 21.01 21.60 21.44 21.61 21.17 21.19 21.46 21.61 21.75 22.161 21.75 22.161 21.75 22.161 21.45 21.61 21.45 21.86 21.86 21.86 21.86 21.86	21.53       21.90         21.66       21.72         22.35       21.90         22.13       22.20         22.10       22.10         21.57       22.29         21.09       22.63         21.27       23.13         21.01       22.92         21.60       23.01         21.44       22.80         21.82       21.91         21.61       21.69         21.17       22.18         21.19       21.26         21.46       20.53         21.68       20.79         21.75       20.62         22.13       20.17         21.61       20.55         21.45       20.54         21.34       20.29         20.78          21.91          21.86          21.81          21.85          21.81          21.60          22.35	21.53       21.90          21.66       21.72          22.35       21.90          22.13       22.20          22.10       22.10          21.57       22.29          21.09       22.63          21.27       23.13          21.01       22.92          21.60       23.01          21.82       21.91          21.82       21.91          21.17       22.18          21.19       21.26          21.46       20.53          21.75       20.62          22.13       20.17          21.61       20.55          21.45       20.54          21.34       20.29          21.91           21.86           21.86           21.81           21.81           21.60      <	21.53       21.90           21.66       21.72           22.35       21.90           22.13       22.20           22.10       22.10           21.57       22.29           21.09       22.63           21.101       22.92           21.60       23.01           21.44       22.80           21.42       22.80           21.43       21.91           21.61       21.69           21.17       22.18        21.02         21.46       20.53        21.76         21.68       20.79        21.65         21.75       20.62        21.44         22.13       20.17        29.3         21.45       20.54        21.55         21.45       20.54        21.33         21.34	21.53       21.90         22.75         21.66       21.72        20.48         22.35       21.90         19.89         22.13       22.20        20.71       22.152         21.57       22.29        23.05       21.52         21.09       22.63        23.05       22.58         21.01       22.92        22.48       22.78         21.44       22.80        22.68       21.71       22.68         21.82       21.91        22.68       21.71       21.71       21.71       21.61       21.69        22.91       21.71       21.71       21.73       21.19       21.26        21.91       21.73       21.73       21.76       22.56       21.73       21.73       21.75       21.46       20.53        21.65       22.17       21.73       21.65       22.17       21.73       21.65       22.17       21.75       22.56       21.65       22.17       21.75       22.56       21.50       21.50       21.50       21.50       21.50       21.50       21.50       21.50	21.53       21.90         22.75       23.06         21.66       21.72         20.48       23.67         22.35       21.90         19.89       23.60         22.13       22.20         20.71       22.54         22.10       22.10         21.52       21.81         21.57       22.29         23.05       22.19         21.09       22.63         23.05       22.19         21.27       23.13         22.58       21.65         21.01       22.92         22.48       21.27         21.60       23.01         22.78       21.41         21.44       22.80         22.68       21.38         21.82       21.91         22.68       21.38         21.82       21.91         22.91       22.52         21.17       22.18        -2.91       22.72         21.61       21.69 <td< td=""><td>21.53       21.90         22.75       23.06       20.27         21.66       21.72         20.48       23.67       20.54         22.35       21.90         19.89       23.60       20.75         22.13       22.20         20.71       22.54       20.97         22.10       22.10         21.52       21.81       20.63         21.57       22.29         23.05       22.19       21.32         21.09       22.63         23.05       22.19       21.32         21.72       23.13         22.58       21.65       21.04         21.01       22.92         22.48       21.27       20.58         21.60       23.01         22.78       21.41       21.66         21.44       22.80         22.68       21.38       21.69         21.44       22.80         22.91       22.52       21.81         21.61       21.62       21.61       21.62<td>21.53       21.90         22.75       23.06       20.27       22.55         21.66       21.72         20.48       23.67       20.54       22.45         22.35       21.90         19.89       23.60       20.75       22.71         22.10         21.52       21.81       20.63       22.23         21.57       22.29         23.38       23.01       20.82       21.95         21.09       22.63         23.05       22.19       21.32       21.99         21.27       23.13         22.58       21.65       21.04       23.07         21.01       22.92         22.48       21.27       20.58       22.74         21.60       23.01         22.68       21.41       21.66       22.64         21.44       22.80         22.68       21.38       21.69       22.90         21.82       21.91         22.171       21.25       21.81       22.42         21.61       2</td><td>21.53       21.90         22.75       23.06       20.27       22.55       22.30         21.66       21.72         20.48       23.67       20.54       22.45       22.72         22.35       21.90         19.89       23.60       20.75       22.71       21.98         22.10       22.10         21.52       21.81       20.63       22.23       22.39         21.57       22.28         21.52       21.81       20.63       22.23       22.39         21.57       22.28         23.05       22.19       21.32       21.99       22.63         21.27       23.13         23.05       22.19       21.32       21.99       22.63         21.27       23.31         22.58       21.65       21.04       23.07       22.01         21.09       22.63         22.58       21.65       21.09       22.63         21.60       23.01         22.68       21.82       21.62       22.64       21.95</td><td>21.53</td><td>21.53</td></td></td<>	21.53       21.90         22.75       23.06       20.27         21.66       21.72         20.48       23.67       20.54         22.35       21.90         19.89       23.60       20.75         22.13       22.20         20.71       22.54       20.97         22.10       22.10         21.52       21.81       20.63         21.57       22.29         23.05       22.19       21.32         21.09       22.63         23.05       22.19       21.32         21.72       23.13         22.58       21.65       21.04         21.01       22.92         22.48       21.27       20.58         21.60       23.01         22.78       21.41       21.66         21.44       22.80         22.68       21.38       21.69         21.44       22.80         22.91       22.52       21.81         21.61       21.62       21.61       21.62 <td>21.53       21.90         22.75       23.06       20.27       22.55         21.66       21.72         20.48       23.67       20.54       22.45         22.35       21.90         19.89       23.60       20.75       22.71         22.10         21.52       21.81       20.63       22.23         21.57       22.29         23.38       23.01       20.82       21.95         21.09       22.63         23.05       22.19       21.32       21.99         21.27       23.13         22.58       21.65       21.04       23.07         21.01       22.92         22.48       21.27       20.58       22.74         21.60       23.01         22.68       21.41       21.66       22.64         21.44       22.80         22.68       21.38       21.69       22.90         21.82       21.91         22.171       21.25       21.81       22.42         21.61       2</td> <td>21.53       21.90         22.75       23.06       20.27       22.55       22.30         21.66       21.72         20.48       23.67       20.54       22.45       22.72         22.35       21.90         19.89       23.60       20.75       22.71       21.98         22.10       22.10         21.52       21.81       20.63       22.23       22.39         21.57       22.28         21.52       21.81       20.63       22.23       22.39         21.57       22.28         23.05       22.19       21.32       21.99       22.63         21.27       23.13         23.05       22.19       21.32       21.99       22.63         21.27       23.31         22.58       21.65       21.04       23.07       22.01         21.09       22.63         22.58       21.65       21.09       22.63         21.60       23.01         22.68       21.82       21.62       22.64       21.95</td> <td>21.53</td> <td>21.53</td>	21.53       21.90         22.75       23.06       20.27       22.55         21.66       21.72         20.48       23.67       20.54       22.45         22.35       21.90         19.89       23.60       20.75       22.71         22.10         21.52       21.81       20.63       22.23         21.57       22.29         23.38       23.01       20.82       21.95         21.09       22.63         23.05       22.19       21.32       21.99         21.27       23.13         22.58       21.65       21.04       23.07         21.01       22.92         22.48       21.27       20.58       22.74         21.60       23.01         22.68       21.41       21.66       22.64         21.44       22.80         22.68       21.38       21.69       22.90         21.82       21.91         22.171       21.25       21.81       22.42         21.61       2	21.53       21.90         22.75       23.06       20.27       22.55       22.30         21.66       21.72         20.48       23.67       20.54       22.45       22.72         22.35       21.90         19.89       23.60       20.75       22.71       21.98         22.10       22.10         21.52       21.81       20.63       22.23       22.39         21.57       22.28         21.52       21.81       20.63       22.23       22.39         21.57       22.28         23.05       22.19       21.32       21.99       22.63         21.27       23.13         23.05       22.19       21.32       21.99       22.63         21.27       23.31         22.58       21.65       21.04       23.07       22.01         21.09       22.63         22.58       21.65       21.09       22.63         21.60       23.01         22.68       21.82       21.62       22.64       21.95	21.53	21.53

#### MISSOURI RIVER MAIN STEM

## 06441595 MISSOURI RIVER AT FARM ISLAND, NEAR PIERRE, SD

#### STAGE RECORDS

LOCATION.--Lat 44°20'03", long 100°15'54", IN NW\sW\nE\s sec.18, T.110 N., R.79 W., Hughes County, Hydrologic Unit 10140101, on left bank of Farm Island Recreation Area, 4.8 mi downstream from La Framboise gage, 4.9 mi southeast of Pierre, 5.2 mi downstream from Bad River, 12.6 mi downstream from Oahe Dam, and at mile 1,059.2.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE. -- Water-stage recorder. Datum of gage is 1,415.88 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Stage regulated by Oahe Reservoir. Gage heights prior to October 1988 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES												
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	20.65					22.00	19.82	21.40	21.09	21.31	21.83	21.09
2	21.00					22.48	20.30	21.30	21.20	21.36	21.90	21.08
3	21.27					22.70	20.27	21.42	20.89	21.81	21.56	20.72
4	21.35					21.79	20.36	21.10	20.96	21.64	21.55	20.96
5	21.24					21.35	20.20	20.90	21.43	21.71	21.20	21.40
6					21.74	22.06	20.18	20.79	21.52	21.18	21.27	21.17
7					21.54	21.55	20.31	21.02	21.34	21.10	21.62	20.88
8					21.27	21.17	20.28	21.52	20.90	21.27	21.98	20.79
9					21.03	20.84	20.27	21.41	20.77	21.22	21.90	20.30
10					21.20	20.83	20.87	21.44	20.94	22.01	21.85	20.71
11					21.08	20.78	20.79	21.69	21.06	21.76	21.86	20.83
12					20.78	20.93	20.77	21.19	21.31	21.51	21.47	20.61
13					21.50	21.68	20.65	20.87	20.96	21.06	21.25	20.22
14	20.37			20.72	21.04	21.60	20.48	20.80	21.01	20.78	21.72	20.02
15	20.48			20.74	20.86	21.05	20.60	21.55	20.93	20.67	22.06	19.97
16	20.91			21.20	21.21	20.70	20.41	21.65	21.06	21.25	21.96	20.16
17	21.00			21.06	20.70	20.77	21.39	21.39	20.45	21.68	21.96	20.69
18	21.03				20.50	20.33	21.06	21.36	20.79	21.41	22.17	21.02
19	21.24				19.79	20.27	20.84	21.15	21.51	21.06	21.44	20.64
20	20.76				21.01	20.64	20.78	21.11	21.18	21.23	21.42	20.64
21	20.60				20.81	20.35	21.13	21.12	20.92	21.16	21.97	20.52
22				20.81	20.55	20.12	20.84	21.69	20.80	21.04	22.03	20.17
23				21.39	20.85	20.04	21.05	21.68	20.79	21.27	21.96	20.19
24				21.15	20.25	20.04	21.42	21.02	20.81	21.85	22.40	20.29
25					20.34	20.27	21.41	20.83	20.85	21.84	21.76	20.56
26					20.35	20.28	21.53	21.04	21.53	21.58	21.32	20.92
27					21.61	20.39	21.75	21.29	21.42	21.43	21.70	20.67
28					21.62	20.26	21.02	21.27	21.62	21.26	21.90	20.60
29						20.32	20.65	21.39	21.07	21.20	21.84	20.76
30						20.02	20.95	21.31	21.10	21.43	22.10	20.96
31						19.95		20.96		21.81	21.37	
MEAN						20.89	20.75	21.25	21.07	21.38	21.75	20.65
MAX						22.70	21.75	21.69	21.62	22.01	22.40	21.40
MIN						19.95	19.82	20.79	20.45	20.67	21.20	19.97

#### MEDICINE KNOLL CREEK BASIN

#### 06442000 MEDICINE KNOLL CREEK NEAR BLUNT. SD

LOCATION.--Lat 44°33'46", long 99°54'50", in NWk sec.31, T.113 N., R.75 W., Sully County, Hydrologic Unit 10140103, on left bank at downstream side of highway bridge, 4.8 mi northeast of Blunt, and 5.5 mi upstream from South Fork Medicine Knoll Creek.

DRAINAGE AREA, -- 317 mi 2.

PERIOD OF RECORD. -- March 1950 to current year. Prior to October 1959, published as Medicine Creek near Blunt.

REVISED RECORDS. -- WDR SD-76-1: Drainage area. WDR SD-88-1: 1987(M).

GAGE. --Water-stage recorder. Datum of gage is 1,611.08 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 31, 1950, nonrecording gage at same site and datum.

REMARKS,--Records poor. Only daily discharges above 25  $\rm ft^3/s$  are being published. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 1,830 ft<sup>3</sup>/s, Apr. 5, 1952, gage height, 12.34 ft, from flood-marks; maximum gage height, 13.2 ft, between Mar. 26-29, 1959, from floodmarks, backwater from ice; no flow for long periods in each year.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Oischarge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 10	1045	*68	*8.96	No other	peak greater	than base	discharge.

No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

Daily discharge, in cubic feet per second, above 25 ft<sup>3</sup>/s are given herewith:

Mar. 10	61	Mar.	12	36	Mar.	14	33
		2277		- 1.5.7			
Mar. 11	48	Mar.	13	32	Mar	15	41

#### MEDICINE CREEK BASIN

#### 06442500 MEDICINE CREEK AT KENNEBEC. SD

LOCATION.--Lat 43°54'17", long 99°52'35", in NWkNEk sec.18, T.105 N., R.75 W., Lyman County, Hydrologic Unit 10140104, on right bank 4 ft downstream from highway bridge, 0.5 mi west of Kennebec, and 0.5 mi downstream from small right-bank tributary.

DRAINAGE AREA. -- 465 mi<sup>2</sup>, approximately.

PERIOD OF RECORD . -- July 1954 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,659.64 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 28, 1954, nonrecording gage at same site and datum.

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--35 years, 18.3 ft<sup>3</sup>/s, 13,260 acre-ft/yr; median of yearly mean discharges, 7.9 ft<sup>3</sup>/s, 5.700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,400 ft<sup>3</sup>/s, May 9, 1986, gage height, 17.26 ft; no flow for many days each year.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood in April 1952 reached a stage of 17.0 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 29	2000	*26	*2.39				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow for many days.

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	5.6	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	3.8	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	2.9	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	2.3	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	2.2	.00	.00	.00	.00	.00
,	.00	.00	.00	.00	.00	.00	2.2	.00	.00	.00	.00	
6	.00	.00	.00	.00	.00	.00	1.6	.00	.00	.00		.00
7	.00	.00	.00	.00	.00	.00	. 87	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	. 27	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	e.20	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00					.00	.00	.00	.00
					.00	e.40	.00	.00				
13	.00	.00	.00	.00	.00	e.50	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	e.40	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	e.30	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	e.20	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e.10	.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	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	.00		.00	.00	.00	.00	.00	.00				
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.06	.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	.06	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.13	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.19	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	.00	13	.00	.00	.00	.00	.00	.00
											.00	.00
30	.00	.00	.00	.00		16	.00	.00	.00	.00		.00
31	.00		.00	.00		9.4		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	41.16	19.60	0.00	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	1.33	. 65	.00	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	16	5.6	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	82	39	.0	.0	.0	.0	.0
.10 11					. 0	02	00	. •	. •	. •	. •	

CAL YR 1988 TOTAL 336.67 MEAN .92 MAX 209 MIN .00 AC-FT 668 WTR YR 1989 TOTAL 60.76 MEAN .17 MAX 16 MIN .00 AC-FT 121

e Estimated

#### MISSOURI RIVER MAIN STEM

#### 06442700 LAKE SHARPE NEAR FORT THOMPSON, SD

LOCATION.--Lat 44°02'18", long 99°26'45", in SE% sec.27, T.107 N., R.72 W., Lyman County, Hydrologic Unit 10140101, at left approach wall of powerhouse at Big Bend Dam on Missouri River, 2.5 mi south of Fort Thompson, and at mile 987.4.

DRAINAGE AREA, -- 249, 300 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- July 1963 to current year (monthend contents only).

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

REMARKS.--Reservoir is formed by earthfill dam; closure made July 1963; intentional storage began November 1963.

Maximum capacity, 1,874,000 acre-ft below elevation, 1,423.0 ft (top of spillway gates). Normal maximum, 1,697,000 acre-ft below elevation 1,424.0 ft. Inactive storage, 1,424,000 acre-ft below elevation 1,415.0 ft. Figures given herein represent elevations at powerhouse and total contents adjusted for wind effect.

The spillway consists of a concrete chute with flat crest at elevation 1,385.0 ft surmounted by 8 taintor gates, each 40 by 38 ft; design capacity, 390,000 ft<sup>3</sup>/s. Normal releases are through 8 power units (completed in July 1966), with a generating capacity of 58,500 kilowatts each. Maximum release through power-plant about 100,000 ft<sup>3</sup>/s. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION .-- Records of elevation and contents provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD. --Maximum contents, 1,829,000 acre-ft, Apr. 22, 1971, affected by wind; minimum since initial filling, 1,448,000 acre-ft, Sept. 17, 1967, affected by wind.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,775,000 acre-ft, Nov. 13, Feb. 5; minimum contents, 1,682,000 acre-ft, July 28.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 Elevation Contents Change in contents Date (acre-feet) (acre-feet) (feet) Sept. 30 1,420.11 1,704,000 Oct. +40.000 1,744,000 31 1,420.88 Nov. 30 1,420.03 1,696,000 -48.000 +20,000 Dec. 31 1,420.36 1,716,000 +8,000 Jan. 1,420.73 1,725,000 +9,000 Feb. 29 1,420.15 1,705,000 -20,000 Mar. 31 1,696,000 1,419,90 -9,000 30 1,738,000 +42,000 Apr. 1,420,62 May 1,420.53 1,724,000 -14.000 June 30 1,419.96 1,696,000 -28,000 July 31 1,731,000 +35,000 1.420.55 -22,000 31 1,420.22 1,709,000 Aug. Sept. 30 ,729,000 +20.000 1,420.73 +25,000

NOTE. -- Lake frozen over Dec. 26 to Apr. 6.

#### CAMPBELL CREEK BASIN

#### 06442718 CAMPBELL CREEK NEAR LEE'S CORNER, SD

LOCATION.--Lat 44°04'39", long 99°22'51", in NW\nE\nW\ne\sec.17, T.107 N., R.71 W., Buffalo County, Hydrologic Unit 10140105, on left bank at downstream side of bridge on State Highway 34, 2.8 mi east of Fort Thompson, and 5.4 mi upstream from high-water line of Lake Francis Case.

DRAINAGE AREA. -- 54.1 mi<sup>2</sup>.

PERIOD OF RECORD .-- October 1987 to current year.

GAGE. -- Water-stage recorder. Datum of gage is 1,440.32 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Records for water year 1988 fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 757 ft<sup>3</sup>/s, May 25, 1988, gage height, 14.19 ft; no flow for long periods in each year.

EXTREMES FOR CURRENT PERIOD. -- Water year 1988: Peak discharges greater than base discharge of 50 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 22 May 22	2030 0730	66 84	4.29 4.77	May 25	2300	*757	*14.19

No flow for many days.

Water year 1989: Peak discharges greater than base discharge of 50 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
July 17	1915	*209	*7.36	Sept. 21	0345	90	4.93

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

No flow for many days.

		DIDOME	oz, za oo.		I III DIOO	MEAN VALUE		ODDAK 1907	10 0111111	DIK 1500		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.00	.00	.00	e4.4	.30	.15	.11	.09	.00	.00
2	.00	.00	.00	.00	.00	e7.5	1.7	.36	.07	.07	.00	.00
3	.00	.01	.00	.00	.00	e6.6	6.2	.32	.05	.06	.00	.00
4	.00	.00	.00	.00	.00	e5.4	1.8	.25	.03	.05	.00	.00
5	.00	.00	.00	.00	.00	e4.5	.71	.18	.03	.03	.00	.00
6	.00	.00	.00	.00	e.00	e5.4	. 27	.16	.02	.01	.00	.00
7	.00	.00	.00	.00	e.00	e5.0	.25	.21	.01	.00	.00	.00
8	.00	.00	.00	.00	e.00	e4.0	.23	.19	.01	.04	.00	.00
9	.00	.00	.00	.00	e.00	e3.5	.19	.17	.00	.04	.00	.00
10	.00	.00	.00	.00	e.00	e2.4	.20	.15	.00	.04	.00	.00
11	.00	.00	.00	.00	e.00	e1.6	.19	.15	.00	.02	.00	.00
12	.00	.00	.00	.00	e.00	e.80	.20	.15	.00	.02	.00	.00
13	.00	.00	.00	.00	e.00	e.40	.19	.10	.03	.00	.00	.00
14												
	.00	.00	.00	.00	e.00	e.20	.20	.10	.09	.00	.00	.00
15	.00	.00	.00	.00	e.00	e.30	.19	.09	.03	.00	.00	.00
16	.00	.03	.00	e.00	e.00	0.44	.20	.08	.02	.00	.00	.00
17	.00	.00	e.00	e.00	e.00	e1.0	.18	.08	.03	.00	.00	.00
18	.00	.00	e.00	e.00	e.00	e2.0	. 20	.10	.02	.00	.00	.00
19	.00	.00	.00	e.00	e.00	e4.5	.21	.18	.02	.00	.00	.00
20	.00	.00	e.00	e.00	e.00	15	. 20	.36	.00	.00	.00	.00
21	.00	.01	e.00	e.00	e.00	23	.19	9.1	.00	.00	.00	.00
22	.00	.00	e.00	.00	e.10	36	.22	41	.00	.00	.00	.00
23	.00	.00	.00	.00	e.20	27	.30	7.2	.00	.00	.00	.00
24	.00	.00	.00	e.00	e.35	18	.24	2.9	.00	.00	.00	.00
25	.00	.00	.00	.00	e.50	10	. 18	42	.00	.00	.00	.00
26	.00	.00	.00	.00	e.80	5.8	.32	54	.00	.00	.00	.00
27	.00	.00	.00	.00	e1.2	5.2	.21	4.6	.00	.00	.00	.00
28	.00	.00	e.00	.00	e1.5	3.4	.17	2.2	.00	.00	.00	.00
29	.00	.00	e.00	.00	e2.2	.99	.17	1.4	.00	.00	.00	.00
30	.01	e.00	e.00	.00	62.2	.97	.20	.60	.03	.00	.00	.00
31	.00	9.00	.00	.00			.20	.23	.03	.00	.00	.00
31	.00		.00	.00		. 47		. 23		.00	.00	
TOTAL	0.01	0.05	0.00	0.00	6.85	205.77	16.01	168.76	0.60	0.47	0.00	0.00
MEAN	.000	.002	.00	.00	.24	6.64	. 53	5.44	.020	.015	.00	.00
MAX	.01	.03	.00	.00	2.2	36	6.2	54	.11	.09	.00	.00
MIN	.00	.00	.00	.00	.00	.20	. 17	.08	.00	.00	.00	.00
AC-FT	.02	.1	.0	.0	14	408	32	335	1.2	.9	.0	.0

WTR YR 1988 TOTAL 398.52 MEAN 1.09 MAX 54 MIN .00 AC-FT 790

e Estimated

## 06442718 CAMPBELL CREEK NEAR LEE'S CORNER, SD--Continued

# DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

						MEAN VALUE	3					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	e.00	.44	2.0	.04	.00	.00	.00
2	.00	.00	.00	.00	.00	e.00	.34	1.2	.05	.00	.00	.00
3	.00	.00	.00	.00	.00	e.00	.34	1.7	.04	.00	.00	.00
4	.00	.00	.00	.00	.00	e.00	. 28	1.5	.03	.02	.00	.00
5	.00	.00	.00	.00	.00	e.00	.19	.85	.04	.00	.00	.00
6	.00	.00	.00	.00	.00	e.00	.15	.36	.04	.00	.00	.00
7	.00	.00	.00	.00	.00	e.00	.18	.24	.03	.00	.00	.00
8	.00	.00	.00	.00	.00	e.40	.15	.22	.01	.00	.00	.00
9	.00	.00	.00	.00	.00	e1.6	. 13	.22	.01	.00	.00	.00
10	.00	.00	.00	.00	.00	e4.4	. 13	.20	.02	.00	.00	.00
11	.00	.00	.00	.00	.00	e5.0	.15	.18	.02	.00	.00	.00
12	.00	.00	.00	.00	.00	e5.5	. 16	.11	.03	.00	.00	.00
13	.00	.00	.00	.00	.00	e5.0	.15	.10	.03	.01	.00	.00
14	.00	.00	.00	.00	.00	e4.4	. 14	.10	.02	3.5	.00	.00
15	.00	.00	.00	.00	.00	e3.9	. 13	.07	.01	.16	.00	.00
16	.00	.00	.00	.00	.00	e3.5	.15	.07	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e3.3	.15	.08	.02	28	.00	.00
18	.01	.00	.00	.00	.00	e3.5	. 15	.07	.02	3.9	.00	.00
19	.00	.00	.00	.00	.00	e7.0	.15	.06	.01	.21	.00	.00
20	.00	.00	.00	.00	.00	e13	. 16	.05	.00	.06	.00	.00
21	.00	.00	.00	.00	.00	e23	. 15	.05	.00	.01	.00	12
22	.00	.00	.00	.00	.00	e34	. 17	.07	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	e30	. 18	.09	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e28	. 16	.05	.00	.00	.00	.00
25	.00	.00	.00	.00	e.00	24	.18	.05	.01	.00	.00	.00
26	.00	.00	.00	.00	e.00	19	.15	.04	.03	.00	.00	.00
27	.00	.00	.00	.00	e.00	8.6	.15	.03	.01	.00	.00	.00
28	.00	.00	.00	.00	e.00	3.9	.34	.03	.01	.00	.00	.00
29	.00	.00	.00	.00		2.9	. 23	.02	.00	.00	.00	.00
30	.00	.00	.00	.00		1.3	1.7	.02	.00	.00	.00	.00
31	.00		.00	.00		.42		.02		.00	.00	
TOTAL	0.01	0.00	0.00	0.00	0.00	235.62	7.23	9.85	0.53	35.87	0.00	12.00
MEAN	.000	.00	.00	.00	.00	7.60	. 24	.32	.018	1.16	.00	.40
MAX	.01	.00	.00	.00	.00	34	1.7	2.0	.05	28	.00	12
MIN	.00	.00	.00	.00	.00	.00	.13	.02	.00	.00	.00	.00
AC-FT	.02	.0	.0	.0	.0	467	14	20	1.1	71	.0	24

CAL YR 1988 TOTAL 398.47 MEAN 1.09 MAX 54 MIN .00 AC-FT 790 WTR YR 1989 TOTAL 301.11 MEAN .82 MAX 34 MIN .00 AC-FT 597

e Estimated

#### MISSOURI RIVER MAIN STEM

#### 06442996 LAKE FRANCIS CASE (AMERICAN CREEK BAY) AT CHAMBERLAIN, SD

#### STAGE RECORDS

LOCATION.--Lat 43\*48'52", long 099\*19'24", in SEkNEkNWk sec.15, T.104 N., R.71 W., Brule County, Hydrologic Unit 10140101, on left bank at upstream end of American Creek Recreation Area, 0.5 mi upstream from intersection of I-90 and State Highway 50 Business Loop, 1.5 mi upstream from Lewis and Clark Memorial Bridge, and at mile 967.5.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 1,360 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair. Stage regulated by Ft. Randall Reservoir. Gage heights prior to October 1988 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES NOV SEP DAY OCT JUN JUL. AUG DEC JAN FEB MAR APR MAY ---------53.89 57.30 55.71 56.81 55.92 55.18 55.70 56.98 2 ---------------53.98 55.91 56.96 55.55 55.44 55.66 3 ---------------56.53 56.20 56.75 55.50 55.40 55.07 54.20 ---------------53.89 56.48 56.19 56.27 55.63 55.35 54.58 55.17 5 ---------54.91 53.73 56.64 56.27 56.14 56.22 54.15 56.67 56.40 56.27 56.25 54.74 56.27 ---54.32 56.51 56.27 56.50 54.74 54.87 55.02 55.02 8 54.49 56.15 56.30 56.36 56.41 9 ---55.59 56.49 56.47 55.92 55.26 54.83 54.85 10 56.20 55.83 55.37 54.54 55.30 55.53 56.66 11 ------55.48 55.43 56.99 55.61 55.94 55.46 54.39 12 ---------------55.53 55.60 56.87 55.15 55.97 55.21 54.23 13 ---------------55.98 55.60 56.52 55.19 55.97 54.74 53.92 ------------55.66 56.08 55.35 56.02 54.51 53.65 56.82 15 ---------------57.39 55.79 56.03 55.59 55.65 54.87 53.35 16 55.27 54.97 57.78 55.16 56.21 55.84 ------55.29 ---17 56.27 55.43 55.20 55.28 58.24 54.96 ---57.13 55.03 55.57 18 55.46 56.38 ---55.26 55.08 19 ------55.64 56.55 54.99 58.54 20 55.46 58.68 55.67 56.55 55.19 54.80 21 ---------56.38 54.91 55 58 54 97 ---------59.01 55.81 ---------55.09 22 ---------59.11 55.68 56.45 55.17 55.50 23 ------------------59.15 55.38 56.62 55.22 55.15 55.43 ---24 ------------59.14 55.49 56.53 55.03 55.31 55.91 ---25 ---------59.01 55.49 56.75 54.75 55.41 55.93 ---26 ---------58.73 55.75 56.80 54.98 55.63 55.48 ---27 ---------------58.49 55.82 57.08 55.47 55.71 55.24 ---56.97 28 ---------------58.26 55.83 56.08 55.78 55.06 ---29 ------------58.13 55.84 56.60 56.06 55.47 55.35 ---30 57.96 56.65 56.04 54.95 55.87 ---55.63 54.87 31 57.76 56.63 55.81 MEAN ------------56.46 55.72 55.64 55.24 ------56.75 55.88 ------MAX ---------59.15 57.30 57.08 56.96 56.50 55.93 MIN ------53.73 55.16 55.71 54.75 54.87 54.51

#### 06444000 WHITE RIVER AT CRAWFORD, NE

LOCATION.--Lat 42°41'33", long 103°25'03", in Wa sec.3, T.31 N., R.52 W., Dawes County, Hydrologic Unit 10140201, on right bank 15 ft downstream from bridge in city park at Crawford.

DRAINAGE AREA. -- 313 mi 2.

PERIOD OF RECORD .-- February 1931 to September 1943, October 1947 to current year.

REVISED RECORDS. -- WSF 1309: 1931(M), 1942(M). WSF 1729: 1958-59(M). WSF 1917: 1958-59.

GAGE.--Water-stage recorder. Datum of gage is 3,659.85 ft above National Geodetic Vertical Datum of 1929. Feb. 25, 1931, to Oct. 2, 1933, nonrecording gage at old highway bridge 0.5 mi upstream at different datum and Oct. 3, 1933, to Sept. 30, 1943, 1 mi upstream at different datum.

REMARKS. -- Estimated daily discharges: Nov. 28, Dec. 9, 16, 17, 24-28, Jan. 2, 7-9, 12-16, 20, 26, 27, Feb. 1-14, 16-19, and Mar. 2-7. Records good except for periods of estimated record, which are fair. Some regulation at low flows by pumps for irrigation and diversion for water supply for town of Crawford.

AVERAGE DISCHARGE. -- 54 years, 20.2 ft3/s, 14,630 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,580 ft<sup>3</sup>/s, Mar. 15, 1948, gage height, 6.88 ft; maximum gage height, 7.7 ft, July 10, 1958, from floodmarks; minimum daily discharge, 2.7 ft<sup>3</sup>/s, Aug. 13, 31, Sept. 1, 1960.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Aug. 19	1130	166	3.24	Sept. 21	0330	*185	*3.62

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 6.5 ft3/s, July 24.

		DISCHA	ROE, CODI	C FEET FE	M SECOND,	EAN VALUE	S COLORE	K 1900 10	SELIMIDE	W 1909		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	17	17	21	19	20	23	23	19	12	8.2	8.4
1 2 3	14	17	17	20	18	20	22	22	18	11	8.1	8.6
3	14	17	17	19	19	19	20	22	18	9.6	8.3	8.6
4	14	17	17	19	20	18	20	22	19	9.6	8.1	
5	14	17	17	20	21	18	20	22	18	9.1	8.1	8.3
,	14	1,	17	20	21	10	20	22	10	3.1	0.1	
6	14	17	17	20	19	25	20	21	16	7.9	8.7	7.7
7	14	18	17	19	19	26	20	21	16	7.3	9.9	7.9
8	14	17	17	20	18	26	21	21	16	6.9	9.7	12
9	14	17	17	21	19	29	21	21	19	6.8	8.3	17
10	14	17	17	22	19	35	21	21	17	6.8	9.1	19
11	15	17	16	22	20	28	20	20	15	6.9	8.9	18
12	15	18	17		20	26	20	22	15	6.9	23	15
13			17					22	13	6.7	15	16
	15	18		21	19	24	20					
14	15	17	16	22	20	23	20	22	14	7.0	12	15
15	15	18	16	22	23	22	20	21	14	8.4	11	14
16	15	18	16	21	22	22	20	21	13	9.9	9.6	13
17	15	18	17	20	21	21	23	26	13	9.7	10	12
18	16	19	18	22	20	21	21	22	13	9.6	9.2	11
19	16	19	18	22	21	22	20	21	13	8.9	47	11
20	16	18	19	21	20	22	20	20	12	8.3	21	13
20	10	10	13	21	20	22	20	20		0.0		
21	15	18	19	21	20	21	20	20	12	7.9	15	88
22	15	18	20	19	20	22	20	19	13	7.1	9.6	25
23	15	19	18	18	20	21	20	18	13	6.7	9.5	17
24	16	18	18	19	21	22	22	17	17	6.5	8.9	15
25	16	18	18	18	21	21	19	16	19	6.5	11	14
26	16	18	18	18	21	21	21	16	18	7.2	11	14
27	16	17	17	19	20	21	26	17	17	7.1	9.8	16
28	16	18	17	20	20	20	25	17	14	7.3	9.6	15
											9.3	14
29	16	19	16	20		20	22	16	14	8.7		
30	16	17	22	20		22	23	19	13	8.9	8.9	14
31	16		23	21		22		20		8.5	8.3	
TOTAL	466	531	546	628	560	700	630	628	461	251.7	364.1	475.6
MEAN	15.0	17.7	17.6	20.3	20.0	22.6	21.0	20.3	15.4	8.12	11.7	15.9
MAX	16	19	23	22	23	35	26	26	19	12	47	88
MIN	14	17	16	18	18	18	19	16	12	6.5	8.1	7.7
AC-FT	924	1050	1080	1250	1110	1390	1250	1250	914	499	722	943
	524	1030	1000	1230	1110	1000	1250	1250	014			

CAL YR 1988 TOTAL 6984.3 MEAN 19.1 MAX 52 MIN 6.6 AC-FT 13850 WTR YR 1989 TOTAL 6241.4 MEAN 17.1 MAX 88 MIN 6.5 AC-FT 12380

#### 06445685 WHITE RIVER NEAR NEBRASKA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 43°00'47", long 102°50'07", in NE\SW\nE\sec.15, T.35 N., R.47 W., Shannon County, Hydrologic Unit 10140201, on left bank 1.0 mi north of Nebraska-South Dakota State line, and 4.3 mi south of Slim Butte.

DRAINAGE AREA. -- 1,440 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- October 1987 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,030 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 866 ft<sup>3</sup>/s, May 20, 1988, gage height, 12.46 ft; no flow July 13-18, Aug. 3-17, Sept. 5-10, 1989.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	1500	*331	*7.96	No other peak greater	than base	discharge.

No flow July 13-18, Aug. 3-17, Sept. 5-10.

		DISCHARGE	, IN	CUBIC FEET		D, WATER EAN VALUE	YEAR OCTOR	BER 1988	TO SEPTEM	BER 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.2	9.0	e7.5	e7.0	e3.5	e9.0	7.9	51	6.4	1.7	.31	.49
2	5.3	8.1	e8.0		e3.0	e9.0	8.8	30	9.0	1.4	.03	.36
3	7.2	6.6	e7.0		e2.0	e9.0	14	21	12	1.4	.00	.17
4	8.0	7.5	e6.0	e9.0	e1.8	e9.0	23	16	19	1.3	.00	.02
5	6.9	7.6	e6.5		e2.5	e10	27	34	24	1.2	.00	.00
6	6.2	7.7	e7.0	e11	e2.5	e12	24	36	22	.98	.00	.00
7	6.8	7.4	e7.0		e3.0	e12	23	31	24	1.0	.00	.00
8	6.6	7.5	e6.0						25	.98	.00	.00
					e4.5	e30	28	31				.00
9	6.8	7.5	e4.5		e6.5	e50	34	32	26	.74	.00	
10	7.5	7.9	e5.5	e9.0	e6.5	e80	34	31	25	.51	.00	.00
11	8.2	7.9	e5.5	e9.0	e8.0	173	39	30	20	.36	.00	. 26
12	8.8	8.8	e6.5		e9.0	271	44	31	19	.10	.00	.60
13	8.2	9.4	e6.5		e9.0	255	44	31	15	.00	.00	.68
14	12	10	e6.0		e8.0	174	38	31	12	.00	.00	1.9
15	11	11	e5.0		e8.0	125	37	35	12	.00	.00	14
16	10	10	e5.0	e7.0	e7.0	99	36	43	13	.00	.00	9.1
17	9.0	8.6	e6.0		e6.0	98	35	57	11	.00	.00	8.9
18	7.7	e7.0	e6.0		e5.0	81	37	47	10	.00	.85	9.8
19	7.2	e7.0	e6.5					38	9.6	.71	2.5	9.8
					e7.0	57	40					
20	6.2	e7.0	e7.0	e6.0	e8.0	58	29	22	6.9	3.3	3.4	8.0
21	6.1	e7.0	e7.0		e12	49	15	19	4.2	3.0	4.4	7.8
22	6.9	e8.0	e8.0	e7.0	e15	27	19	11	2.9	1.5	2.6	6.6
23	7.3	e8.0	e7.0	e6.0	e12	28	22	9.8	2.3	1.7	2.7	8.0
24	7.2	e7.0	e6.0	e6.0	e15	20	10	9.0	1.9	1.6	5.8	91
25	6.8	e6.5	e5.0	e6.0	e15	19	8.3	6.4	1.9	1.5	9.1	53
26	6.5	e6.5	e4.0	e6.0	e15	16	7.6	5.8	1.9	1.4	6.8	18
27	6.7	e6.5	e3.5		e15	16	9.7	6.5	1.8	1.2	4.3	9.7
28	6.4	e6.5	e3.5		e10	15	11	6.9	2.7	1.0	3.2	6.8
29	6.1	e7.0	e4.0			10	21	6.2	3.4	.69	2.0	4.3
30	6.2	e7.5	e5.0			8.7	37	5.1	2.9	.68	1.2	2.9
31	7.4		e6.0			8.0		5.3		. 53	.77	
TOTAL	220 4	224 0	104 0	226 5	210 0	1042 7	762 2	760.0	346.8	30.48	49.96	272.18
TOTAL	228.4	234.0	184.0		219.8	1843.7	763.3	769.0	11.6	.98	1.61	9.07
MEAN	7.37	7.80	5.94		7.85	59.5	25.4	24.8				
MAX	12	11	8.0		15	271	44	57	26	3.3	9.1	91
MIN	5.2	6.5	3.5		1.8	8.0	7.6	5.1	1.8	.00	.00	.00
AC-FT	453	464	365	469	436	3660	1510	1530	688	60	99	540

CAL YR 1988 TOTAL 12104.8 MEAN 33.1 MAX 714 MIN 2.2 AC-FT 24010 WTR YR 1989 TOTAL 5178.12 MEAN 14.2 MAX 271 MIN .00 AC-FT 10270

e Estimated

#### 06445980 WHITE CLAY CREEK NEAR OGLALA, SD

LOCATION.--Lat 43°08'46", long 102°40'58", in NW\sE\sE\sec.30, T.37 N., R.45 W., Shannon County, Hydrologic Unit 10140201, on left bank at downstream side of bridge on U.S. Highway 18, 4.3 mi southeast of Oglala, 5.5 mi upstream from Oglala Dam, and 11 mi northwest of Pine Ridge.

DRAINAGE AREA. -- 340 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- August 1965 to September 1981, October 1987 to current year.

GAGE. -- Water-stage recorder. Datum of gage is 3,001.54 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some storage and possible regulation upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--18 years (water years 1966-81, 1988-89), 10.4 ft<sup>3</sup>/s, 7,530 acre-ft/yr; median of yearly mean discharges, 8.7 ft<sup>3</sup>/s, 6,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 659 ft<sup>3</sup>/s, June 16, 1967, gage height, 14.74 ft; maximum gage height, 15.02 ft, Mar. 11, 1966, backwater from ice; no flow at times in 1965, 1970, 1973-75, 1978, 1980-81, 1989

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft 3/s and maximum (\*):

		Discharge	Gage height			Discharge	Gage height
Date	Time	$(ft^3/s)$	(ft)	Date	Time	$(ft^3/s)$	(ft)
Mar. 22	unknown	*70	*a h				

- a Backwater from ice.
- b Undetermined.
- No flow for many days.

		DISCHAF	RGE, IN CU	BIC FEET		ND, WATER T		BER 1988	TO SEPTEM	BER 1989		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.1	5.6	e3.5	e.10	e.50	e.00	11	12	7.0	2.9	e.70	.33
2	4.0	5.8	e4.0	e.10	e.30	e.00	11	12	7.0	3.1	e.50	.33
3	3.9	5.9	e4.0	e.10	e.20	e.00	11	12	6.9	3.2	e.30	1.1
4	3.8	5.8	e4.0	e.10	e.10	e.00	11	12	7.0	3.4	e.30	.68
5	3.8	5.9	e4.0	e.20	e.00	e.00	11	12	7.0	3.2	e.35	. 47
6	3.8	5.8	e4.0	e.30	e.00	e.20	11	11	6.9	2.9	e.45	.46
7	3.8	5.9	e4.0	e.20	e.00	e.60	11	11	6.6	2.6	e.35	1.7
8	4.0	5.9	e3.0	e.10	e.00	e1.0	11	10	6.5	2.5	e.30	1.7
9	4.2	6.0	e2.0	e.00	e.00	e1.0	11	10	6.5	2.3	e.30	1.6
10	4.3	6.1	e2.0	e.00	e.10	e1.5	11	9.7	6.4	2.1	e.30	2.1
11	4.4	6.2	e2.5	e.00	e.20	e2.0	11	9.2	6.4	1.9	e.30	2.5
12	4.4	6.6	e2.5	e.00	e.20	e1.5	11	8.0	6.2	1.7	e.35	2.8
13	4.5	6.5	e2.5	e.00	e.10	e1.5	11	8.1	5.9	1.8	e.30	3.2
14	4.6	6.5	e2.0	e.00	e.00	e1.5	11	8.7	5.7	3.2	e.30	3.1
15	4.6	6.7	e1.5	e.00	e.00	e1.5	11	9.2	5.3	e3.4	e.30	2.8
16	4.6	e5.0	e1.0	e.00	e.00	e1.0	11	9.6	5.0	e3.2	e.30	2.6
17	4.8	e4.0	e1.5	e.00	e.00	e1.0	11	9.8	5.0	e3.0	e.30	2.4
18	5.0	e4.0	e1.5	e.00	e.00	e2.0	12	9.4	4.8	e2.5	e.35	2.3
19	5.1	e3.0	e1.0	e.00	e.00	e6.0	11	9.1	4.6	e2.0	e.35	2.1
20	5.2	e4.0	e,70	e.00	e.00	e8.0	11	8.7	4.2	e2.0	e.35	2.3
21	5.2	e4.0	e.50	e.00	e.00	e20	11	8.4	3.9	e2.0	e.36	3.7
22	5.1	e4.0	e.50	e.00	e.10	e60	11	8.3	3.7	e2.0	.36	3.8
23	5.1	e4.5	e.40	e.10	e.10	44	11	8.2	3.6	e1.5	.35	5.3
24	5.1	e5.0	e.30	e.10	e.20	42	11	8.0	3.5	e1.5	.35	5.4
25	5.1	e5.0	e.20	e.10	e.25	16	10	7.8	3.8	e1.5	.35	5.0
26	5.2	e4.0	e.20	' e.00	e.20	14	10	7.6	4.4	e1.5	.35	4.4
27	5.2	e3.0	e.00	e.00	e.10	13	11	7.5	4.2	e1.5	.35	4.0
28	5.3	e3.0	e.00	e.20	e.00	12	12	7.4	4.1	e1.5	.33	3.6
29	5.3	e3.5	e.00	e.20		12	12	6.8	3.6	e1.0	.33	3.4
30	5.4	e3.5	e.00	e.30		12	12	6.8	3.3	e.80	.34	3.2
31	5.5		e.10	e.40		11		6.9		e.80	.33	
TOTAL	144.4	150.7	53.40	2.60	2.65	286.30	332	285.2	159.0	68.50	10.85	78.37
MEAN	4.66	5.02	1.72	.084	.095	9.24	11.1	9.20	5.30	2.21	.35	2.61
MAX	5.5	6.7	4.0	. 40	. 50	60	12	12	7.0	3.4	.70	5.4
MIN	3.8	3.0	.00	.00	.00	.00	10	6.8	3.3	. 80	.30	.33
AC-FT	286	299	106	5.2	5.3	568	659	566	315	136	22	155

CAL YR 1988 TOTAL 2853.90 MEAN 7.80 MAX 89 MIN .00 AC-FT 5660 WTR YR 1989 TOTAL 1573.97 MEAN 4.31 MAX 60 MIN .00 AC-FT 3120

e Estimated

#### 06446000 WHITE RIVER NEAR OGLALA, SD

LOCATION.--Lat 43°15'17", long 102°49'29", in SWkNEk sec.24, T.38 N., R.47 W., Shannon County, Hydrologic Unit 10140201, on right bank at downstream side of bridge, 3.0 mi downstream from Blacktail Creek, and 7.0 mi northwest of Oglala.

DRAINAGE AREA. -- 2,200 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- May 1943 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,853.54 ft above National Geodetic Vertical Datum of 1929. Prior to May 6, 1947, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some diversions for irrigation upstream from station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--46 years, 53.0 ft<sup>3</sup>/s, 38,400 acre-ft/yr; median of yearly mean discharges, 45 ft<sup>3</sup>/s, 32.600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,200 ft<sup>3</sup>/s, June 21, 1947, gage height, 23.50 ft, from rating curve extended above 2,800 ft<sup>3</sup>/s on basis of velocity-area studies; maximum gage height, 23.61 ft, June 16, 1967; no flow at times some years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 800 ft 3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 14	1215	*243	*8.64				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow Aug. 1-14.

MEAN VALUES DAY OCT NOV APR SEP DEC JAN FER MAR MAY TIIN JUIT. AUG 11 8.3 e8 0 e8.0 e4.0 e10 30 9.9 e.90 e.00 18 3.9 2 7.4 e8.0 e9.0 e3.5 e10 27 52 9.6 .96 e.00 18 3 2.5 7.1 e7.0 e8.0 e3.0 e10 27 55 11 2.0 e.00 19 2.5 12 e6.0 e8.0 e4.0 e9.0 26 46 13 1.9 e.00 20 5 10 e9.0 e9.0 31 41 16 1.5 e.00 20 e4.0 7.9 6.5 e8.5 e9.0 36 37 17 e.00 21 e5.0 e10 1.2 e8.0 e.00 6.4 e8.0 11 e20 38 42 20 e1.0 21 e6.0 8 9.5 7.0 20 e.90 e.00 21 e6.0 e9.0 e7.0 36 44 42 9.3 e.80 e.00 7.0 e5.0 40 20 e10 e8.0 64 36 24 7.3 10 11 e7.0 20 32 e10 e9.0 93 38 39 e. 60 e.00 7.0 11 e7.0 37 20 e.00 30 11 e10 e10 153 41 e.40 e8.0 7.1 7.4 12 11 e8.0 e10 120 42 36 20 e.10 e.00 26 13 11 e7.0 e7.0 e10 142 45 36 19 1.0 e.00 24 14 13 7.4 e6.0 e8.0 e10 226 47 36 18 2.1 e.00 23 e7.0 15 14 e5.0 e8.0 e9.0 190 47 38 18 1.7 e.40 22 16 14 e7.0 e8.0 e8.0 177 44 40 6.3 21 31 17 18 e7.0 e5.0 e8.5 e7.0 119 44 40 12 2.9 4.3 18 14 e7.5 e6.0 e8.0 e6.0 45 49 18 1.6 4.0 32 125 19 e7.5 27 14 e6.0 e8.0 e10 117 45 48 16 e.80 4.3 20 13 e7.5 e7.0 e7.0 45 42 e.80 6.4 31 e10 85 11 21 47 9.6 12 e7.5 e8.0 e8.0 e15 75 38 e.70 9.1 49 22 11 e8.0 e8.0 e8.0 e15 62 43 31 8.2 e.70 15 69 23 8.1 e8.5 e8.0 e8.0 e15 62 36 28 5.7 e.60 16 43 7.6 24 e8.5 e7.0 e8.0 e18 51 36 25 3.8 e.70 17 29 25 6.2 e7.0 e5.5 e7.0 39 22 2.7 19 42 26 8.8 e5.0 e7.0 e18 39 32 e.60 19 95 27 10 e6.0 e5.0 e8.0 e18 31 16 4.7 e.50 30 51 41 9.1 e7.0 e4.0 e9.0 39 33 12 3.8 e.50 25 35 e12 29 7.8 e8.0 e5.0 e10 37 37 12 1.7 e.40 23 27 30 7.0 1.2 20 23 e8.0 e6.0 12 e.40 e10 36 34 e.20 19 7.4 e6.0 e6.0 31 11 TOTAL. 199.5 301.2 226.9 257.5 1066 366.1 35.36 233.00 944 272.5 2247 0 1140 31.5 MEAN 9.72 7.56 6.44 8.31 9.73 72.5 38.0 34.4 12.2 1.14 7 52 MAX 18 12 8.5 10 18 226 47 55 20 6.3 30 95 MIN 2.5 6.0 4.0 6.0 3.0 9.0 26 11 1.2 .10 00 18 AC-FT 597 450 396 511 541 2260 2110 726 70 462 1870

CAL YR 1988 TOTAL 13475.4 MEAN 36.8 MAX 892 MIN 1.5 AC-FT 26730 WTR YR 1989 TOTAL 7289.06 MEAN 20.0 MAX 226 MIN .00 AC-FT 14460

e Estimated

#### 06447000 WHITE RIVER NEAR KADOKA, SD

LOCATION.--Lat 43°45'09", long 101°31'28", in SE\SE\sec.30, T.3 S., R.22 E., Black Hills meridian, Jackson County, Hydrologic Unit 10140202, near center of span on downstream side of bridge on State Highway 73, 5.0 mi upstream from Pass Creek, 5.5 mi downstream from Cottonwood Creek, and 5.8 mi south of Kadoka.

DRAINAGE AREA. -- 5.000 mi 2, approximately.

PERIOD OF RECORD . -- July 1942 to current year.

REVISED RECORDS .-- WSP 1279: 1944(M). 1948.

GAGE.--Water-stage recorder. Datum of gage is 2,122.18 ft above National Geodetic Vertical Datum of 1929.
Prior to June 14, 1949, nonrecording gage, and June 14, 1949, to Mar. 8, 1955, water-stage recorder at site 0.3 mi downstream at same datum. Mar. 9, 1955, to May 17, 1957, nonrecording gage at present site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--47 years, 269 ft<sup>3</sup>/s, 194,900 acre-ft/yr; median of yearly mean discharges, 250 ft<sup>3</sup>/s, 181,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 21,700 ft<sup>3</sup>/s, June 7, 1951, gage height, 13.83 ft, site then in use, from rating curve extended above 16,000 ft<sup>3</sup>/s; maximum gage height, 16.18 ft, May 20, 1982; no flow at times in many years.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 4, 1942, reached a stage of 16.24 ft, from floodmarks (discharge, about 32,000 ft<sup>3</sup>/s, from rating curve extended above 16,000 ft<sup>3</sup>/s). Floods of Mar. 8, 1905, and in spring of 1927 were 1 or 2 ft higher than flood of June 4, 1942, from information by local residents.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 3,600 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Sept. 21	1645	*7,510	*9.76	No other	peak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow June 30 to July 5, July 29 to Aug. 11, Sept. 6-9.

			,			MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	460	16	e46	e9.0	e10	e11	92	326	19	e.00	.00	9.0
2	203	15	e50	e9.5	e5.0	e10	83	194	18	e.00	.00	17
3	91	14	e47	e10	e4.5	e9.0	83	143	22	e.00	.00	e3.0
4	49	14	e50	e11	e4.5	e8.0	88	153	23	e.00	.00	e1.0
5	30	15	e54	e10	e5.0	e7.0	83	108	19	e.00	.00	e.50
6	22	15	e50	e10	e6.0	e7.5	83	133	e16	100	.00	e.00
7	20	15	e45	e8.0	e7.5	e9.0	75	124	e13	122	.00	e.00
8	21	15	e39	e6.0	e7.0	e20	71	100	8.0	126	.00	e.00
9	20	16	e35	e6.0	e8.5	e200	54	80	5.9	23	.00	e.00
10	16	16	e32	e6.2	e10	e1400	56	55	4.8	e8.0	.00	132
11	12	e16	e31	e7.0	e12	e1500	68	44	e4.9	e4.0	e.00	522
12	11	e16	e33	e8.0	e14	e1000	58	51	5.0	e2.0	6.0	752
13	8.9	e15	e36	e9.0	e13	e650	58	182	7.3	e1.0	e2.0	252
14	7.9	e15	e33	e9.0	e12	e500	40	235	8.8	30	e1.0	89
15	7.7	e14	e28	e8.5	e11	e400	29	293	6.6	104	e.50	40
16	7.7	e15	e29	e9.0	e10	e440	20	346	e5.0	350	e.00	22
17	23	e16	e30	e9.5	e9.0	e420	22	195	e4.0	243	e.00	12
18	90	e17	e33	e10	e8.0	e300	64	249	e3.0	112	e.00	9.1
19	101	e17	e34	e10	e8.5	e100	228	219	e2.5	51	9.0	e2.0
20	139	e18	e32	e10	e9.5	e250	343	140	e2.0	138	e3.5	43
21	89	e20	e33	e11	e10	e300	177	88	e1.5	64	e2.0	4980
22	54	e24	e30	e11	e9.5	e380	94	74	e1.0	25	e1.0	3700
23	38	e30	e26	e10	e11	336	89	68	2.7	9.0	e.60	1100
24	29	e40	e22	e9.5	e13	321	79	55	5.3	5.2	e.20	371
25	24	e50	e18	e9.0	e13	268	74	44	e4.0	e3.0	15	141
26	22	e48	e15	e9.5	e12	210	63	35	e3.0	e2.0	6.0	87
27	19	e40	e13	e11	e13	163	577	35	e2.0	e1.0	e2.0	70
28	19	e35	e11	e10	e12	132	612	29	e1.0	e.50	6.0	45
29	18	e40	e9.0	e11		126	612	26	e.50	e.00	22	31
30	14	e43	e9.0	e14		109	399	25	e.00	e.00	2.7	42
31	14		e9.5	e13		100		23		e.00	e1.0	
TOTAL	1680.2	680	962.5	294.7	268.5	9686.5	4474	3872	218.80	1523.70	80.50	12472.60
MEAN	54.2	22.7	31.0	9.51	9.59	312	149	125	7.29	49.2	2.60	416
MAX	460	50	54	14	14	1500	612	346	23	350	22	4980
MIN	7.7	14	9.0	6.0	4.5	7.0	20	23	.00	.00	.00	.00
AC-FT	3330	1350	1910	585	533	19210	8870	7680	434	3020	160	24740

CAL YR 1988 TOTAL 62155.27 MEAN 170 MAX 5760 MIN .00 AC-FT 123300 WTR YR 1989 TOTAL 36214.00 MEAN 99.2 MAX 4980 MIN .00 AC-FT 71830

e Estimated

#### 06447500 LITTLE WHITE RIVER NEAR MARTIN, SD

LOCATION.--Lat 43\*10'00", long 101\*37'47", in NW% sec.19, T.37 N., R.36 W., Bennett County, Hydrologic Unit 10140203, on right bank 70 ft downstream from highway culvert and 5.4 mi east of Martin.

DRAINAGE AREA. -- 310 mi<sup>2</sup>, approximately, of which about 230 mi<sup>2</sup> probably contributes directly to surface runoff.

PERIOD OF RECORD. -- February 1938 to September 1940, July 1962 to current year. Prior to October 1965, published as South Fork White River near Martin.

GAGE.--Water-stage recorder. Elevation of gage is 3,045 ft, by barometer. Prior to Aug. 14, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --29 years, 19.3 ft<sup>3</sup>/s, 13,980 acre-ft/yr; median of yearly mean discharges, 18 ft<sup>3</sup>/s, 13,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 1,190 ft<sup>3</sup>/s, July 19, 1965, gage height, 12.90 ft, from rating curve extended above 340 ft<sup>3</sup>/s on basis of computation of peak flow through culvert and flow-over-road measurement of peak flow; maximum gage height, 13.21 ft, Mar. 11, 1966, backwater from ice; minimum daily discharge, 0.6 ft<sup>3</sup>/s, Aug. 14, 16, 18, 1940; no flow for part of each day Oct. 19, 20, 22, 1962 (regulation caused by construction work above station).

EXTREMES OUTSIDE PERIOD OF RECORD .-- Flood of May 5, 1932, reached a stage of 13.3 ft, from floodmarks.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge 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. 13	2245	*197	*5.81	No other	peak grea	ter than base d	ischarge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Minimum daily discharge, 3.1 ft<sup>3</sup>/s, July 30, 31.

					1	MEAN VALUES	3					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.8	12	e16	e10	e11	e6.6	33	25	11	7.3	3.5	4.9
2	8.8	13	e17	e9.0	e5.0	e5.6	31	25	12	7.5	3.6	5.0
2	8.7	13	e18	e8.6	e4.0	e5.4	32	26	11	7.1	3.5	5.1
4	8.7	13	e17	e9.0	e4.2	e5.0	38	25	10	7.0	3.4	5.1
5	8.6	13	e17	e10	e4.5	e5.4	37	26	10	6.3	3.3	5.3
6	8.7	13	e18	e9.0	e5.0	e7.0	37	25	9.9	6.0	3.2	5.1
7	9.3	13	e19	e8.0	e5.6	e8.0	29	24	9.2	5.4	3.2	5.1
8	e9.3	13	e17	e7.0	e5.8	e10	23	23	8.5	4.8	3.2	5.2
9	9.5	13	e17	e6.4	e5.4	e20	22	22	8.2	4.4	3.3	5.6
10	9.6	14	e18	e6.6	e6.4	e40	22	21	8.2	3.9	3.5	6.4
11	9.5	14	e17	e6.8	e7.0	69	22	20	8.4	3.6	3.8	7.2
12	9.6	14	e17	e6.8	e7.0	93	21	19	8.1	3.4	4.2	8.3
13	9.7	15	e18	e7.4	e6.6	141	21	19	7.9	3.3	4.4	8.8
14	9.7	15	e19	e7.6	e6.4	151	20	19	7.9	3.4	4.6	8.6
15	10	15	e16	e7.4	e6.2	82	20	20	7.8	3.6	4.8	8.3
16	e10	16	e13	e7.2	e6.4	68	20	20	7.8	3.8	4.8	8.2
17	e10	e15	e14	e7.8	e6.6	49	21	22	7.6	4.1	4.8	8.0
18	11	16	e15	e8.4	e4.5	e44	23	26	7.3	4.3	4.8	7.4
19	11	e15	e15	e8.2	e5.0	e40	23	22	7.0	4.4	4.8	7.0
20	11	e15	e14	e8.0	e5.4	e38	24	20	6.5	4.3	5.9	7.2
21	12	e14	e13	e8.2	e6.0	e41	23	18	6.1	4.3	5.4	8.3
22	12	e14	e13	e9.0	e5.6	e43	21	15	5.8	4.0	5.0	8.9
23	12	e14	e13	e9.0	e5.4	45	20	14	5.7	3.8	4.8	12
24	11	e15	e12	e7.0	e8.0	47	18	13	6.8	3.6	4.5	12
25	e12	e15	e11	e6.4	e9.0	44	19	11	7.6	3.4	4.4	11
26	e12	e15	e10	e7.0	e8.0	38	19	11	9.1	3.3	4.5	9.9
27	12	e15	e9.0	e8.0	e7.4	38	21	10	9.2	3.3	4.5	9.2
28	12	e15	e9.5	e9.6	e7.8	39	22	10	9.2	3.2	4.5	8.5
29	12	e14	e10	e8.6		38	24	9.8	8.2	3.2	4.6	8.0
30	12	e15	e10	e9.6		36	25	9.7	7.6	3.1	4.7	7.8
31	12		e10	e10		34		11		3.1	4.6	
TOTAL	322.5	426	452.5	251.6	175.2	1331.0	731	581.5	249.6	136.2	132.1	227.4
MEAN	10.4	14.2	14.6	8.12	6.26	42.9	24.4	18.8	8.32	4.39	4.26	7.58
MAX	12	16	19	10	11	151	38	26	12	7.5	5.9	12
MIN	8.6	12	9.0	6.4	4.0	5.0	18	9.7	5.7	3.1	3.2	4.9
AC-FT	640	845	898	499	348	2640	1450	1150	495	270	262	451

CAL YR 1988 TOTAL 8177.4 MEAN 22.3 MAX 277 MIN 3.3 AC-FT 16220 WTR YR 1989 TOTAL 5016.6 MEAN 13.7 MAX 151 MIN 3.1 AC-FT 9950

e Estimated

#### 06449000 LAKE CREEK BELOW REFUGE, NEAR TUTHILL, SD

LOCATION.--Lat 43°08'46", long 101°30'38", in SWk sec.30, T.37 N., R.35 W., Bennett County, Hydrologic Unit 10140203, on left bank 400 ft downstream from east boundary of LaCreek game refuge, 1.2 mi southwest of Tuthill, and 5.5 mi upstream from mouth.

DRAINAGE AREA. -- 120 mi<sup>2</sup>, approximately, of which about 60 mi<sup>2</sup> probably contributes directly to surface runoff.

PERIOD OF RECORD . -- February 1938 to September 1940, July 1962 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 3,055 ft, by barometer. Prior to Aug. 4, 1938, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --29 years, 16.5 ft<sup>3</sup>/s, 11,950 acre-ft/yr; median of yearly mean discharges, 17 ft<sup>3</sup>/s, 12,300 acre-ft/yr

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 594 ft<sup>3</sup>/s, Mar. 25, 1987, gage height, 5.57 ft, from rating curve extended above 150 ft<sup>3</sup>/s; maximum gage height, 6.46 ft, Mar. 12, 1988, backwater from ice; no flow for many days in most years.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 88 ft<sup>3</sup>/s at 1345 hours, Apr. 3, gage height, 3.86 ft; no flow Nov. 17-22.

					ŀ	EAN VALUE	3					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.79	.05	.06	4.0	18	8.9	33	18	9.2	22	4.4	.70
2	. 83	.05	.06	4.1	.88	9.3	37	18	7.3	20	4.2	.70
2	.72	.07	.06	4.0	4.3	15	51	22	7.1	19	3.6	.70
4	.72	.06	.07	4.0	6.9	18	28	26	7.3	17	3.2	.70
5	.76	.04	.07	6.0	13	13	28	23	9.4	17	3.0	.73
6	.71	.07	.05	8.0	17	21	28	18	8.2	17	2.8	.76
7	.70	.05	.04	e9.5	16	23	31	20	14	18	2.7	.75
8	.71	.07	.06	e9.0	11	24	23	20	22	18	2.5	.72
9	. 62	.07	.08	e8.8	14	26	24	19	32	17	2.1	.70
10	. 56	.06	.11	8.7	14	28	27	20	40	17	2.0	.72
11	. 56	.13	.09	8.5	10	29	23	20	17	16	1.8	.70
12	. 55	.11	. 13	8.3	8.9	30	31	19	14	16	1.7	.70
13	.56	.09	.11	8.3	8.4	32	37	23	12	19	1.8	.70
14	. 55	.10	.05	8.3	8.2	35	33	22	9.5	22	1.5	.71
15	.47	.17	.02	8.4	8.1	36	32	21	9.6	22	1.1	.73
16	. 50	.01	.05	8.6	8.2	36	27	21	9.5	21	1.0	.72
17	.45	.00	12	8.5	8.7	38	27	25	9.2	20	1.0	.68
18	.45	.00	14	8.2	8.6	39	29	23	8.6	18	.96	.61
19	.48	.00	4.3	8.1	8.8	38	27	23	8.3	17	1.0	.45
20	.42	.00	4.2	8.3	8.9	37	26	18	8.2	16	1.0	.46
21	.33	.00	4.2	8.3	9.0	36	25	19	6.9	15	.95	. 58
22	. 28	.00	4.9	8.0	9.1	37	25	16	6.6	14	.88	.41
23	.19	.01	8.5	8.0	9.2	37	22	14	6.5	13	.86	. 22
24	.11	.02	4.2	e7.8	9.2	37	21	15	6.6	26	.86	.21
25	.08	.06	3.8	e7.6	9.1	36	20	15	6.6	32	1.0	.19
26	.08	.09	5.0	e7.6	9.0	36	21	5.5	6.8	5.1	1.3	. 18
27	.04	e.10	6.6	e7.8	9.0	36	23	5.7	11	5.5	. 56	. 17
28	.05	.10	7.1	8.2	8.9	36	30	5.2	11	5.3	.61	.19
29	.06	.08	7.1	8.3		36	20	5.8	14	5.1	.66	. 17
30	.05	.07	5.7	8.2		33	18	7.0	22	4.8	.68	.17
31	.05		4.3	8.9		34		7.0		4.6	.70	
TOTAL	13.43	1.73	97.01	238.3	274.38	930.2	827	534.2	360.4	499.4	52.42	16.13
MEAN	. 43	.058	3.13	7.69	9.80	30.0	27.6	17.2	12.0	16.1	1.69	. 54
MAX	.83	.17	14	9.5	18	39	51	26	40	32	4.4	.76
MIN	.04	.00	.02	4.0	.88	8.9	18	5.2	6.5	4.6	.56	.17
AC-FT	27	3.4	192	473	544	1850	1640	1060	715	991	104	32

CAL YR 1988 TOTAL 9371.36 MEAN 25.6 MAX 146 MIN .00 AC-FT 18590 WTR YR 1989 TOTAL 3844.60 MEAN 10.5 MAX 51 MIN .00 AC-FT 7630

e Estimated

#### 06449100 LITTLE WHITE RIVER NEAR VETAL, SD

LOCATION.--Lat 43°06'03", long 101°13'49", in NEkNWk sec.17, T.36 N., R.33 W., Bennett County, Hydrologic Unit 10140203, on left bank 120 ft downstream from highway bridge, 0.3 mi downstream from small right-bank tributary, 10.8 mi southeast of Vetal, and 15.3 mi upstream from Spring Creek.

DRAINAGE AREA. --590  $\min^2$ , approximately, of which about 415  $\min^2$  probably contributes directly to surface runoff.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- August 1959 to current year. Prior to October 1965, published as South Fork White River near Vetal.

GAGE.--Water-stage recorder. Datum of gage is 2,780.69 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 14, 1959, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Some small diversion for irrigation and some storage in several small lakes above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--30 years, 53.0 ft<sup>3</sup>/s, 38,400 acre-ft/yr; median of yearly mean discharges, 55 ft<sup>3</sup>/s, 39,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,330 ft<sup>3</sup>/s, Mar. 13, 1966, gage height, 7.75 ft; minimum daily, 9.0 ft<sup>3</sup>/s, Dec. 24, 25, 1974.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 26	1615	a	*4.78	Mar. 11		*140	a4.50

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice.
Minimum daily discharge, 10 ft<sup>3</sup>/s, Feb. 3.

		DISCHARGE	, IN CODIC	, FEET FE	M	EAN VALUES	EAR OCTOR	ER 1900	O SEFTEM	3EK 1909		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	27	e33	e28	e23	e34	83	56	35	39	21	17
2	21	27	34	e27	e16	e32	80	57	34	41	20	17
3	21	27	34	e27	e10	e31	75	56	33	40	21	17
4	22	27	33	e28	e11	e30	84	56	32	42	19	19
5	22	28	33	e29	e12	e29	77	61	32	37	18	20
6	22	28	34	e28	e15	e29	70	59	33	34	19	19
7	22	28	35	e27	e18	e30	70	58	32	34	20	19
8	22	28	30	e26	e21	e32	70	59	32	34	20	20
9	22	28	31	e25	e24	e40	65	57	40	35	18	22
10	23	29	37	e25	e27	e70	62	56	45	33	18	25
11	23	29	35	e26	e30	e120	65	55	54	32	18	23
12	23	29	33	e27	e33	e105	62	54	45	32	18	17
13	23	29	37	e27	e32	e95	66	59	36	31	18	17
14	23	29	34	e28	e32	e90	72	59	34	33	18	18
15	23	29	33	e28	e32	e85	71	58	32	39	18	17
16	23	29	33	e29	e32	e80	73	55	31	40	17	16
17	23	29	33	e30	e33	e76	68	59	30	40	17	15
18	23	32	38	e31	e32	e74	67	60	30	39	17	15
19	23	29	41	33	e31	e72	69	56	29	38	18	14
20	23	29	40	e33	e31	e74	69	56	28	37	19	21
21	23	31	38	34	e32	e76	69	53	27	34	20	28
22	24	33	39	33	e32	e78	68	53	26	33	19	20
23	24	33	36	33	e31	e80	67	51	26	32	18	18
24	25	34	e35	29	e32	e82	65	48	30	30	18	17
25	25	31	e33	29	e35	e84	61	45	31	31	18	16
26	25	32	e32	e27	e38	e86	61	42	30	45	17	16
27	25	e31	e30	e24	e36	e88	60	39	28	32	17	16
28	26	e30	e29	23	e35	e90	59	35	29	25	17	16
29	27	e31	e28	22		90	64	35	31	23	17	16
30	27	e32	e27	25		87	61	33	30	21	17	16
31	26		e27	24		81		35		21	16	7
TOTAL	725	888	1045	865	766	2150	2053	1615	985	1057	566	547
MEAN	23.4	29.6	33.7	27.9	27.4	69.4	68.4	52.1	32.8	34.1	18.3	18.2
MAX	27	34	41	34	38	120	84	61	54	45	21	28
MIN	21	27	27	22	10	29	59	33	26	21	16	14
AC-FT	1440	1760	2070	1720	1520	4260	4070	3200	1950	2100	1120	1080

CAL YR 1988 TOTAL 21307 MEAN 58.2 MAX 318 MIN 15 AC-FT 42260 WTR YR 1989 TOTAL 13262 MEAN 36.3 MAX 120 MIN 10 AC-FT 26310

e Estimated

WHITE RIVER BASIN 191 06449100 LITTLE WHITE RIVER NEAR VETAL, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD. -- October 1985 to September 1989 (discontinued).

			million Qui	marra bitt	a, waring	IIII OCIC	DIM 1300	10 011111	IDDIE 1000			
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC FRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
NOV												
03 DEC	1215	27	297	8.41	18.5	9.5	675	10.7	106	110	34	5.3
13 MAR	1610	38	272	8.53	15.5	5.5	675	10.6	95	100	33	4.7
29	1415	91	288	8.22	14.0	13.0	685	9.5	101	96	29	5.8
APR 26	1420	61	311	8.06	16.0	12.5	678	9.1	96	110	33	6.3
JUN 20		28	356	8.30	29.0	24.0	679	7.9	106	120	36	6.3
SEP												
15	1130	18	295	8.15	26.0	16.0	685	9.4	106	98	32	4.5
DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	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, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)
NOV 03	22	29	0.9	8.8	139	19	2.6	0.40	46	225	0.31	16.4
DEC												
13 MAR		27	0.8	8.2	128	17	3.9	0.40	50	217	0.29	22.1
29 APR	22	31	1	10	133	19	3.0	0.50	36	207	0.28	50.8
26 JUN	25	31	1	11	146	14	3.0	0.50	40	223	0.30	36.8
20	26	30	1	13	161	18	3.2	0.60	47	250	0.34	18.9
SEP 15	22	30	1	8.7	133	16	2.5	0.40	51	220	0.30	10.7
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	DIS- SOLVED (MG/L AS NH4)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	SOLVED (MG/L AS P)		ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
NOV												
03 DEC	0.020	0.680	0.700	0.010	0.01	0.150	0.090	<1	4	36	2.6	91
13	<0.010		0.720	0.040	0.05	0.240	0.150	<1	12	65	6.6	89
MAR 29	<0.010		0.270	0.020	0.03	0.320	0.160	<1	40			
APR 26	0.010	0.550	0.560	0.020	0.03	0.380	0.200	<1	4			
JUN 20	<0.010		0.700	0.020	0.03	0.240	0.200	<1	5	180	14	93
SEP 15	0.020	0.570	0.590	0.020		0.100			4	12	0.58	82

#### 06449300 LITTLE WHITE RIVER ABOVE ROSEBUD. SD

LOCATION.--Lat 43°15'47", long 100°55'02", in NW\SE\ sec.18, T.38 N., R.30 W., Todd County, Hydrologic Unit 10140203, on right bank at downstream side of Lampert bridge on BIA highway in Crazy Horse Canyon, at Ghost Hawk Park, 3.1 mi upstream from Rosebud Creek, and 4.6 mi northwest of Rosebud.

DRAINAGE AREA. -- 890 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- October 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,415 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Some small diversions for irrigation and some storage in several small lakes above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 104 ft<sup>3</sup>/s, 75,350 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 900 ft<sup>3</sup>/s, Aug. 4, 1983, gage height, 3.51 ft; maximum gage height, 4.57 ft, backwater from ice, sometime during period Jan. 20-27, 1987; minimum daily, 20 ft<sup>3</sup>/s, Feb. 3, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 10	unknown	*450	a*2.50	No other	peak grea	ter than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 20 ft<sup>3</sup>/s, Feb. 3.

			,		М	EAN VALUES	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e66	e74	82	e44	e40	e70	138	116	71	66	55	39
2	e66	72	78	e50	e22	e68	132	131	70	81	51	40
3	e65	70	76	e54	e20	e67	119	143	66	77	55	40
4	e65	71	72	e58	e21	e66	113	136	66	91	51	41
5	e65	69	77	e62	e23	e65	109	135	66	78	50	40
6	e65	63	85	e60	e30	e66	113	126	64	67	47	39
7	e66	69	80	e58	e45	e70	106	131	65	60	44	39
8	e66	67	52	e56	e60	e76	114	131	62	61	46	40
9	e66	75	48	e54	e70	e150	102	121	63	61	45	44
10	e66	71	75	e56	e75	e400	81	119	77	59	51	60
11	e64	76	82	e58	e74	e300	105	112	87	58	50	63
12	e64	78	86	e60	e73	e200	116	111	99	58	50	49
13	e66	79	80	e60	e72	e170	116	119	89	62	57	45
14	e66	79	91	e61	e70	e150	120	122	76	66	52	46
15	e68	81	62	e62	e68	139	127	117	71	85	49	47
16	e68	71	43	e63	e70	141	136	114	70	87	44	58
17	e70	67	65	e64	e72	172	131	114	67	88	43	47
18	e68	78	91	e65	e71	113	128	128	66	89	42	45
19	e82	73	102	e66	e70	123	138	118	65	83	44	46
20	e88	62	100	e67	e68	125	148	104	60	80	46	63
21	e88	79	71	e68	e68	113	161	104	55	72	45	141
22	e90	90	65	e69	e70	132	157	98	54	68	42	83
23	e70	89	59	e70	e71	134	149	97	57	63	44	60
24	e76	108	36	e68	e72	142	145	92	67	62	37	54
25	e80	77	e35	e66	e73	138	137	84	72	58	40	55
26	e72	92	e34	e67	e74	183	129	75	69	59	37	49
27	e72	51	e33	e68	e74	181	133	75	64	75	35	44
28	e74	47	e33	e70	e72	169	121	72	73	68	38	47
29	e72	100	e34	e70		156	111	69	74	80	39	46
30	e64	98	e36	e71		140	121	72	71	64	38	47
31	e78		e40	e72		111		70		65	40	
TOTAL	2196	2276	2003	1937	1688	4330	3756	3356	2076	2191	1407	1557
MEAN	70.8	75.9	64.6	62.5	60.3	140	125	108	69.2	70.7	45.4	51.9
MAX	90	108	102	72	75	400	161	143	99	91	57	141
MIN	64	47	33	44	20	65	81	69	54	58	35	39
AC-FT	4360	4510	3970	3840	3350	8590	7450	6660	4120	4350	2790	3090

CAL YR 1988 TOTAL 39441 MEAN 108 MAX 360 MIN 33 AC-FT 78230 WTR YR 1989 TOTAL 28773 MEAN 78.8 MAX 400 MIN 20 AC-FT 57070

e Estimated

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## 06449300 LITTLE WHITE RIVER ABOVE ROSEBUD, SD--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD. --October 1981 to current year.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
MAR	1405	150	070					700		00	V10	100
30 APR	1425	156	276	8.13	10.0	9.0	27	700	9.8	92	K10	100
27 MAY	1720	118	298	8.17	2.0	11.0	29	690	9.6	96	67	110
24 JUN	1210	92	300	8.30	21.0	22.0	53	686	8.1	103	240	110
20 SEP	1530	59	308	8.47	33.0	28.5	33	689	7.7	110	200	110
15	1440	53	275	8.22	32.0	20.0	3.5	694	9.1	110	K15	100
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 PERCENT (00932)	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)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)
MAR	-22		1.50	4.2	2.2	2.5			20.2	240	1.24	
30	33	5.3	18	25	0.8	9.3	135	15	2.6	197	153	166
27	34	5.6	20	27	0.8	9.2	141	14	2.0	214	8	173
24	35	5.6	22	28	0.9	11	148	13	3.1	226	169	179
JUN 20 SEP	34	5.0	21	28	0.9	10	145	14	3.3	236	92	176
15	33	4.6	19	27	0.8	8.2	132	11	1.5	222	11	158
DATE	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, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	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, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	GEN, AMMONIA DIS- SOLVED (MG/L AS NH4)	ORGANIC TOTAL (MG/L AS N)	NITRO- GEN, TOTAL (MG/L AS NO3) (71887)
MAR 30	0.27	83.0	0.020	<0.010	0.280	0.300	0.320	0.060	0.020	0.03	0.90	5.3
APR 27	0.29	68.2	0.020	<0.010	0.580	0.600	0.600	0.040	0.040	0.05	1.0	7.1
MAY 24	0.31	56.1		<0.010			<0.100		<0.010			
JUN 20	0.32	37.6		<0.010			0.320		0.030	0.04		
SEP 15	0.30	31.8	0.010	<0.010	0.390	0.400	0.350	0.010	0.010	0.01	0.70	4.9

06449300 LITTLE WHITE RIVER ABOVE ROSEBUD, SD--Continued WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	DIS- SOLVED (MG/L AS P)	(MG/L AS P)	SOLVED (MG/L AS P)	ARSENIC TOTAL (UG/L AS AS)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)
MAR 30	0.330	0.160	0.127	0.162	7	7	40	<1	1	3	<0.010	<0.01
APR 27	0.280	0.170	0.189	0.127	6	6	40	1	<1	2	<0.010	<0.01
MAY 24		0.170		0.129		9	40		<1	5		<0.01
JUN 20		0.140		0.100		9	60		<1	5		<0.01
SEP 15		0.050	0.075	0.016	6	7	40	<1	<1	<1	<0.010	
13	0.100	0.030	0.073	0.016	0	,	40	~1	~1	-1	<0.010	<0.01
DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	SOLVED (UG/L	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN. .062 MM (70331)
MAR 30	4200	28	7	100	2	<0.1	<1	<1	4			
APR 27		18	<5	100	1	<0.1	<1	<1	14			
MAY 24		30	<1		4	<0.1		<1	7			
JUN 20		18	<1		2	<0.1		<1	4	185	29	67
SEP 15			<1	20	2	<0.1	<1	<1	10	78.		21
13	500	13		20	4	-0.1	-1	-1	10	/0.	11	21
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	(MM OF HG)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	ALDRIN, TOTAL (UG/L) (39330)	ALDRIN, DIS- SOLVED (UG/L) (39331)
MAY		CHARGE, INST. CUBIC FEET PER SECOND (00061)	CIFIC CON- DUCT- ANCE (US/CM) (00095)	(STAND- ARD UNITS) (00400)	ATURE AIR (DEG C) (00020)	ATURE WATER (DEG C) (00010)	METRIC PRES- SURE (MM OF HG) (00025)	DIS- SOLVED (MG/L) (00300)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLOR TOTAL RECOVER (UG/L) (77825)	TOTAL (UG/L) (39330)	DIS- SOLVED (UG/L) (39331)
MAY 24 SEP	1210	CHARGE, INST. CUBIC FEET PER SECOND (00061)	CIFIC CON- DUCT- ANCE. (US/CM) (00095)	(STAND- ARD UNITS) (00400)	ATURE AIR (DEG C) (00020)	ATURE WATER (DEG C) (00010)	METRIC PRES- SURE (MM OF HG) (00025)	DIS- SOLVED (MG/L) (00300)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLOR TOTAL RECOVER (UG/L) (77825)	TOTAL (UG/L) (39330) <0.010	DIS- SOLVED (UG/L) (39331)
MAY 24	1210	CHARGE, INST. CUBIC FEET PER SECOND (00061)	CIFIC CON- DUCT- ANCE (US/CM) (00095)	(STAND- ARD UNITS) (00400)	ATURE AIR (DEG C) (00020)	ATURE WATER (DEG C) (00010)	METRIC PRES- SURE (MM OF HG) (00025)	DIS- SOLVED (MG/L) (00300)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLOR TOTAL RECOVER (UG/L) (77825)	TOTAL (UG/L) (39330)	DIS- SOLVED (UG/L) (39331)
MAY 24 SEP	1210	CHARGE, INST. CUBIC FEET PER SECOND (00061) 92 53 ATRA- ZINE, TOTAL (UG/L)	CIFIC CON- DUCT- ANCE (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL (UG/L)	(STAND- ARD UNITS) (00400)	ATURE AIR (DEG C) (00020) 21.0 32.0  CYAN-AZINE	ATURE WATER (DEG C) (00010)	METRIC PRES- SURE (MM OF HG) (00025) 686 694 DDD, DIS- SOLVED (UG/L)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE,	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CHLOR TOTAL RECOVER (UG/L) (77825) <0.10 <0.10 DDT, TOTAL (UG/L)	TOTAL (UG/L) (39330) <0.010	DIS- SOLVED (UG/L) (39331)
MAY 24 SEP 15 DATE	1210 1440 AME- TRYNE TOTAL (82184)	CHARGE, INST. CUBIC FEET FER SECOND (00061) 92 53 ATRA- ZINE, TOTAL (UG/L) (39630)	CIFIC CON- DUCT- ANCE. (US/CM) (00095) 300 275 CHLOR- DANE, TOTAL (UG/L) (39350)	(STAND- ARD UNITS) (00400) 8.30 8.22 CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	ATURE AIR (DEG C) (00020) 21.0 32.0 CYAN- AZINE TOTAL (UG/L) (81757)	ATURE WATER (DEG C) (00010)  22.0  20.0  DDD, TOTAL (UG/L) (39360)	METRIC PRES- SURE (MM OF HG) (00025) 686 694 DDD, DIS- SOLVED (UG/L) (39361)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301) 103 110 DDE, DIS- SOLVED (UG/L) (39366)	CHLOR TOTAL RECOVER (UG/L) (77825) <0.10 <0.10 DDT, TOTAL (UG/L) (39370)	TOTAL (UG/L) (39330) <0.010 <0.010 DDT, DIS-SOLVED (UG/L) (39371)	DIS- SOLVED (UG/L) (39331) <0.01 <0.01 DI- AZINON, TOTAL (UG/L) (39570)
MAY 24 SEP 15  DATE  MAY 24 SEP	1210 1440 AME- TRYNE TOTAL (82184)	CHARGE, INST. CUBIC FEET PER SECOND (00061)  92  53  ATRA-ZINE, TOTAL (UG/L) (39630)  <0.10	CIFIC CON- DUCT- ANCE. (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL. (UG/L) (39350)	(STAND- ARD UNITS) (00400) 8.30 8.22 CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	ATURE AIR (DEG C) (00020)  21.0  32.0  CYAN-AZINE TOTAL (UG/L) (81757)  <0.10	ATURE WATER (DEG C) (00010)  22.0 20.0  DDD, TOTAL (UG/L) (39360)  <0.010	METRIC FRES- SURE (MM OF HG) (00025) 686 694 DDD, DIS- SOLVED (UG/L) (39361)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301) 103 110 DDE, DIS- SOLVED (UG/L) (39366)	CHLOR TOTAL RECOVER (UG/L) (77825) <0.10 <0.10 DDT, TOTAL (UG/L) (39370) <0.010	TOTAL (UG/L) (39330) <0.010 <0.010 DDT, DIS-SOLVED (UG/L) (39371) <0.01	DIS- SOLVED (UG/L) (39331) <0.01 <0.01 DI- AZINON, TOTAL (UG/L) (39570)
MAY 24 SEP 15 DATE	1210 1440 AME- TRYNE TOTAL (82184)	CHARGE, INST. CUBIC FEET PER SECOND (00061)  92  53  ATRA-ZINE, TOTAL (UG/L) (39630)  <0.10	CIFIC CON- DUCT- ANCE. (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL. (UG/L) (39350)	(STAND- ARD UNITS) (00400) 8.30 8.22 CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	ATURE AIR (DEG C) (00020)  21.0  32.0  CYAN-AZINE TOTAL (UG/L) (81757)  <0.10	ATURE WATER (DEG C) (00010)  22.0 20.0  DDD, TOTAL (UG/L) (39360)  <0.010	METRIC FRES- SURE (MM OF HG) (00025) 686 694 DDD, DIS- SOLVED (UG/L) (39361)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301) 103 110 DDE, DIS- SOLVED (UG/L) (39366)	CHLOR TOTAL RECOVER (UG/L) (77825) <0.10 <0.10 DDT, TOTAL (UG/L) (39370)	TOTAL (UG/L) (39330) <0.010 <0.010 DDT, DIS-SOLVED (UG/L) (39371)	DIS- SOLVED (UG/L) (39331) <0.01 <0.01 DI- AZINON, TOTAL (UG/L) (39570)
MAY 24 SEP 15  DATE  MAY 24 SEP	1210 1440  AME- TRYNE TOTAL (82184)  <0.10  <0.10  DI- AZINON, DIS- SOLVED (UG/L)	CHARGE, INST. CUBIC FEET PER SECOND (00061)  92  53  ATRA-ZINE, TOTAL (UG/L) (39630)  <0.10  DI-ELDRIN TOTAL	CIFIC CON- DUCT- ANCE. (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL. (UG/L) (39350)	(STAND- ARD UNITS) (00400) 8.30 8.22 CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	ATURE AIR (DEG C) (00020)  21.0  32.0  CYAN-AZINE TOTAL (UG/L) (81757)  <0.10	ATURE WATER (DEG C) (00010)  22.0 20.0  DDD, TOTAL (UG/L) (39360)  <0.010	METRIC FRES- SURE (MM OF HG) (00025) 686 694 DDD, DIS- SOLVED (UG/L) (39361)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)  103 110  DDE, DIS- SOLVED (UG/L) (39366)  <0.01  <0.01  ETHION DISSOLV (UG/L)	CHLOR TOTAL RECOVER (UG/L) (77825) <0.10 <0.10 <0.10 CM (UG/L) (39370) <0.010 <0.010 CM (UG/L) (39370) <0.010 CM (UG/L) (	TOTAL (UG/L) (39330) <0.010 <0.010 DDT, DIS-SOLVED (UG/L) (39371) <0.01	DIS- SOLVED (UG/L) (39331) <0.01 <0.01 DI- AZINON, TOTAL (UG/L) (39570)
MAY 24 SEP 15  DATE  MAY 24 SEP 15	1210 1440  AME- TRYNE TOTAL (82184)  <0.10 <0.10  DI- AZINON, DIS- SOLVED (UG/L) (39572)	CHARGE, INST. CUBIC FEET PER SECOND (00061)  92  53  ATRA-ZINE, TOTAL (UG/L) (39630)  <0.10  DI-ELDRIN TOTAL (UG/L) (39380)	CIFIC CON- DUCT- ANCE. (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL. (UG/L) (39350)  <0.1  DI- ELDRIN DIS- SOLVED (UG/L) (39381)	(STAND-ARD UNITS) (00400)  8.30  8.22  CHLOR-DANE, DIS-SOLVED (UG/L) (39352)  <0.1  <0.1  ENDO-SULFAN, TOTAL (UG/L) (39388)	ATURE AIR (DEG C) (00020)  21.0  32.0  CYAN- AZINE TOTAL (UG/L) (81757)  <0.10  <0.10  ENDO- SULFAN DISSOLV (UG/L) (82354)	ATURE WATER (DEG C) (00010)  22.0  20.0  DDD, TOTAL (UG/L) (39360)  <0.010  ENDRIN, TOTAL (UG/L) (39390)	METRIC PRES- SURE (MM OF HG) (00025)  686 694  DDD, DIS- SOLVED (UG/L) (39361)  <0.01  ENDRIN, DIS- SOLVED (UG/L) (39391)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365) <0.010 ETHION, TOTAL (UG/L) (39398)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301)  103  110  DDE, DIS- SOLVED (UG/L) (39366)  <0.01  <0.01  ETHION DISSOLV (UG/L) (82346)	CHLOR TOTAL RECOVER (UG/L) (77825)  <0.10 <0.10  DDT, TOTAL (UG/L) (39370)  <0.010  <0.010  HEPTA-CHLOR, TOTAL (UG/L) (39410)	TOTAL (UG/L) (39330) <0.010 <0.010 <0.010 DDT, DIS-SOLVED (UG/L) (39371) <0.01 <0.01 HEPTA-CHLOR, DIS-SOLVED (UG/L) (39411)	DIS-SOLVED (UG/L) (39331)  <0.01 <0.01  DI-AZINON, TOTAL (UG/L) (39570)  <0.01  <0.01  HEPTA-CHLOR EPOXIDE TOTAL (UG/L) (39420)
MAY 24 SEP 15  DATE  MAY 24 SEP 15	1210 1440  AME- TRYNE TOTAL (82184)  <0.10  <0.10  DI- AZINON, DIS- SOLVED (UG/L) (39572)  <0.01	CHARGE, INST. CUBIC FEET FER SECOND (00061)  92  53  ATRA- ZINE, TOTAL (UG/L) (39630)  <0.10  DI- ELDRIN TOTAL (UG/L) (UG/L)	CIFIC CON- DUCT- ANCE. (US/CM) (00095)  300 275  CHLOR- DANE, TOTAL (UG/L) (39350)  <0.1  DI- ELDRIN DIS- SOLVED (UG/L)	(STAND-ARD UNITS) (00400)  8.30  8.22  CHLOR-DANE, DIS-SOLVED (UG/L) (39352)  <0.1  <0.1  ENDO-SULFAN, TOTAL (UG/L)	ATURE AIR (DEG C) (00020)  21.0  32.0  CYAN- AZINE TOTAL (UG/L) (81757)  <0.10  ENDO- SULFAN DISSOLV (UG/L)	ATURE WATER (DEG C) (00010)  22.0  20.0  DDD, TOTAL (UG/L) (39360)  <0.010  ENDRIN, TOTAL (UG/L)	METRIC PRES- SURE (MM OF HG) (00025)  686 694  DDD, DIS- SOLVED (UG/L) (39361)  <0.01  ENDRIN, DIS- SOLVED (UG/L) (UG/L)	DIS- SOLVED (MG/L) (00300) 8.1 9.1 DDE, TOTAL (UG/L) (39365) <0.010 ETHION, TOTAL (UG/L)	DIS- SOLVED (PER- CENT SATUR- ATION) (00301) 103 110 DDE, DIS- SOLVED (UG/L) (39366) <0.01 <0.01 ETHION DISSOLV (UG/L) (82346)	CHLOR TOTAL RECOVER (UG/L) (77825)  <0.10  <0.10  DDT, TOTAL (UG/L) (39370)  <0.010  <0.010  HEPTA-CHLOR, TOTAL (UG/L) (UG/L)	TOTAL (UG/L) (39330)   <0.010   <0.010    DDT, DIS-SOLVED (UG/L) (39371)   <0.01   <0.01   HEPTA-CHLOR, DIS-SOLVED (UG/L) (UG/L) (UG/L) (UG/L) (UG/L) (UG/L)	DIS-SOLVED (UG/L) (39331)  <0.01 <0.01  AZINON, TOTAL (UG/L) (39570)  <0.01  <0.01  HEPTA-CHLOR EPOXIDE TOTAL (UG/L) (UG/L)

195 06449300 LITTLE WHITE RIVER ABOVE ROSEBUD, SD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	HEPTA- CHLOR EPOXIDE DIS- SOLVED (UG/L) (39421)	LIND TOT (UG (393	ANE I	INDANE DIS- DLVED (UG/L) 39341)	MALA- THION TOTAL (UG/L (39530	, DI SOI ) (UC	CON, CES- CES-LVED TO	TH- DXY- ILOR, DTAL IG/L)	METHOXY- CHLOI DISSO (UG/) (823)	R THOLV TO	THYL RA- ION, TAL IG/L)	THIC DIS SOL' (UG	A- MET ON, TR S- THI VED TOT /L) (UG	I- TRI- ON, THION AL DISSO /L) (UG/I	MIREX, DLV TOTAL (UG/L)
MAY 24 SEP	<0.01	<0.	010	<0.01	<0.0	1 <0	0.01 <	0.01	<0	.01 <	0.01	<0	.01 <0	.01 <0.	01 <0.01
15	<0.01	<0.	010	<0.01	<0.0	1 <0	0.01 <	0.01	<0	.01 <	0.01	<0	.01 <0	.01 <0.	01 <0.01
DAT	re so	REX, DIS- DLVED G/L) 0756)	PARA- THION TOTAL (UG/I (39540	TH (, D SO:	LVED (	PCB, TOTAL UG/L) 39516)	PCB, DIS- SOLVED (UG/L) (39517)	LE PO CH TO (UG	PH- HA- NES, LY- LOR. TAL /L) 250)	PCN DISSOL (UG/L) (82360	V	PER- THANE TOTAL (UG/L) 39034)	PER- THANE DISSOLV (UG/L) (82348)	(UG/L)	PROMETRYNE TOTAL (UG/L) (39057)
MAY 24 SEP	. <	0.01	<0.0	)1 <	0.01	<0.1	<0.1	. <	0.10	<0.1	.0	<0.1	<0.10	<0.1	<0.1
15	. <	0.01	<0.0	)1 <	0.01	<0.1	<0.1	. <	0.10	<0.1	.0	<0.1	<0.10	<0.1	<0.1
DAT	TE TOT	INE	SILVEX TOTAL (UG/I (39760	( Z TO	INE TAL G/L)	SIME- TRYNE TOTAL (UG/L) 39054)	TOX- APHENE, TOTAL (UG/L) (39400)	APHI Di SOI (Ud	OX- ENE, IS- LVED G/L)	TOTAL TRI- THION (UG/L (39786	D D	RI- HION ISSOLV (UG/L) 82342)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
MAY 24 SEP	. <	0.10	<0.0	)1 <	0.10	<0.1	<1	<	1.0	<0.0	1	<0.01	<0.01	<0.01	<0.01
15	. <	0.10	<0.0	1 <	0.10	<0.1	<1	<	1.0	<0.0	1	<0.01	<0.01	<0.01	<0.01

#### 06449400 ROSEBUD CREEK AT ROSEBUD, SD

LOCATION.--Lat 43°14'14", long 100°51'26", in SWkSWkNEk sec.27, T.38 N., R.30 W., Todd County, Hydrologic Unit 10140203, on left bank 40 ft upstream from bridge on Spotted Tail Lane in town of Rosebud, 0.4 mi downstream from small right bank tributary, and 1.0 mi downstream from Spotted Tail Dam.

DRAINAGE AREA. -- 50.8 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- October 1974 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,531.91 ft above National Geodetic Vertical Datum of 1929. October 1963 to September 1970, low-flow partial-record station 0.26 mi<sup>2</sup> upstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by Spotted Tail Dam and dam forming Indian Scout Lake, combined capacity, about 50 acre-ft, and some small diversions for irrigation of Spotted Tail Golf Course above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--15 years, 7.49 ft<sup>3</sup>/s, 5,430 acre-ft/yr; median of yearly mean discharges, 7.5 ft<sup>3</sup>/s, 5,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 643 ft<sup>3</sup>/s, July 27, 1976, gage height, 10.34 ft; no flow Apr. 21, 1982.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32 ft<sup>3</sup>/s at 2030 hours, Sept. 20, gage height, 5.24 ft; maximum gage height, 6.23 ft, Mar. 5, backwater from ice; minimum daily discharge, 2.7 ft<sup>3</sup>/s, Feb. 3.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

					M	EAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.4	7.9	8.9	e7.7	5.6	7.8	8.0	8.2	9.2	3.9	4.7	4.2
2	6.0	7.8	8.7	e7.7	e4.0	e6.8	7.5	8.0	8.1	4.7	4.9	4.3
2	6.4	7.3	8.6	8.0	e2.7	e5.8	7.5	8.0	7.8	3.6	5.6	4.4
4	6.3	7.2	8.7	8.0	e3.4	e5.0	8.1	8.8	7.3	3.9	4.6	4.9
5	6.6	7.0	8.5	8.0	e4.5	e6.7	9.2	9.0	7.1	3.2	4.7	4.9
6	6.7	7.1	8.1	8.0	e6.0	e9.8	7.6	8.0	7.0	3.3	4.7	4.4
7	6.6	7.0	7.8	e7.4	7.8	e14	7.3	7.2	6.8	3.1	4.5	4.5
8	6.3	7.4	6.6	e8.2	e7.2	13	7.1	8.0	6.5	3.0	e4.5	5.0
9	6.2	6.9	7.8	8.5	e7.0	14	7.4	7.6	6.8	3.0	e4.6	5.6
10	6.2	6.7	8.4	8.4	7.5	11	7.5	7.4	6.7	2.9	e5.0	8.8
11	6.1	6.9	8.3	8.1	7.8	10	8.4	6.8	6.7	3.1	e5.1	7.9
12	6.3	7.7	8.2	7.5	6.9	9.6	7.2	6.9	6.7	3.0	e5.2	5.9
13	6.3	7.5	8.8	7.4	7.0	9.6	8.3	7.7	6.8	3.9	e5.6	5.9
14	6.2	7.7	8.2	7.8	6.9	9.4	7.2	7.3	6.6	7.5	e5.0	5.8
15	6.4	8.0	6.9	7.3	7.1	9.3	7.3	7.1	5.9	11	4.6	5.6
16	7.2	8.0	7.1	7.3	7.3	8.8	7.3	7.4	5.3	11	4.0	5.5
17	8.9	8.4	7.3	7.5	e7.6	8.4	8.4	8.9	5.3	6.4	3.8	5.3
18	8.6	8.4	7.4	7.6	7.7	e8.0	8.8	9.2	5.5	6.3	3.8	4.9
19	8.6	8.2	7.6	7.3	7.5	9.3	7.9	7.4	5.1	4.9	4.2	5.5
20	8.6	8.1	7.3	7.2	7.3	8.4	6.7	7.1	4.6	4.2	4.0	8.8
21	8.2	7.8	7.3	7.3	7.3	8.3	6.5	6.9	4.5	4.4	4.0	16
22	8.3	8.1	7.8	7.1	7.0	8.4	6.4	6.8	4.3	4.7	3.6	7.7
23	8.1	8.1	7.0	7.0	7.5	8.4	6.6	6.9	4.1	5.4	3.5	5.8
24	8.0	8.1	e6.6	7.0	8.2	8.5	6.5	6.6	5.8	5.2	3.6	5.2
25	8.1	7.6	6.4	7.0	8.7	8.9	7.5	6.9	5.7	4.5	3.7	5.0
26	8.2	8.2	e6.0	e6.8	9.2	9.0	7.8	7.6	4.4	4.0	4.0	5.3
27	7.7	7.4	e5.6	7.0	8.7	8.5	8.6	8.4	4.6	4.0	4.0	5.3
28	7.8	7.7	e6.0	7.0	7.9	8.0	8.9	8.5	4.6	4.4	4.3	5.1
29	8.1	9.2	e6.6	7.0		8.7	9.3	8.7	4.8	5.8	5.2	4.9
30	8.0	8.8	e7.2	7.5		8.6	8.8	9.9	3.7	4.9	4.9	4.9
31	8.1		e7.4	7.6		9.9		9.6		5.1	4.0	
TOTAL	225.5	232.2	233.1	233.2	193.3	279.9	231.6	242.8	178.3	148.3	137.9	177.3
MEAN	7.27	7.74	7.52	7.52	6.90	9.03	7.72	7.83	5.94	4.78	4.45	5.91
MAX	8.9	9.2	8.9	8.5	9.2	14	9.3	9.9	9.2	11	5.6	16
MIN	6.0	6.7	5.6	6.8	2.7	5.0	6.4	6.6	3.7	2.9	3.5	4.2
AC-FT	447	461	462	463	383	555	459	482	354	294	274	352

CAL YR 1988 TOTAL 2953.4 MEAN 8.07 MAX 75 MIN 1.7 AC-FT 5860 WTR YR 1989 TOTAL 2513.4 MEAN 6.89 MAX 16 MIN 2.7 AC-FT 4990

e Estimated

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LOCATION.--Lat 43°19'32", long 100°53'00", in SWkNWk sec.28, T.39 N., R.30 W., Todd County, Hydrologic Unit 10140203, on left bank at downstream side of bridge on U.S. Highway 18, 0.3 mi downstream from Scabby Creek, 0.7 mi downstream from Soldier Creek, and 6.4 mi north of Rosebud.

06449500 LITTLE WHITE RIVER NEAR ROSEBUD, SD

DRAINAGE AREA.--1,020 mi<sup>2</sup>, approximately, of which about 760 mi<sup>2</sup> probably contributes directly to surface runoff.

PERIOD OF RECORD. -- May 1943 to current year. Prior to October 1965, published as South Fork White River near

REVISED RECORDS. -- WSP 1056: Drainage area. WSP 1309: 1946(M).

GAGE. -- Water-stage recorder. Datum of gage is 2,294.99 ft above National Geodetic Vertical Datum of 1929. Prior to May 11, 1948, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Some small diversions for irrigation and some storage in several small lakes above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 46 years, 110 ft3/s, 79,700 acre-ft/yr; median of yearly mean discharges, 110 ft3/s, 79.700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,640 ft<sup>3</sup>/s, June 11, 1967, gage height, 14.09 ft, from rating curve extended above 1,300 ft<sup>3</sup>/s; minimum daily, 10 ft<sup>3</sup>/s, Jan. 4, 1949, Feb. 20, 1955.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 330 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Discharge Gage height (ft /s) (ft)
Mar. 6 Mar. 10	1100	*500	*7.33 a6.42	No other peak greater than base discharge.

a Backwater from ice. Minimum daily discharge, 20 ft 3/s, Feb. 3.

		DISCHARGE	IN	CUBIC	FEET	PER		WATER N VALUE		OCTOBER	1988	TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	:	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1	70	74	e91		e42		e64	e84		160	114		85	56	55	52
2	69	65	e100		e43		e25	e82		145	123		85	64	57	54
3	66	67	e83		e44		e20	e80		147	119		82	60	66	56
4	66	68	e76		e45		e22	e78		136	121		81	68	57	57
5	65	90	e76		e47		e26	e80		139	121		79	64	53	54
6	67	99	e84		e47		e40	e82		136	113		79	57	51	53
7	69	105	e76		e46		e60	e100		136	118		84	65	51	55
8	68	98	e76		e45		e80	e130		161	121		77	91	53	57
9	68	103	e76		e44		e90	e170		127	112		76	103	52	59
10	68	95	e78		e43		e95	e400		110	112		86	81	53	71
11	67	76	e85	;	e45		e93	e300		117	108		93	62	53	74
12	69	82	e90		e46		e90	130		124	108		98	50	55	67
13	104	88	e95		e47		e90	109		130	116		95	55	60	63
14	121	101	102		e48		e88	135		121	117		83	80	57	60
15	103	106	92		e49		e84	126		134	116		79	82	63	57
16	88	76	87		e50		e84	129		132	112		77	83	60	59
17	78	73	90		e51		e82	127		119	115		76	78	52	59
18	86	87	95		e52		e80	112		119	123		73	79	55	54
19	96	87	108		e53		e80	122		121	121		70	74	52	54
20	95	97	116		e54		e82	122		130	108		65	72	54	81
21	96	86	103		e55		e84	120		132	107		62	69	48	148
22	100	89	102		e56		e86	122		139	104		62	65	50	93
23	74	100	e90		e56		e88	122		129	100		64	62	46	73
24	84	105	e66		e54		e90	127		134	99		76	61	42	73
25	88	109	e60		e52		e92	138		122	94		83	58	42	73
26	79	e84	e50		e52		e90	144		155	88		80	58	43	68
27	79	e81	e45	,	e54		e88	168		124	85		72	65	52	64
28	82	e73	e40		e56		e86	171		114	85		68	65	53	65
29	80	e98	e39		e58			171		108	82		63	68	52	63
30	67	e91	e39		e60			165		114	85		61	66	53	60
31	85		e40		e62			161			83			62	53	
TOTAL	2497	2653	2450		1556		2079	4307	3	915	3330		2314	2123	1643	1976
MEAN	80.5	88.4	79.0		50.2		74.2	139		130	107			68.5	53.0	65.9
MAX	121	109	116		62		95	400		161	123		98	103	66	148
MIN	65	65	39		42		20	78		108	82		61	50	42	52
AC-FT	4950	5260	4860		3090		120	8540			6610			4210	3260	3920

CAL YR 1988 TOTAL 45491 MEAN 124 MAX 429 MIN 39 AC-FT 90230 WTR YR 1989 TOTAL 30843 MEAN 84.5 MAX 400 MIN 20 AC-FT 61180

e Estimated

#### 06450500 LITTLE WHITE RIVER BELOW WHITE RIVER. SD

LOCATION.--Lat 43°36'05", long 100°44'58", in SWkNWk sec.23, T.42 N., R.29 W., Mellette County, Hydrologic Unit 10140203, on left bank at downstream side of bridge on U.S. Highway 83, 1.3 mi downstream from Pine Creek, and 2.0 mi north of town of White River.

DRAINAGE AREA.--1,570 mi<sup>2</sup>, approximately, of which about 1,310 mi<sup>2</sup> probably contributes directly to surface runoff.

PERIOD OF RECORD. --October 1949 to current year. Prior to October 1965, published as South Fork White River below White River.

REVISED RECORDS. -- WDR SD-85-1: Location.

GAGE.--Water-stage recorder. Datum of gage is 1,912.78 ft above National Geodetic Vertical Datum of 1929. Prior to June 8, 1968, at site 0.8 mi downstream at datum 4.50 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Diurnal fluctuations caused by small powerplant 2.2 mi upstream. Several small diversions for irrigation and some storage in several small lakes above station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--40 years, 127 ft<sup>3</sup>/s, 92,010 acre-ft/yr; median of yearly mean discharges, 120 ft<sup>3</sup>/s, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.—Maximum discharge, 13,700 ft<sup>3</sup>/s, June 12, 1967, gage height, 10.02 ft, site and datum then in use; maximum gage height, 11.21 ft, June 7, 1968, site and datum then in use; maximum gage height at present site and datum, 15.46 ft, June 7, 1968, from floodmarks; no flow for parts of several days in 1952, 1954, 1956; minimum daily discharge, 7.0 ft<sup>3</sup>/s, July 31, Aug. 31, Sept. 1, 1952.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 550 ft<sup>3</sup>/s at 0300 hours, Sept. 21, gage height, 3.70 ft; maximum gage height, 5.02 ft, Mar. 18, backwater from ice; minimum daily discharge, 24 ft<sup>3</sup>/s, Aug. 7.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY SEP OCT NOV DEC JAN FER MAR APR MAY TIIN. .TIIT. AUG e92 e66 e70 e64 e60 e82 e66 e48 e80 e70 e40 e76 e72 e45 e74 e70 e58 e76 e70 e84 e65 e70 e60 e100 e57 e75 e115 e66 e58 e80 e130 e62 e80 e82 e150 e90 e63 e84 e180 e66 e84 e200 e84 e230 e66 e82 e270 e72 e68 e80 e305 e80 e78 e380 e70 e84 e72 e70 e76 e450 e70 e78 e70 e410 e65 e80 e370 e82 e320 e68 e82 e270 e66 e80 e220 e66 e64 e84 e63 e64 e90 e60 e66 e94 e57 e68 e90 e58 e70 e86 e60 e70 e60 e68 e62 e73 ---TOTAL. MEAN 73.2 74.4 71.6 66.4 75.4 97.1 75.7 68 8 43.7 59.4 MAX MIN 

CAL YR 1988 TOTAL 41607 MEAN 114 MAX 432 MIN 36 AC-FT 82530 WTR YR 1989 TOTAL 30774 MEAN 84.3 MAX 450 MIN 24 AC-FT 61040

e Estimated

## 06452000 WHITE RIVER NEAR OACOMA, SD (National stream-quality accounting network station)

LOCATION.--Lat 43°44'54", long 99°33'22", in SE\SW\ sec.3, T.103 N., R.73 W., Lyman County, Hydrologic Unit 10140204, on left bank at downstream side of bridge on State Highway 47, 1.5 mi downstream from Wagner Draw, 1.8 mi upstream from high-water line of Lake Francis Case, and 8.8 mi southwest of Oacoma.

DRAINAGE AREA. -- 10,200 mi<sup>2</sup>, approximately.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- August 1928 to current year.

REVISED RECORDS. -- WSP 786: Drainage area. WSP 1309: 1929-30(M).

GAGE.--Water-stage recorder. Datum of gage is 1,377.29 ft above National Geodetic Vertical Datum of 1929. See WSP 1709, 1729, or 1917 for history of changes prior to Feb. 27, 1960.

REMARKS. -- Records good except those for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--61 years, 527 ft<sup>3</sup>/s, 381,800 acre-ft/yr; median of yearly mean discharges, 440 ft<sup>3</sup>/s, 319,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,900 ft<sup>3</sup>/s, Mar. 30, 1952, gage height, 15.40 ft, site and datum then in use; maximum gage height, 23.59 ft, Mar. 14, 1978, ice jam; no flow Aug. 14-28, 1971, July 16-23, 1974, Aug. 29 to Sept. 9, Sept. 13, 1976, July 23 to Aug. 7, 1980, July 9, 10, Aug. 12-23, Aug. 26 to Sept. 5, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 5,500 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	0745	ice jam	*16.94	Sept. 23	1030	*7,150	9.52

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

No flow July 9, 10, Aug. 12-23, Aug. 26 to Sept. 5.

		DISCHARGE	, IN CO	BIC FEET		EAN VALUE		DEK 1900	IO SEPIE	MDER 1909		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	99	e94	e36	e38	e78	451	367	105	19	26	.00
2	53	95	e98	e37	e30	e76	402	695	98	14	26	.00
3	53	93	e100	e40	e25	e74	362	686	92	5.4	23	.00
4	95	91	e94	e42	e26	e74	335	505	77	8.9	21	.00
5	274	91	e84	e43	e30	e76	315	438	55	3.8	15	.00
6	245	88	e80	e43	e35	e84	300	396	51	2.3	11	e2.5
7	196	84	e78	e41	e40	e94	291	310	46	.80	10	e5.0
8	161	79	e76	e40	e40	e100	286	277	42	. 12	9.7	e10
9	120	84	e74	e38	e45	e120	281	281	35	.00	5.4	e15
10	88	82	e72	e36	e50	e200	264	232	31	.00	2.8	e20
11	86	86	e72	e34	e56	e300	250	224	31	.37	e1.0	26
12	80	93	e76	e33	e62	e1100	250	224	31	.24	.00	32
13	74	88	e82	e32	e62	e2400	246	199	36	64	.00	43
14	63	84	e82	e32	e60	e1900	219	176	43	107	.00	460
15	61	99	e76	e31	e56	e1500	203	156	35	116	.00	601
16	66	e98	e81	e31	e54	e1200	187	139	36	96	.00	484
17	77	e95	e82	e31	e54	e1000	191	134	41	538	.00	e330
18	80	e90	e84	e32	e54	e960	191	153	31	909	.00	219
19	77	e80	e86	e33	e56	e1100	187	272	26	603	.00	131
20	74	e70	e86	e35	e60	e1600	184	346	22	505	.00	100
21	74	e60	e86	e37	e62	e2200	169	300	19	356	.00	e110
22	74	e52	e82	e36	e64	e3000	147	241	17	228	.00	119
23	72	e45	e74	e34	e66	e4000	139	277	15	169	.00	
24	107	e45	e66	e33	e70	e3500	147	228	17	134	e2.0	3280
25	136	e50	e58	e34	e74	2990	300	187	21	103	e1.0	2070
26	148	e90	e54	e37	e78	1170	195	150	32	100	.00	1150
27	131	e88	e52	e39	e81	980	150	131	29	75	.00	603
28	115	e84	e48	e41	e80	847	156	119	25	58	.00	315
29	109	e86	e43	e41		750	163	116	24	51	.00	180
30	103	e90	e38	e41		619	180	114	23	46	.00	119
31	103		e35	e40		505		112		42	.00	
TOTAL	3248	2459	2293	1133	1508	34597	7141	8185	1186	4354.93		13614.50
MEAN	105	82.0	74.0	36.5	53.9	1116	238	264	39.5	140	4.96	454
MAX	274	99	100	43	81	4000	451	695	105	909	26	3280
MIN	53	45	35	31	25	74	139	112	15	.00	.00	.00
AC-FT	6440	4880	4550	2250	2990	68620	14160	16230	2350	8640	305	27000

CAL YR 1988 TOTAL 152138 MEAN 416 MAX 6380 MIN 18 AC-FT 301800 WTR YR 1989 TOTAL 79873.33 MEAN 219 MAX 4000 MIN .00 AC-FT 158400

e Estimated

#### 06452000 WHITE RIVER NEAR OACOMA, SD--Continued (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

PERIOD OF RECORD. --October 1945 to September 1953, October 1968 to September 1969, October 1971 to current year.

PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: October 1974 to September 1976, October 1977 to Sept. 30, 1981. WATER TEMPERATURE: October 1974 to September 1976, October 1978 to September 1988. SUSPENDED-SEDIMENT DISCHARGE: October 1971 to September 1976, October 1981 to current year.

REMARKS.--Sediment-discharge records fair. No flow Aug. 11-23 and Aug. 26 to Sept. 5. Sediment-discharge records prior to Oct. 1, 1971, on file in the District office, U.S. Army Corps of Engineers, Omaha, NE.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum daily, 1,950 microsiemens, Aug. 8, 1980; minimum daily, 370 microsiemens, Mar. 17, 1975.

WATER TEMPERATURE: Maximum daily, 33.5°C, July 18, 1986; minimum daily, -1.0°C on many days during winter

periods.

SEDIMENT CONCENTRATION: Maximum daily mean, 72,300 mg/L, Apr. 15, 1974; minimum daily mean, 0 mg/L, July 17-23, 1974, Aug. 29 to Sept. 9, Sept. 13, 1976, Aug. 11-23, Aug. 26 to Sept. 5, 1989.

SEDIMENT LOAD: Maximum daily, 1,640,000 tons, May 17, 1982; 0 ton, July 17-23, 1974, Aug. 29 to Sept. 9, Sept. 13, 1976, Aug. 11-23, Aug. 26 to Sept. 5, 1989.

EXTREMES FOR CURRENT YEAR . --

SEDIMENT CONCENTRATION: Maximum daily mean, 52,400 mg/L, Sept. 24; minimum daily mean, 0 mg/L, Aug. 11-23, Aug. 26 to Sept. 5. SEDIMENT LOAD: Maximum daily, 464,000 tons, Sept. 24; minimum daily, 0 ton, Aug. 11-23, Aug. 26 to Sept. 5.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
NOV											
04 JAN	1300	91	504	8.17	172	18.0	8.0	2400	713	10.7	97
18	1230	33	606	8.02	209	13.5	0.5	12	728	10.6	77
APR 06	1220	300	500	8.18	166	7.0	8.0	440	730	10.8	95
MAY 30	1115	119	575	8.25	187	13.0	14.5	2400	719	9.2	96
JUL 31	1345	41	618	8.50	210	35.0	31.0	5100	726	6.8	97
SEP 12	1230	33	633	8.48	151	15.0	14.5	3700	731	10.2	105
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)	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)
NOV 04	K800	K300	70	24	2.4	84	70	4	6.3	181	70
JAN	K000	K300	70	24	2.4	04	70	•		101	
18 APR	<2	K10	170	56	7.9	67	44	2	8.2	219	94
06 MAY	K29	K230	100	34	4.0	73	60	3	4.6	170	82
30	K830	5300	64	22	2.1	100	75	5	6.6	200	72
JUL 31	K800	K800	27	9.7	0.60	130	89	11	7.2	224	77
SEP 12	K2800	K1400	79	27	2.9	110	73	5	8.9	166	140

## 06452000 WHITE RIVER NEAR OACOMA, SD--Continued

	CHLO-	FLUO-	SILICA,	SOLIDS, RESIDUE	SOLIDS, SUM OF	SOLIDS,	SOLIDS,	NITRO- GEN,	NITRO- GEN,	NITRO- GEN,
	RIDE, DIS- SOLVED	RIDE, DIS- SOLVED	DIS- SOLVED (MG/L	AT 180 DEG. C DIS-	CONSTI- TUENTS, DIS-	DIS- SOLVED (TONS	DIS- SOLVED (TONS	NITRITE DIS- SOLVED	NITRATE DIS- SOLVED	NO2+NO3 DIS- SOLVED
DATE	(MG/L AS CL) (00940)	(MG/L AS F) (00950)	AS SIO2) (00955)	SOLVED (MG/L) (70300)	SOLVED (MG/L) (70301)	PER AC-FT) (70303)	PER DAY) (70302)	(MG/L AS N) (00613)	(MG/L AS N) (00618)	(MG/L AS N) (00631)
NOV										
04	7.5	0.50	37	337	336	0.46	82.8	0.010	0.540	0.550
JAN 18	8.5	0.40	56	447	432	0.61	39.8	<0.010		1.00
APR 06	7.9	0.40	30	341	340	0.46	276	<0.010		0.350
MAY 30 JUL	11	0.60	37	377	367	0.51	121	<0.010		0.570
31 SEP	6.6	1.0	48	423	421	0.58	46.8	<0.010		0.770
12	8.5	0.50	33	434	421	0.59	38.7	<0.010	122.1	<0.100
	NITRO- GEN,	NITRO- GEN, AMMONIA	NITRO- GEN, AMMONIA	NITRO- GEN, AM- MONIA +	PHOS-	PHOS- PHOROUS	PHOS- PHOROUS ORTHO,	ALUM- INUM,	ARSENIC	BARIUM,
DATE	AMMONIA	SOLVED	SOLVED	ORGANIC	PHOROUS	SOLVED	DIS- SOLVED	DIS- SOLVED	DIS- SOLVED	DIS- SOLVED
DATE	(MG/L AS N)	(MG/L AS N)	(MG/L AS NH4)	(MG/L AS N)	(MG/L AS P)	(MG/L AS P)	(MG/L AS P)	(UG/L AS AL)	(UG/L AS AS)	(UG/L AS BA)
	(00610)	(00608)	(71846)	(00625)	(00665)	(00666)	(00671)	(01106)	(01000)	(01005)
NOV										
04	0.020	<0.010		0.50	0.260	0.050	0.020			
JAN 18 APR	0.020	0.010	0.01	0.30	0.110	0.100	0.090	<10	9	46
06 MAY	0.010	0.020	0.03	0.50	0.990	0.080	0.030	<10	9	25
30 JUL	0.030	0.020	0.03	3.8	4.90	0.050	0.020	10	21	21
31 SEP	0.060	<0.010		5.2	11.0	0.040	0.030	10	32	14
12	0.150	0.010	0.01	4.9	6.70	0.010	<0.010			
	BERYL- LIUM, DIS-	CADMIUM DIS-	CHRO- MIUM, DIS-	COBALT, DIS-	COPPER, DIS-	IRON, DIS-	LEAD, DIS-	LITHIUM DIS-	MANGA- NESE, DIS-	MERCURY DIS-
DATE	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L	SOLVED (UG/L
22	AS BE)	AS CD)	AS CR)	AS CO)	AS CU)	AS FE)	AS PB)	AS LI)	AS MN)	AS HG)
	(01010)	(01025)	(01030)	(01035)	(01040)	(01046)	(01049)	(01130)	(01056)	(71890)
NOV										
04 JAN	:				77					
18 APR	<0.5	<1	1	<3	2	6	<5	38	6	<0.1
06 MAY	<0.5	<1	<1	<3	5	41	<5	29	5	0.3
30 JUL	<0.5	<1	<1	<3	6	9	<1	34	<1	<0.1
31 SEP	<0.5	<1	1	<3	9	6	<1	31	<1	<0.1
12						- 22				

06452000 WHITE RIVER NEAR OACOMA, SD--Continued

DATE	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							
04							
JAN							
18	<10	<1	2	<1.0	400	9	<3
APR							
06	<10	5	2	1.0	250	9	71
MAY							
30	<10	1	2	<1.0	160	29	<3
JUL							
31	<10	2	3	<1.0	78	75	<3
SEP							
12							

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER		1	NOVEMBER		1	DECEMBER	
1	53	5120	733	99	7960	2130	e94	271	69
1 2	53	3700	529	95	6580	1690	e98	305	81
3	53	2760	395	93	4730	1190	e100	400	108
4	95	3300	846	91	6000	1470	e94	520	132
5	274	16400	12100	91	3900	958	e84	660	150
6 7	245	34300	22700	88	3600	855	e80	830	179
7	196	34300	18200	84	3690	837	e78	719	151
8	161	34100	14800	79	3280	700	e76	608	125
	120	30700	9950	84	2570	583	e74	497	99
10	88	24900	5920	82	1990	441	e72	386	75
11	86	19900	4620	86	1800	418	e72	275	53
12	80	16000	3460	93	1750	439	e76	164	34
13	74	11600	2320	88	1500	356	e82	198	44
14	63	8740	1490	84	1200	272	e82	232	51
15	61	6880	1130	99	1330	356	e76	266	55
16	66	5100	909	e98	570	151	e81	301	66
17	77	3780	786	e95	580	149	e82	297	66
18	80	3770	814	e90	340	83	e84	292	66
19	77	3730	775	e80	195	42	e86	287	67
20	74	3080	615	e70	190	36	e86	299	69
21	74	2530	505	e60	185	30	e86	311	72
22	74	2120	424	e52	180	25	e82	323	72
23	72	2500	486	e45	103	13	e74	285	57
24	107	3600	1040	e45	70	8.5	e66	250	45
25	136	7000	2570	e50	190	26	e58	230	36
26	148	9760	3900	e90	1120	272	e54	210	31
27	131	11300	4000	e88	940	223	e52	200	28
28	115	11700	3630	e84	640	145	e48	194	25
29	109	12200	3590	e86	430	100	e43	190	22
30	103	10700	2980	e90	286	69	e38	198	20
31	103	8580	2390				e35	202	19
TOTAL	3248		128607	2459		14067.5	2293		2167

e Estimated

06452000 WHITE RIVER NEAR OACOMA, SD--Continued

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		JANUARY			FEBRUARY			MARCH	
1	e36	307	30	e38	44	4.5	e78	36	7.6
2	e37 e40	412 517	41 56	e30 e25	41 39	3.3 2.6	e76 e74	31 33	6.4 6.6
4	e42	623	71	e26	36	2.5	e74	35	7.0
5	e43	551	64	e30	34	2.8	e76	37	7.6
6	e43 e41	479 407	56 45	e35 e40	31 29	2.9	e84 e94	39 41	8.8 10
8	e40	335	36	e40	26	2.8	e100	43	12
9	e38 e36	263 191	27 19	e45 e50	32 38	3.9 5.1	e120 e200	400 1360	130 734
11	e34	121	11	e56	45	6.8	e300	2500	2020
12	e33	107	9.5	e62	51	8.5	e1100	19800	58800
13 14	e32 e32	93 80	8.0 6.9	e62 e60	57 64	9.5 10	e2400 e1900	23900 19000	155000 97500
15	e31	66	5.5	e56	70	11	e1500	12400	50200
16	e31	52	4.4	e54	77	11	e1200	10900	35300
17 18	e31 e32	39 26	3.3	e54 e54	71 65	10 9.5	e1000 e960	8300 8100	22400 21000
19	e33	26	2.3	e56	58	8.8	e1100	20000	59400
20	e35	27	2.6	e60	52	8.4	e1600	19000	82100
21	e37	27	2.7	e62	46	7.7	e2200	16300	96800
22	e36 e34	28 28	2.7	e64 e66	39 32	6.7 5.7	e3000 e4000	14700 14700	119000 159000
24	e33	29	2.6	e70	35	6.6	e3500	14600	138000
25	e34	29	2.7	e74	39	7.8	2990	9320	75200
26 27	e37 e39	31 33	3.1 3.5	e78 e81	42 46	8.8	1170 980	6800 5610	21500 14800
28	e41	35	3.9	e80	41	8.9	847	5030	11500
29 30	e41 e41	37 39	4.1				750 619	5350 4580	10800 7650
31	e40	41	4.4				505	3680	5020
TOTAL	1133		537.3	1508		189.2	34597		1243920.0
		APRIL			MAY			JUNE	
1	451	3400	4140	367	6100	6040	105	4240	1200
2	402 362	3000 2500	3260 2440	695 686	14100 25300	26500 46900	98 92	3580 2790	947 693
4	335	2040	1850	505	21700	29600	77	1910	397
5	315	1660	1410	438	18200	21500	55	1060	157
6 7	300	1360	1100	396	17700	18900	51	616	85 63
8	291 286	1240 1090	974 842	310 277	15300 10600	12800 7930	46 42	507 418	47
9	281	930	706	281	11300	8570	35	270	26
	264	781	557	232	6300	3950	31	201	17
11 12	250 250	631 426	426 288	224 224	7800 7100	4720 4290	31 31	210 365	18 31
13	246	565	375	199	6670	3580	36	608	59
14 15	219 203	616 617	364 338	176 156	5300	2520 1680	43 35	508 481	59 45
					3990				
16 17	187 191	570 499	288 257	139 134	2940 2670	1100 966	36 41	435 451	42 50
18	191	451	233	153	3200	1320	31	324	27
19 20	187 184	437 422	221 210	272 346	6700 11500	4920 10700	26 22	192 191	13 11
21	169	403	184	300	13300	10800	19	132	6.8
22	147	381	151	241	11800	7680	17	90	4.1
23 24	139 147	290 260	109 103	277 228	13800 11700	10300 7200	15 17	87 112	3.5 5.1
25	300	2070	1680	187	11300	5710	21	185	10
26 27	195	2600	1370	150	9350	3790	32	290	25
.,,	150 156	6100 6800	2470 2860	131 119	7630 7100	2700 2280	29 25	218 223	17 15
					6900	2160	24	212	14
28 29	163	5800	2550	116					14
28	163 180	5700	2770	114 112	6800 4530	2090 1370	23	194	12

e Estimated

06452000 WHITE RIVER NEAR OACOMA, SD--Continued
SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		JULY			AUGUST		SI	EPTEMBER	
1	19	176	9.0	26	5800	407	.00	0	.00
2	14	150	5.7	26	5480	385	.00	0	.00
3	5.4	121	1.8	23	3200	199	.00	0	.00
4	8.9	110	2.6	21	750	43	.00	0	.00
5	3.8	100	1.0	15	641	26	.00	0	.00
6	2.3	88	. 55	11	780	23	e2.5	6500	44
7	. 80	70	. 15	10	750	20	e5.0	6400	86
8	. 12	61	.02	9.7	150	3.9	e10	4100	111
9	.00	72	.00	5.4	80	1.2	e15	950	38
10	.00	134	.00	2.8	108	.82	e20	5000	270
11	.37	164	.16	e1.0	60	.16	26	1600	112
12	.24	138	.09	.00	0	.00	32	4800	415
13	64	11700	2020	.00	0	.00	43	7100	824
14	107	34700	10000	.00	0	.00	460	25300	31400
15	116	25400	7960	.00	0	.00	601	27400	44500
16	96	19100	4950	.00	0	.00	484	42100	55000
17	538	13800	20000	.00	0	.00	e330	44100	39300
18	909	8500	20900	.00	0	.00	219	38800	22900
19	603	28300	46100	.00	0	.00	131	32500	11500
20	505	27300	37200	.00	0	.00	100	21800	5890
21	356	17800	17100	.00	0	.00	e110	20800	6180
22	228	20200	12400	.00	0	.00	119	16000	5140
23	169	24000	11000	.00	0	.00	3190	35300	304000
24	134	27500	9950	e2.0	200	1.1	3280	52400	464000
25	103	24000	6670	e1.0	60	.16	2070	45700	255000
26	100	19800	5350	.00	0	.00	1150	40400	125000
27	75	17700	3580	.00	0	.00	603	35400	57600
28	58	20300	3180	.00	0	.00	315	29300	24900
29	51	20300	2800	.00	0	.00	180	23800	11600
30	46	17200	2140	.00	0	.00	119	20300	6520
31	42	12600	1430	.00	0	.00			
TOTAL	4354.93		224751.07	153.90		1110.34	13614.50		1472330.00

e	Es	t.i	ma	t.	ha

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	
NOA					
04 DEC	1300	91	8.0	6830	100
16	1140	81	0.0	284	100
JAN 18	1230	33	0.5	26	100
APR					
06 MAY	1220	300	8.0	1290	100
08	1415	277	18.0	10300	100
30 Jun	1115	119	14.5	7210	100
22	1255	17	21.5	88	99
JUL					
31 SEP	1345	41	31.0	12300	100
12	1230	33	14.5	7150	100
22	1715	262	11.0	13600	100
26	1300	1180	13.0	40200	100

#### MISSOURI RIVER MAIN STEM

#### 06452278 LAKE FRANCIS CASE (FT. RANDALL RESERVOIR) NEAR PLATTE, SD

## STAGE RECORDS

LOCATION.--Lat 43°23'37", long 99°07'11", in SEkSWkNWk sec.15, T.99 N., R.70 W., Charles Mix County, Hydrologic Unit 10140101, on left bank at Snake Creek Recreation Area, 0.4 mi upstream from Platte-Winner bridge, 3.9 mi west of junction on State Highways 44 and 50, 14.2 mi west of Platte, 38.4 mi upstream from Ft. Randall Reservoir, and at mile 921.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 1,365 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair. Stage regulated by Ft. Randall Reservoir. Gage heights prior to October 1988 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51.22			43.25	49.21	52.80	57.36	55.15	56.12	55.30	54.34	55.28
2	50.91			43.03	48.91	53.33	56.75	55.32	56.28	55.07	54.36	55.13
3	50.45			42.97	47.76	53.76	56.46	55.42	56.28	54.76	54.75	54.71
4	50.30			43.20	47.17	53.89	56.48	55.84	55.81	54.92	54.87	54.21
5	50.17			43.56	46.92	53.60	56.40	56.11	55.40	55.11	54.90	53.93
6	50.06			44.19	46.46	53.68	56.33	56.09	55.50	55.61	54.50	54.23
7	49.90			44.84	46.67	54.10	56.25	55.87	55.35	55.80	54.11	54.39
8	49.58			44.99	45.95	54.35	56.07	55.90		55.90	54.28	54.62
9	48.85			44.83	46.45	54.67	55.47	56.00		55.62	54.47	54.71
10	48.07			44.84	47.31	55.12	55.04	56.07		55.21	54.63	54.28
11	47.68			45.07	48.12	55.52	54.98	56.04		55.28	54.72	53.93
12	47.36			45.82	49.00	55.59	55.05	56.18		55.42	54.78	53.77
13	47.08				49.85	55.79	55.08	56.22		55.45	54.40	53.52
14	46.89				50.45	56.55	55.18	55.85	54.92	55.40	53.98	53.21
15	46.56		40.48		50.69	57.30	55.08	55.52	54.78	55.32	54.14	52.88
16	45.94		40.79		51.03	57.73	54.82	55.58	54.86	54.74	54.26	52.33
17	45.18		41.23		51.43	58.20	54.61	55.79	54.91	54.44	54.36	51.64
18	44.54		41.17	46.69	51.71	58.59	54.85	55.89	54.44	54.69	54.42	50.94
19	44.17		40.87	46.91	51.55	58.58	55.05	56.20	53.97	54.76	54.67	50.70
20	43.86		40.93	47.70	51.47	58.60	55.13	56.24	54.13	54.93	54.34	50.37
21	43.75		41.41	48.19	51.75	58.97	55.15	56.02	54.49	55.10	54.17	
22	43.49		41.77	48.05	51.98	59.10	55.20	55.94	54.48	55.13	54.46	49.88
23	42.84		42.37	48.06	52.09	59.15	54.87	56.13	54.55	54.76	54.72	49.67
24	42.09		42.77	48.51	52.28	59.12	54.84	56.24	54.46	54.51	54.90	49.16
25	41.52		42.77	49.06	52.27	59.00	55.01	56.32	54.25	54.72	55.18	48.60
26	41.23		42.50	49.53	52.06	58.73	55.11	56.15	54.32	54.93	55.22	48.28
27	40.73		42.36	49.72	51.99	58.40	55.34	56.18	54.64	55.15	54.71	48.00
28	40.67		42.55	49.69	52.38	58.19	55.54	56.04	54.90	55.19	54.50	48.00
29	40.60		42.89	49.68		58.02	55.55	55.95	55.36	55.20	54.69	47.93
30	39.95		43.15	49.58		57.91	55.27	55.82	55.35	54.73	54.92	47.63
31			43.33	49.59		57.67		55.99		54.28	55.22	
MEAN					49.82	56.65	55.48	55.94		55.08	54.58	111
MAX					52.38	59.15	57.36	56.32		55.90	55.22	
MIN					45.95	52.80	54.61	55.15		54.28	53.98	

206 PLATTE CREEK BASIN

#### 06452320 PLATTE CREEK NEAR PLATTE, SD

LOCATION.--Lat 43°19'38", long 98°58'13", in NWkNWkNEk sec.11, T.98 N., R.69 W., Charles Mix County, Hydrologic Unit 10140101, on right bank at upstream side of bridge on State Highway 1804, 0.5 mi above high-water line of Fort Randall Reservoir, and 8.0 mi southwest of Platte.

DRAINAGE AREA. -- 741 mi<sup>2</sup>.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE.--Water-stage recorder. Elevation of gage is 1,370 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Flow regulated by Lake Platte, capacity, 100 acre-ft, 13.6 mi upstream. Several observations of water temperature and specific conductance were made during the year.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 16	unknown	*10	a*3.32				

a Backwater from ice.

No flow July 9, 11-13, Aug. 21 to Sept. 30.

		DISCHAR	GE, IN CU	BIC FEET	PER SECON	D, WATER		BER 1988 :	TO SEPTEM	BER 1989		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.5	1.0	e1.2	e.95	e1.0	e1.5	e5.2	1.7	.33	.04	e.01	.00
2	2.1	1.0	e1.3	e.90	e.85	e1.4	e5.0	1.5	.33	.04	.03	.00
3	1.2	1.1	e1.3	e.85	e.65	e1.4	e5.0	1.6	.24	.01	e.04	.00
4	.79	1.2	e1.2	e.80	e.55	e1.3	e5.0	1.5	.28	.02	e.03	.00
5	.65	1.2	e1.2	e.76	e.60	e1.2	e4.7	.94	.28	.01	e.02	.00
6	.71	1.2	e1.2	e.76	e.70	e1.2	4.3	1.0	.20	.01	e.01	.00
7	.72	1.2	e1.3	e.76	e.90	e1.2	4.0	1.1	.11	.01	e.01	.00
8	. 58	1.2	e1.2	e.70	e1.0	e1.3	4.0	. 85	.14	.01	e.01	.00
9	.61	1.2	e1.2	e.60	e.90	e1.5	4.7	. 69	. 23	.00	e.01	.00
10	.65	1.2	e1.1	e.64	e1.0	e2.0	3.1	. 56	.18	.01	.01	.00
11	. 55	1.2	e1.0	e.66	e1.1	e2.5	2.8	.45 -	.15	.00	.01	.00
12	. 57	1.8	e1.1	e.70	e1.2	e3.0	2.9	.48		.00	e.01	.00
13	. 57	1.8	e1.2	e.73	e1.3	e3.7	2.5	.49	. 17	.00	e.01	.00
14	. 57	1.6	e1.1	e.74	e1.4	e4.5	2.4	. 40	.09	e.30	e.01	.00
15	. 57	1.6	e1.0	e.72	e1.5	e5.4	2.2	. 42	.06	e5.0	e.01	.00
16	.51	1.6	e.89	e.70	e1.4	e6.0	1.8	7.41	.02	e2.8	e.01	.00
17	. 54	1.3	e.90	e.72	e1.4	e5.4	1.8	. 63	.03	e1.5	e.01	.00
18	. 57	e1.3	e.95	e.74	e1.2	e4.8	2.1	. 64	.03	e.86	e.01	.00
19	. 57	e1.3	e1.0	e.78	e1.1	e5.6	2.4	. 63	.04	e.47	e.01	.00
20	.62	e1.2	e1.0	e.75	e1.2	e5.0	1.6	. 57	.08	e.25	.01	.00
21	.65	e1.2	e1.0	e.70	e1.4	e4.7	1.5	. 47	.05	e.15	.00	.00
22	.75	e1.2	e1.0	e.74	e1.3	e4.5	1.6	1.2	.10	e.08	.00	.00
23	.78	e1.3	e1.0	e.80	e1.2	e4.8	1.1	e.90	. 13	e.05	.00	.00
24	.74	e1.3	e1.0	e.76	e1.3	e5.0	1.2	e.70	.09	e.03	.00	.00
25	.74	e1.2	e1.0	e.76	e1.5	e5.0	1.0	e.60	.10	.01	.00	.00
26	.79	e1.2	e.95	e.76	e1.4	e4.8	1.3	e.50	.25	.01	.00	.00
27	.83	e1.1	e.90	e.76	e1.3	e5.0	1.2	e.45	. 12	.01	.00	.00
28	. 83	e1.1	e.85	e.80	e1.4	e5.4	1.1	e.40	.10	e.01	.00	.00
29	. 83	e1.1	e.80	e.80		e5.6	1.4	e.40	.11	e.01	.00	.00
30	. 87	e1.1	e.85	e.85		e5.6	1.7	e.35	.07	e.01	.00	.00
31	1.0		e.90	e.90		e5.4		.34		e.01	.00	
TOTAL	26.96	38.0	32.59	23.59	31.75	115.7	80.6	22.87	4.32	11.72	0.28	0.00
MEAN	. 87	1.27	1.05	.76	1.13	3.73	2.69	.74	.14	.38	.009	.00
MAX	4.5	1.8	1.3	. 95	1.5	6.0	5.2	1.7	.33	5.0	.04	.00
MIN	.51	1.0	.80	.60	.55	1.2	1.0	.34	.02	.00	.00	.00
AC-FT	53	75	65	47	63	229	160	45	8.6	23	.6	.0

WTR YR 1989 TOTAL 388.38 MEAN 1.06 MAX 6.0 MIN .00 AC-FT 770

e Estimated

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#### MISSOURI RIVER BASIN

#### 06452380 ANDES CREEK NEAR ARMOUR. SD

LOCATION (REVISED).--Lat 43°15'23", long 97°24'08", in SWkNWk sec.3, T.97 N., R.64 W., Charles Mix County, Hydrologic Unit 10140101, at bridge 2.8 mi west of U.S. Highway 281 and 4.0 mi south of Armour.

PERIOD OF RECORD . -- April 1983 to current year.

REMARKS.--Samples are collected only when flow is greater than 2 ft<sup>3</sup>/s. No water-quality samples collected this water year, all flows at times of inspections below 2 ft<sup>3</sup>/s.

#### MISSOURI RIVER BASIN

#### 06452383 LAKE ANDES TRIBUTARY NO. 3 NEAR ARMOUR, SD

LOCATION (REVISED).--Lat 43°15'23", long 98°25'58", in SWaNE's sec.5, T.98 N., R.64 W., Charles Mix County, Hydrologic Unit 10140101, at bridge 4.3 mi west of U.S. Highway 281 and 4.0 mi south of Armour.

PERIOD OF RECORD . -- February 1986 to current year.

REMARKS.--Samples are taken when flow exceeds 2 ft<sup>3</sup>/s. No water-quality samples collected this water year, all flows at times of inspections below 2 ft<sup>3</sup>/s.

#### MISSOURI RIVER BASIN

#### 06452386 LAKE ANDES TRIBUTARY NO. 2 NEAR LAKE ANDES. SD

LOCATION.--Lat 43°12'43", long 98°26'45", in SE\SE\SE\SE\SE\SE sec.18, T.97 N., R.64 W., Charles Mix County, Hydrologic Unit 10140101, at culvert 3.0 mi north and 4.6 mi east of town of Lake Andes.

PERIOD OF RECORD . -- October 1984 to current year.

REMARKS.--Water-quality samples are taken only when streamflow exceeds 2.0 ft<sup>3</sup>/s. No water-quality samples collected this water year, all flows at times of inspections below 2 ft<sup>3</sup>/s.

### MISSOURI RIVER BASIN

## 06452389 LAKE ANDES TRIBUTARY NO. 1 NEAR LAKE ANDES, SD

LOCATION.--Lat 43°11'25", long 98°27'57", in NE\nE\sE\s sec.25, T.97 N., R.65 W., Charles Mix County, Hydrologic Unit 10140101, at culvert 1.0 mi north and 3.0 mi east of town of Lake Andes.

PERIOD OF RECORD . -- October 1984 to current year.

REMARKS.--Samples are taken when flow exceeds 2 ft<sup>3</sup>/s. No water-quality samples collected this water year, all flows at times of inspections below 2 ft<sup>3</sup>/s.

## MISSOURI RIVER BASIN

## 06452392 LAKE ANDES NEAR LAKE ANDES, SD

LOCATION.--Lat 43°10'10", long 98°27'35", sec.31, T.97 N., R.64 W., Charles Mix County, Hydrologic Unit 10140101, at bridge on section line road crossing the lake on T.96 and 97 N. boundary.

PERIOD OF RECORD. -- September 1983 to April 1986, October 1987 to September 1989 (discontinued).

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

	·		, , , , , , , , , , , , , , , , , , ,	W. 12	zak 001002	BARO-		OXYGEN,		
		SPE- CIFIC CON- DUCT-	PH (STAND-	TEMPER- ATURE	TEMPER- ATURE	METRIC PRES- SURE (MM	OXYGEN, DIS-	DIS- SOLVED (PER- CENT	HARD- NESS TOTAL (MG/L	CALCIUM DIS- SOLVED
DATE	TIME	ANCE (US/CM) (00095)	ARD UNITS) (00400)	AIR (DEG C) (00020)	WATER (DEG C) (00010)	OF HG) (00025)	SOLVED (MG/L) (00300)	SATUR- ATION) (00301)	AS CACO3) (00900)	(MG/L AS CA) (00915)
OCT 13 DEC	0900	1530	8.76	11.0	11.5	723	10.2	99	630	140
07	1000	1930	8.60	1.0	4.0	734	15.0	120	730	170
FEB 08	1030	2190		-8.0	1.0	741	14.0	102	840	200
APR 13	0830	1480	7.91	9.0	7.0	721	15.3	134	790	190
JUN 07	1100	1750	8.64	24.0	20.0	716	8.0	94	780	180
AUG 04	0900	1870	8.50	26.0	26.0	712	7.2	96	740	160
04	0300	1070	0.50	20.0	20.0	/12	7.2	30	740	100
	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED		SODIUM AD- SORP- TION	POTAS- SIUM, DIS- SOLVED	ALKA- LINITY LAB (MG/L	SULFATE DIS- SOLVED	CHLO- RIDE, DIS- SOLVED	FLUO- RIDE, DIS- SOLVED	SILICA, DIS- SOLVED (MG/L
DATE	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)	SODIUM PERCENT (00932)	RATIO (00931)	(MG/L AS K) (00935)	AS CACO3) (90410)	(MG/L AS SO4) (00945)	(MG/L AS CL) (00940)	(MG/L AS F) (00950)	AS SIO2) (00955)
OCT	69	94	23	•	20	177	610	55	0.40	31
DEC 13				2	32	177	610		0.40	
FEB	75	99	22	2	39	166	720	67	0.50	23
08 APR	83	120	22	2	51	200	820	81	0.60	29
13 JUN	77	98	20	2	39	154	790	76	0.70	18
07 AUG	80	100	21	2	47	222	780	69	0.50	13
04	82	120	24	2	56	146	810	77	0.50	23
	GOT TRG	GO1 TDG		WT.			WT TOO		77700	
	SOLIDS, RESIDUE AT 180 DEG. C	SOLIDS, SUM OF CONSTI- TUENTS,	SOLIDS, DIS- SOLVED	NITRO- GEN, NITRITE DIS-	NITRO- GEN, NO2+NO3 DIS-	NITRO- GEN, AMMONIA DIS-	NITRO- GEN, AMMONIA DIS-	PHOS- PHOROUS	PHOS- PHOROUS ORTHO, DIS-	
DATE	DIS- SOLVED (MG/L)	DIS- SOLVED (MG/L)	(TONS PER AC-FT)	SOLVED (MG/L AS N)	SOLVED (MG/L AS N)	SOLVED (MG/L AS N)	SOLVED (MG/L AS NH4)	TOTAL (MG/L AS P)	SOLVED (MG/L AS P)	
	(70300)	(70301)	(70303)	(00613)	(00631)	(00608)	(71846)	(00665)	(00671)	
DEC	1220	1140	1.66	<0.010	<0.100	0.050	0.06	0.080	0.530	
07 FEB	1410	1290	1.92	<0.010	<0.100	0.080	0.10	0.250	0.140	
08	1650	1510	2.24	<0.010	<0.100	0.070	0.09	0.350	0.180	
APR 13	1490	1380	2.03	<0.010	<0.100	0.060	0.08	0.160	0.010	
JUN 07	1490	1400	2.03	<0.010	<0.100	0.090	0.12	0.470	0.130	
AUG 04	1480	1420	2.01	<0.010	<0.100	0.460	0.59	0.840	0.500	

### MISSOURI RIVER MAIN STEM

#### 06452500 LAKE FRANCIS CASE AT PICKSTOWN, SD

LOCATION.--Lat 43°04'05", long 98°33'15", in SEk sec.5, T.95 N., R.65 W., Charles Mix County, Hydrologic Unit 10140101, in tower 6 of outlet works at Fort Randall Dam, on Missouri River at Pickstown, 1.0 mi upstream from Randall Creek, and at mile 880.0.

DRAINAGE AREA. -- 263.500 mi<sup>2</sup>. approximately.

PERIOD OF RECORD. -- December 1952 to current year (monthend contents only). Prior to October 1964, published as Fort Randall Reservoir at Pickstown.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Mar. 25, 1953, elevations determined from temporary nonrecording gages.

REMARKS.--Reservoir is formed by earthfill dam; storage began in December 1952; initial closure made July 1952.

Maximum capacity, 5,574,000 acre-ft below elevation 1,375.0 ft (top of spillway gates). Normal maximum,
4,589,000 acre-ft below elevation 1,365.0 ft. Inactive storage, 1,184,000 acre-ft below elevation
1,310.0 ft. No dead storage; elevation of invert of lowest outlet is 1,227.0 ft. Figures given herein
represent elevations at outlet works and total contents adjusted for wind effect.

The spillway consists of 21 taintor gates, each 40 ft wide by 29 ft high; spillway capacity, 490,000 ft<sup>3</sup>/s at pool elevation 1,375 ft. Crest of spillway is at elevation 1,346 ft. Normal releases are through 12 tunnels 22 ft in diameter. Installation of power units in 8 of these tunnels was completed in January 1956; maximum release through power tunnels is 46,000 ft<sup>3</sup>/s; maximum release through 4 other tunnels is 130,000 ft<sup>3</sup>/s at pool elevation 1,375 ft. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION .-- Records of elevation and contents provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD. --Maximum contents, 5,087,000 acre-ft, June 20, 1962, affected by wind; minimum since initial filling, 1,450,000 acre-ft, Oct. 23, 1956, affected by wind.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 4,021,000 acre-ft, Mar. 22; minimum contents, 2,333,000 acre-ft, Nov. 7.

MONTHEND EL PLATION AND CONTENTS AT 2400 HOURS HATER VEAD OCTOPED 1000 TO SEPTEMBED 1000

							I	at	ce								Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept.	30																1,351,29	3,368,000	-
oct.																	1,338.56	2,475,000	-893.000
lov.																	1.338.47	2,470,000	-5.000
ec.																	1,343.12	2,766,000	+296,000
CAI	YR.	19	88	3					٠								-	2	+152,000
an.	31																1.348.96	3,185,000	+419,000
eb.																	1,352.30	3,453,000	+268,000
ar.																	1,357.04	3,871,000	+418,000
pr.																	1,355.06	3,680,000	-191,000
ay	31																1,356.13	3,775,000	+95,000
une	30																1,355.35	3,696,000	-79,000
uly	31																1,354.05	3,599,000	-97,000
ug.	31																1,355.29	3,675,000	+76,000
ept.	30																1,346.90	3,048,000	-627,000
WII	R YR	19	989	)													•	12	-320,000

NOTE. -- Lake frozen over Jan. 9 to Apr. 1.

### MISSOURI RIVER MAIN STEM

### 06453007 MISSOURI RIVER ABOVE GREENWOOD, SD

#### STAGE RECORDS

LOCATION.--Lat 42°56'25", long 98°27'08", in NE\sW\sE\sec.19, T.94 N., R.64 W., Charles Mix County, Hydrologic Unit 10170101, on left bank 10.4 mi downstream from Fort Randall Dam outlet, and 3.5 mi northwest of Greenwood

PERIOD OF RECORD. -- May 1988 to April 1989.

GAGE. -- Water-stage recorder. Datum of gage is 1,204.85 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good. Stage regulated by Fort Randall Dam 20.4 mi upstream.

REVISIONS.--Revised mean daily gage heights, in feet, for Sept. 15-30, 1988, are given below. These figures supersede those published in the report for 1988.

Sept.	15	25.35	Sept. 1	19	25.38	Sept.	23	24.97	Sept.	27	25.30
-	16	24.61	2	20	25.45	-	24	24.72		28	25.33
	17	24.48	2	21	25.74		25	24.90		29	24.80
	18	24.93	2	22	25.51		26	24.78		30	24.69

#### GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	24.53	25.48		21.62		21.06	23.58					
2	24.71	25.49		19.40		20.94	23.90					
3	24.52	25.37	21.20	19.10		21.13	23.47					
4	24.58	25.29	20.89	19.66		22.88	23.22					
5	24.71	25.09	20.93	19.20		23.47	23.61					
-	24.71	25.00	20.00	10.20		20.47	20.01					
6	25.45	25.17	20.90	18.99		23.29	24.03					
7	25.31	25.08	20.87	19.28		21.61	24.63					
8	25.25	24.61	21.06	19.92		20.31	24.34					
9	25.13	25.16	21.05	21.13	25.01	20.04	24.28					
10		25.12	21.07		24.34	19.49	24.20					
10		25.12	21.07		24.54	19.45						
11		25.10	20.91		23.50	19.24						
12			20.88		22.49	19.17						
13			21.08		21.89	19.27						
14	24.91		21.06		21.81	19.29						
15	24.83		21.47		21.20	18.84						
	24.00		22.77		21.20	10.04						
16	24.89		21.47		20.87	18.50						
17	25.02		21.18		20.71	19.14						
18	25.69		21.14		20.49	19.49						
19	25.43		21.36		20.61	19.14						
20	25.36		21.03		20.56	19.09						
					20.00	20.00						
21	25.16		20.74		20.45	19.57						
22	25.05		20.53		21.22	19.79						
23	25.23		20.48		21.75	19.96						
24	25.16		20.49		21.41	20.48						
25	25.02		20.60		20.67	21.58						
	25.02		20.00		20.07	22.50						
26	25.17		20.74		20.32	22.05						
27	25.16		21.05		20.56	23.45						
28	25.38		21.56		21.09	24.20						
29	25.17		21.46			24.29						
30	25.12		22.26			23.96						
31	25.51		21.93			23.75						
01	23.31		21.55			20.75						
MEAN						20.92						
MAX						24.29						
MIN						18.50						
. 17.14						10.50						

## CHOTEAU CREEK BASIN

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06453200 CHOTEAU CREEK NEAR WAGNER, SD

LOCATION.--Lat 43°05'52", long 98°17'15", on section line between sec.27 and 28, T.95 N., R.63 W., Charles Mix County, Hydrologic Unit 10170101, at bridge on section line road 1.1 mi north of State Route 46.

PERIOD OF RECORD . -- June 1983 to current year.

## WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC FRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
APR 13	1130	0.07	2100	8.16	27.0	12.0	721	12.8	126	970	190
DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	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)	
APR											
13	120	180	28	3	16	194	1100	130	0.70	8.8	
DATE	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 DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	
APR											
13	1920	1860	2.61	0.36	<0.010	<0.100	0.050	0.06	0.080	0.030	

212 CHOTEAU CREEK BASIN

## 06453252 CHOTEAU CREEK NEAR DANTE, SD

LOCATION.--Lat 43°01'32", long 98°10'03", on section line between sec.21 and 22, T.95 N., R.62 W., Charles Mix County, Hydrologic Unit 10170101, at bridge on section line road 0.9 mi southeast of Dante.

PERIOD OF RECORD .-- June 1983 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

				4º			, ''-			.0105			10 0									
DATE	TIME	CHARC INST CUBI FEI PEI SECC (0006	SE, SF T. CI IC CO ET DU R AN OND (US	E- FIC N- CT- CE (CM) 095)	PH (STAI ARI UNIT: (004)	ND- D S)	ATI A	URE IR G C)	TEMPI ATUI WATI (DEG (0001	RE ER C)	PRI SI (N	RIC ES- JRE M OF S)	SO	IS- LVE G/L	, D	SOL (PE CE SAT ATI	S- VED	CAC	SS TAL S/L	CALC DIS SOL (MG AS (	VED /L CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT																						
13	1445	0.	.03	2450	7	.86		21.0	13	3.0		722		11.	0		111		1400	360		130
DEC																						
07	1230	0.	.12	2390	7	.77		2.0	4	4.0		735		11.	5		92		1300	320		120
FEB															_					750		200
09 APR	1030	0.	.03	5270	-	•		-6.0	-	1.0		734		16.	6		124		3200	750		320
13	1405	0	. 93	2500	7	. 63		23.0	15	3.0		721		12.	6		128		1200	270		120
JUN	1403	0.	. 55	2500	,	. 00		23.0	1.	0.0		121		12.	•		120		1200	270		120
07	1345	0.	.01	2700	7	. 67		26.0	24	4.0		720		7.	1		90		1600	390		160
									-													
																			001	TDG	201	TDG
				80	DIUM	DO	TAC-	ATV				CE	ILO-		FLUO	_	CTI	TCA		IDS,		IDS,
	SOD	IUM,			AD-		TAS-	LINI		SULF	ATE	D1	DE.		RIDE			ICA, S-		180		STI-
	DI				RP-		IS-	LA		DIS			S-		DIS			LVED		G. C		NTS,
	SOL				ION		LVED	(MG		SOL			LVED		SOLV			G/L		IS-		IS-
DATE		G/L	SODIUM		TIO		G/L	AS	, -	(MG			G/L		(MG/		A			LVED		LVED
		NA)	PERCENT				K)	CAC	03)	AS S			CL)		AS F			02)		G/L)		G/L)
		930)	(00932)		931)		935)	(904		(009			940)		0095			955)		300)		301)
OCT																						
13	6	9	9	I.	0.8	1	1	249		1300		1	18		0.	30	2	1		2130		2060
DEC	-	_						000					-							2120		2010
07 FEB	7	5	11		0.9	1	.3	262		1300		-	17		0.	30		9.8		2120		2010
09	27	n	15		2	2	9	576		3000		,	30		0	30	2	1		4940		4820
APR		•			-	-		3,0		5000		`			٠.	-	-	-		1010		1020
13	17	0	24		2	1	9	205		1300			58		0.	40		7.1		2230		2070
JUN																						
07	12	0	14		1	2	0	244		1600		3	33		0.	30	1	5		2630		2490
				NT	TRO-	NT	TRO-	NIT	PO-	NTT	RO-				PHOS	_			SE	DI-	9	ED.
	SOL	IDS.	SOLIDS.		EN.		EN,	GE		GE					HORO					NT.		USP.
		IS-	DIS-		RITE		+NO3	AMMO		AMMO		PF	IOS-		ORTH		SE	DI-		IS-		EVE
		LVED	SOLVED		IS-		IS-	DI			S-		ROUS		DIS-			NT.		RGE.		IAM.
		ONS	(TONS		LVED		LVED	SOL			VED		TAL		OLVE			S-		US-		INER
DATE	P	ER	PER		G/L		G/L	(MG		(MG			MG/L		MG/L			NDED		NDED	1	HAN
		-FT)	DAY)		N)		N)	AS		AS N			5 P)		S P)			G/L)		DAY)		2 MM
	(70	303)	(70302)	(00	613)	(00	631)	(006	(80	(718	46)	(00	0665)	(	0067	1)	(80	154)	(80	155)	(70	331)
OCT																						
OCT		2 00	0 17		010	-0	100		150		10	,	120			20		97		0 01		59
13 DEC		2.90	0.17	-0	.010	<0	.100	U.	150	U	.19	(	130		0.0	20		9/		0.01		29
07		2.88	0.69	<	.010	<0	.100	0	120	0	.15	1	0.060		0.0	20		34		0.01		62
FEB		50	0.50		10	-0	. 200	٠.		•					0			150				100
09		6.72	0.40	<0	.010	<0	.100	0.	360	0	.46	(	.170		0.0	10						
APR																						
13		3.03	5.60	<0	.010	<0	.100	0.	050	0	.06	- (	.130		0.0	20						
JUN											7.0											43
07		3.58	0.07	0	.010	<0	.100	0.	570	0	.73	(	.240		0.0	50						

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#### 06453255 CHOTEAU CREEK NEAR AVON. SD

LOCATION.--Lat 42°55'24", long 98°06'21", in NWkNWk sec.31, T.94 N., R.61 W., Bon Homme County, Hydrologic Unit 10170101, on left bank at downstream side of highway bridge, 6.3 mi southwest of Avon, 0.7 mi downstream from Dry Choteau Creek, and 12.7 mi upstream from mouth.

DRAINAGE AREA, -- 602 mi 2.

PERIOD OF RECORD . -- October 1982 to current year.

REVISED RECORDS .-- WDR SD-86-1: 1984(M).

GAGE. -- Water-stage recorder. Elevation of gage is 1.290 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 7 years, 80.4 ft3/s, 58.250 acre-ft/vr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,280 ft<sup>3</sup>/s, June 12, 1984, gage height, 13.93 ft; minimum daily discharge, 0.75 ft<sup>3</sup>/s, Sept. 27-30, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Oischarge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 9	1930	*300	a*5.21	No other	peak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

Backwater from ice. Minimum daily discharge, 0.75 ft3/s. Sept. 27-30.

MEAN VALUES DAY OCT NOV AUG DEC APR JUN SEP JAN FEB MAR MAY .IIII. 1 e30 2.4 2.2 e2.0 e3.0 e1.0 e2.0 e1.5 e2.0 e1.0 e1.0 2 e20 2.5 2.2 e2.0 e2.5 e1.0 2.2 e1.0 e2.0 e1.0 e1.0 e1.0 e10 2.3 2.2 e2.0 e2.5 e1.0 2.0 e1.0 e1.5 e1.0 e1.0 e1.0 e9.0 2.0 2.1 e2.0 e2.0 e2.0 1.8 e2.0 e1.5 e1.0 e.90 e1.5 e8.0 1.8 2.1 e2.0 e1.0 e1.0 e1.5 e2.0 1.8 e2.0 e1.5 e1.0 2.0 2.1 e.90 e.90 e1.5 e2.0 e2.0 e1.0 e1.0 e2.5 e1.5 e5.0 2.4 e.90 1.6 e1.5 e1.0 e1.0 e1.5 e2.0 e2.5 e2.0 e1.0 e5.0 1.7 1.6 e1.5 e2.5 e.90 e1.5 e1.0 e2.0 e2.0 e1.0 e5.0 2.6 e1.5 e.90 e1.0 e2.0 e50 e1.2 e1.0 e1.5 e2.0 e1.0 10 e4.0 1.1 e1.5 e1.0 e2.0 e1.0 e1.0 e2.0 e200 e1.9 e1.0 e1.0 11 94 0 1.6 e2.5 e1.5 e1.0 e100 e1.0 e1.0 e1.0 e1.0 e.90 e1.8 12 e.80 e3 0 2.0 e1.5 e2.5 e70 e1.7 e1.0 e1.0 e1.0 e1.0 e. 90 13 e2.0 2.0 e1.5 e.80 e2.0 22 e1.6 e1.0 e1.0 e1.0 e1.0 e.90 14 1.8 2.1 e2.0 e.80 e2.0 18 e1.6 e1.0 e1.0 e5.0 e1.0 e.90 15 1.3 2.2 e1.5 e.80 e2.0 15 e1.6 e1.0 e1.0 e10 e1.0 e.80 16 2.2 e1.5 e.80 e2.0 8.4 e1.0 e1.0 e5.0 e1.0 e.80 e1.5 17 1.5 2.0 e1.5 e.89 e.80 e2.0 6.7 e2.0 e2.0 e1.5 e4.0 e1.0 1.6 18 2.0 e1.5 e.89 e1.0 e3.0 e1.0 e.80 e2.0 6.0 A2.5 e1.3 1.7 19 2.0 e1.5 e.89 e1.5 5.0 e3.0 e1.0 e1.0 e2.0 e1.0 e1.0 20 1.7 2.0 e2.0 e.99 e1.5 e2.0 e1.0 e1.0 e1.0 e1.5 e.90 21 1.8 2.0 e1.0 e 90 e1.5 e1 0 e1.5 4.0 e2.0 e1.0 92 0 e1.5 4.6 2.2 2.0 2.0 e1.5 e1.0 e1.5 e2.0 e1.0 e1.0 e1.0 e1.0 e.90 23 1.9 2.2 e1.5 e1.0 e1.0 e1.0 e.90 e1.0 4.7 e2.0 e1.0 e1.0 24 1.8 2.4 e1.5 e1.0 e1.0 4.0 e2.0 e1.5 e1.5 e1.0 e1.0 e.80 25 1.7 2.2 e1.1 e1.5 3.6 e1.0 e1.5 26 1.7 2.1 e1.5 e1.1 e2.0 3.4 e2.0 e1.0 e15 e1.0 e5.0 e.80 27 2.1 e2.0 e1.5 e1.0 e10 e1.0 e3.0 e.75 e1.1 e2.0 3.1 e2.0 28 2.2 e2.0 e1.5 e5.0 e1.0 e1.0 e.75 e1.1 e2.0 2.8 e2.0 e1.0 29 2.3 e2.0 e.75 e1.5 e2.0 e4.0 e1.0 e1.0 e1.2 2.8 e1.0 ---30 2.6 e2.0 e1.5 e.75 e3.0 e1.0 e1.0 e1.2 2.7 e3.0 e1.0 31 2.5 e1.5 e1.7 2.5 e1.5 e1.0 e1.0 TOTAL. 145.6 61.8 51.6 69.2 55.0 38.50 28.20 37 16 54.5 558.2 60 4 36 3 MEAN 4.70 2.06 1.66 1.20 1.95 18.0 2.01 1.17 2.31 1.77 1.24 .94 3.0 MAX 30 2.6 2.2 2.0 3.0 200 2.0 15 10 5.0 1.5 MTN 1.3 1.1 1.5 .80 1.0 1.0 1.0 1.0 1.0 .90 .75 AC-FT 289 123 102 108 1110 137 109 76 56

TOTAL 5621.4 MEAN 15.4 MAX 324 MIN 1.1 AC-FT 11150 TOTAL 1196.46 MEAN 3.28 MAX 200 MIN .75 AC-FT 2370 WTR YR 1989

e Estimated

#### NIOBRARA RIVER BASIN

#### 06464100 KEYA PAHA RIVER NEAR KEYAPAHA, SD

LOCATION.--Lat 43°07'45", long 100°06'24", in NWkSWkSWk sec.17, T.96 N., R.78 W., Tripp County, Hydrologic Unit 10140203, on left bank at downstream side of highway bridge, 2.0 mi northeast of Keyapaha, and 2.0 mi upstream from Sand Creek.

DRAINAGE AREA. -- 466 mi<sup>2</sup>, approximately.

PERIOD OF RECORD .-- October 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,230 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 41.4 ft3/s, 29,990 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 820 ft<sup>3</sup>/s, May 3, 1983, gage height, 7.95 ft; maximum gage height, 9.45 ft, Feb. 20, 1982; minimum daily discharge, 3.4 ft<sup>3</sup>/s, Feb. 10, 1982.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood of 1952 reached a stage of about 14 ft, at present datum, from information by local residents.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 10	1830	a	*4.76	July 14	0400	*127	4.16

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 5.0 ft<sup>3</sup>/s. Feb. 4.

MEAN VALUES JUL AUG SEP DAY OCT NOV DEC JAN FEB MAR APR MAY TIIN. 10 1 17 23 e17 e11 e7.3 e13 44 23 18 11 8.2 16 21 e18 42 23 17 11 10 8.2 e11 96.6 e13 3 16 19 25 16 10 12 8.2 e18 e11 e5.8 e13 40 27 15 11 8.4 4 5 16 19 e19 e12 e5.0 e12 39 11 9.7 10 8.0 16 19 e19 e12 e5.6 e11 39 28 6 9.2 10 17 19 e20 e12 e6.0 e11 38 27 14 8.4 17 19 e20 e11 e7.2 e12 36 26 13 9.1 10 8.7 8 17 20 e18 e10 e8.0 e13 35 25 13 8.7 10 9.1 9 16 21 e16 24 13 8.2 9.7 10 e9.0 e9.0 e14 35 10 20 24 13 9.4 12 16 e14 e8.5 e10 e18 9.5 34 7.9 16 20 e13 e9.0 e11 e25 14 10 22 21 16 8.0 14 12 21 e13 e10 e12 e33 34 20 22 15 9.6 13 13 e13 33 21 11 e11 e12 941 14 22 9.4 13 18 e12 32 21 16 96 e12 e13 e56 15 21 21 15 61 11 12 18 e11 e14 e13 e72 31 16 11 17 19 e12 e14 e13 e60 30 21 14 39 13 17 16 19 e13 e14 e13 e56 30 21 12 30 13 11 18 18 24 e13 e15 e12 e54 31 21 12 24 12 10 19 23 e14 e12 e58 21 12 11 10 20 20 24 e13 e16 e13 e62 30 20 11 11 9.7 21 19 22 e13 e14 e13 65 29 19 10 17 10 11 22 18 23 e12 e13 66 28 19 11 16 9.7 e12 23 25 e12 27 18 11 9.4 15 18 67 e12 e12 24 17 23 27 12 8.9 17 13 e11 e10 e13 66 25 24 12 8.9 13 17 e9.0 26 17 e11 e14 64 9.5 12 26 18 24 e11 e15 63 26 17 12 11 e8.4 27 21 12 11 10 11 18 e11 e8.6 e14 60 27 16 9.8 28 18 e20 e10 e9.0 e13 56 27 16 11 11 10 29 19 e19 e10 e8.0 55 25 15 12 11 8.7 9.8 30 19 52 23 16 11 10 8.6 9.5 e18 e11 e8.0 31 19 17 10 8.4 e11 e7.6 48 551 964 398 313.5 327.2 TOTAL 636 429 346.1 300.5 1309 649 MEAN 17.8 42.2 20.9 13.3 17.7 10.1 10.9 21.2 13.8 11.2 10.7 32.1 96 13 15 MAX 23 25 20 16 15 72 44 28 18 7.6 7.6 8.0 MIN 16 18 10 5 0 11 23 15 10 AC-FT 1090 1260 851 686 596 2600 1910 1290 789 1090 622 649

CAL YR 1988 TOTAL 14867.6 MEAN 40.6 MAX 565 MIN 5.0 AC-FT 29490 WTR YR 1989 TOTAL 6770.7 MEAN 18.5 MAX 96 MIN 5.0 AC-FT 13430

e Estimated

#### NIOBRARA RIVER BASIN

#### 06464500 KEYA PAHA RIVER AT WEWELA. SD

LOCATION.--Lat 43°01'44", long 99°46'49", in SE4 sec.24, T.95 N., R.76 W., Tripp County, Hydrologic Unit 10150005, on right bank at downstream side of bridge on U.S. Highway 183, 1.0 mi north of Wewela, 4.5 mi upstream from Holt Creek, and 11.5 mi downstream from Lost Creek.

DRAINAGE AREA. -- 1,070 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- November 1937 to September 1940, October 1947 to current year. Monthly discharge only for October 1947, published in WSP 1309.

GAGE. --Water-stage recorder. Datum of gage is 2,049.78 ft above National Geodetic Vertical Datum of 1929. Prior to June 21, 1957, nonrecording gage at site 13 ft upstream at same datum. Prior to Aug. 23, 1984, recording gage on left bank 13 ft downstream from bridge at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years (water years 1939-40, 1948-89), 71.7 ft<sup>3</sup>/s, 51,950 acre-ft/yr; median of yearly mean discharges, 59 ft<sup>3</sup>/s, 42,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 5,430 ft<sup>3</sup>/s, Mar. 31, 1952, gage height, 13.08 ft; maximum gage height, 13.5 ft, Mar. 25, 1950, from floodmark, backwater from ice; no flow Jan. 10 to Feb. 15, 1949, Aug. 19 to Sept. 14, 1976.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 13	0315	а	*3.75	Mar. 16		*240	a2.78

a Backwater from ice. Minimum daily discharge, 14 ft<sup>3</sup>/s, Feb. 4.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP e40 e30 e20 e34 e29 e18 e34 **e46** e29 e16 e34 e30 e32 e46 e14 e31 e15 e31 e49 e30 e18 e30 e50 e29 e21 e32 e40 e26 e23 e34 e32 e24 e26 e40 e22 2.4 e30 e28 e50 e24 e30 e70 e32 e26 e33 e90 e31 e28 e35 e130 e29 e32 e34 e160 e30 e35 e34 e200 e32 e35 e34 e220 e33 e35 e34 e2.00 e35 e37 e32 e180 e36 e39 e31 e210 2.8 e35 e38 e32 e180 e35 e33 e34 e32 e32 e34 e32 e28 e34 e30 e25 e34 e30 e36 e24 e30 e23 e38 e30 e24 e36 e42 e2.7 e25 e35 e42 e28 e23 ---e41 e29 e21 ---e30 e22 ---TOTAL MEAN 38.1 45.3 34.7 28.7 28.9 85.3 52.3 29.6 25.7 18.8 23.0 MAX MIN AC-FT 

CAL YR 1988 TOTAL 42114 MEAN 115 MAX 1070 MIN 14 AC-FT 83530 WTR YR 1989 TOTAL 16150 MEAN 44.2 MAX 220 MIN 14 AC-FT 32030

e Estimated

#### NIOBRARA RIVER BASIN

#### 06464900 KEYA PAHA RIVER NEAR NAPER. NE

LOCATION.--Lat 42°55'00", long 99°05'50", in SE\SE\ sec.17, T.34 N., R.15 W., Boyd County, Hydrologic Unit 10150006, on left bank 70 ft upstream from highway bridge, 3.3 mi south of Naper, and 8.6 mi upstream from mouth.

DRAINAGE AREA. -- 1,630 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- October 1957 to current year.

REVISED RECORDS. -- WSP 1709: 1959(M).

GAGE. -- Water-stage recorder. Elevation of gage is 1,680 ft, from topographic map. Prior to May 2, 1958, nonrecording gage at same site and datum.

REMARKS.--Estimated daily discharges: Nov. 28, 29, Dec. 10 to Mar. 20, and Mar. 26 to Apr. 25. Records good except for periods of estimated record, which are poor. Minor diversions for irrigation above station. Data provided by District office, U.S. Geological Survey, Lincoln, Nebraska.

AVERAGE DISCHARGE.--32 years, 140 ft<sup>3</sup>/s, 101,430 acre-ft/yr; median of yearly mean discharges, 120 ft<sup>3</sup>/s, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,280 ft<sup>3</sup>/s, July 1, 1962, gage height, 10.91 ft; maximum gage height, 13.34 ft, Mar. 23, 1960, backwater from ice; no flow July 22-30, Aug. 10, 11, 1976, Aug. 3, 1980.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 900 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 14 Mar. 19	1030	a *350	*10.32 ice jam	No peaks greater	than base discha	rge.

a Backwater from ice. Minimum daily discharge, 14  ${\rm ft}^3/{\rm s}$ , Aug. 2, 9, 11, 12, Sept. 1-3.

		DISCHARGE,	CUBIC	FEET PER		, WATER YEAR MEAN VALUES	OCTOBER	1988 TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	155	84	104	86	46	96	200	123	68	41	15	14
	147	87	106	82	40	93	190	117	66	36	14	14
3	134	85	107	82	32	88	185	111	71	34	18	14
4	119	89	109	84	30	80	180	112	66	33	16	52
2 3 4 5	110	89	109	86	30	70	175	124	62	31	16	35
6	107	89	110	88	33	66	170	133	58	27	15	27
7	102	90	112	86	36	65	170	120	57	25	16	29
8	95	92	104	78	40	74	165	111	55	24	15	33
9	92	91	66	72	44	88	160	118	53	25	14	37
10	89	91	71	68	49	105	150	109	51	22	15	37 37
11	85	94	80	64	54	125	147	108	49	21	14	38
12	85	101	90	66	60	150	145	97	51	21	14	37
13	82	98	110	68	64	180	140	87	48	20	16	39
14	90	98	120	72	66	200	140	87	51	27	26	39
15	84	103	110	76	68	230	140	93	54	53	27	41
16	86	103	95	82	70	280	143	92	52	45	29	39 38
17	87	103	98	88	70	300	145	100	50	81	31	38
18	88	99	100	88	66	290	147	93	53	72	29	35
19	95	95	110	94	64	350	144	91	49	61	28	34
20	93	97	110	98	60	290	126	86	42	52	25	42
21	97	96	105	92	70	230	122	83	38	45	25	42
22	96	92	105	88	78	237	120	85	37	42	23	39
23	89	86	100	74	80	194	118	81	36	39	19	38
24	85	91	100	66	80	204	112	71	40	35	18	38
25	80	99	95	58	84	208	108	61	51	32	16	40
26	79	101	95	54	92	220	114	59	107	29	18	40
27	81	107	90	52	98	215	116	61	101	24	21	40
28	75	84	90	54	100	210	116	59	66	21	21	39
29	78	88	80	56		225	116	59	59	20	18	38
30	79	85	84	52		210	118	60	49	18	16	37
31	82		88	45		210		66		17	15	
TOTAL	2946	2807 3	3053	2299	1704	5583	4322	2857	1690	1073	603	1065
MEAN	95.0		8.5	74.2	60.9	180	144	92.2	56.3	34.6	19.5	35.5
MAX	155	107	120	98	100	350	200	133	107	81	31	52
MIN	75	84	66	45	30	65	108	59	36	17	14	14
AC-FT	5840		6060	4560	3380	11070	8570	5670	3350	2130	1200	2110
AC FI	3040	3370	,000	4500	3360	11070	03/0	3070	0000	2100	1200	2110

CAL YR 1988 TOTAL 82274 MEAN 225 MAX 2470 MIN 36 AC-FT 163200 WTR YR 1989 TOTAL 30002 MEAN 82.2 MAX 350 MIN 14 AC-FT 59510

#### MISSOURI RIVER MAIN STEM

#### 06466700 LEWIS AND CLARK LAKE AT SPRINGFIELD. SD

#### STAGE RECORDS

LOCATION.--Lat 42°51'21", long 97°53'06", in SW\xNE\xSW\x sec.24, T.93 N., R.60 W., Bon Homme County, Hydrologic Unit 10170101, on left bank at east edge of Springfield at mile 832.20.

PERIOD OF RECORD . -- August 1967 to current year.

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

REMARKS.--Records good. Stage regulated by Gavins Point Dam 21.2 mi downstream. Prior to Oct. 1, 1980, gage heights in files of U.S. Army Corps of Engineers.

GAGE HEIGHT. IN FEET. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES SEP DAY OCT NOV DEC APR MAY JUN JUL AUG JAN FEB MAR 8.47 8.29 8.06 8.03 8.34 1 9.36 9.33 8 47 8 46 7.35 7.58 7 90 8.70 2 9.23 9.40 8.30 8.44 8.05 7.16 7.53 7.96 8 00 8.07 8.30 9.09 9.40 8.26 8.48 7.87 6.72 7.57 7.94 8.03 8.12 8.25 8 67 9.05 9.37 8.29 8.56 7.91 7.05 7.35 7.99 8.02 8.16 8.12 8.69 5 9.09 9.24 8.26 8.70 8.24 7.47 7.24 8.02 8.07 7.90 8.09 8.80 6 9.15 9.30 8.19 8.76 7.87 7.43 7.91 8.16 7.83 8.07 8.77 7 9.26 9.27 8.15 8.76 8.66 8.09 7.71 7.85 8.23 7.99 8.06 8.75 8 9.25 9.21 8.10 8.36 8.80 7.78 7.95 7.82 8.26 7.82 8.10 8.68 9 9.29 9.01 8.17 7.85 8.89 7.35 7.84 8.03 8.14 7.83 8.18 8.46 10 9.33 8.73 8.14 7.72 8.99 7.30 7.78 8.12 8.11 7.93 8.21 8.34 11 9.41 8.49 8.22 7.82 9.06 7.20 7.88 8.18 8.01 8.19 8.14 9.44 8.33 7.99 8.05 8.22 8.21 8.22 8.27 8.43 12 9.06 6.82 8.02 13 9.32 8.19 7.95 7.93 8.28 8.10 8.32 8.24 8.69 9.00 8.19 6.68 8.26 8.79 7.91 8.91 6.82 7,92 8.33 8.07 8.34 14 9.24 8.23 8.41 8.91 8.44 15 7.88 8.33 9.10 7.85 8.06 8.56 8.80 6.99 8.34 8.13 7.70 8.16 8.31 8.30 8.99 16 9.01 8.13 8.64 8.59 7.04 7.78 8.31 9.07 17 8.95 8.02 8.31 8.69 8.28 7.05 7.83 8.30 8.23 8.22 8 22 18 9.02 7.95 8.34 8.71 7.92 7.02 7.94 8.27 8.29 8.30 8.26 9.08 7.57 19 9.28 7.86 8.40 8.66 6.84 7.97 8.15 8.32 8.15 8.22 9.03 8.59 20 9.28 7.87 8.47 7.33 6.57 7.92 8.04 8.32 7.90 8.24 9.04 21 9.31 7.91 8.66 8.49 7.25 6.39 7.97 7.96 8.23 7.92 8.32 9.02 22 9.28 7.91 8.42 8.45 7.15 6.38 8.00 7.90 8.13 7.87 8.16 8.97 9.01 23 9.14 8.09 8.40 8.36 6.49 7.96 8.08 7.82 8.05 7.40 8.02 9.24 8.27 7.69 8.05 9.01 24 8.24 8.26 8.07 8.12 8.03 25 9.21 8.32 8.24 7.65 8.13 7.98 8.07 9.02 8.24 6.55 8.11 8.10 8.06 8.44 9.04 26 9.19 8.31 8.15 8.13 7.37 6.66 8.16 8.12 8.15 8.97 8.20 8.66 2.7 9.03 8 00 7.96 8.14 7.09 6.84 8.14 8.20 7.84 7.76 8.54 28 9.20 8.27 7.63 8.29 7.16 7.45 8.00 8.10 8.21 8.92 7.76 29 9.33 8.17 7.68 8.34 7.92 8.12 7.68 8.25 8.35 8.98 30 9.23 8.23 7.86 8.38 ---7.84 7.88 8.06 7.88 8.31 8.13 9.03 31 9.16 8.28 8.45 ---7.74 8.08 8.31 8.20 8,18 MEAN 9.21 8.47 8.39 8.13 7.09 7.84 8.08 8.10 8.09 8.23 8.82 MAX 9.44 9.40 8.66 8.76 9.06 8.09 8.16 8.34 8.32 8.44 8.66 9.08 MIN 8.95 7.70 7.63 7.72 7.09 6.38 7.24 7.82 7.68 7.82 8.05 8.14

#### MISSOURI RIVER MAIN STEM

#### 06467000 LEWIS AND CLARK LAKE NEAR YANKTON, SD

LOCATION.--Lat 42°50'56", long 97°28'54", in SWk sec.7, T.33 N., R.1 W., Cedar County, NE, Hydrologic Unit 10170101, in powerhouse of Gavins Point Dam on Missouri River, 3.75 mi southwest of Yankton, 13.6 mi upstream from James River, 32.5 mi downstream from Niobrara River, and at mile 811.0.

DRAINAGE AREA. -- 279,500 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. -- July 1955 to current year (monthend contents only). Prior to October 1955, published as Gavins Point Reservoir near Yankton.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Dec. 9, 1955, recorder at temporary location on wall of intake structure unit 3.

REMARKS.--Reservoir is formed by earthfill dam; storage began in July 1955. Maximum capacity, 504,000 acre-ft below elevation 1,210.0 ft (top of spillway gates). Normal maximum, 442,600 acre-ft below elevation 1,208.0 ft. Inactive storage, 157,000 acre-ft below elevation 1,195.0 ft. Dead storage, 23,000 acre-ft below elevation 1,180.0 ft (crest of spillway). From capacity table put into use Nov. 1, 1986; maximum capacity, 491,700 acre-ft. Normal maximum, 432,000 acre-ft. Inactive storage, 149,400 acre-ft. Dead storage, 17,700 acre-ft. Figures given herein represent elevations at powerhouse and total contents adjusted for wind effect.

The spillway consists of 14 taintor gates, each 40 ft wide by 30 ft high; spillway capacity, 280,000 ft<sup>3</sup>/s at pool elevation 1,210.0 ft. Crest of spillway is at elevation 1,180.0 ft. Normal releases are through 3 power units, installation completed in January 1957; maximum release through power units is 35,000 ft<sup>3</sup>/s at pool elevation, 1,210.0 ft. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION .-- Records of elevation and contents provided by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 565,000 acre-ft, Apr. 1, 1960, affected by wind; minimum since initial filling, 61,950 acre-ft, Apr. 23, 1956.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 446,000 acre-ft, Jan. 7; minimum, 332,000 acre-ft, Mar. 5.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

						9	Da	te								Elevation (feet)	Contents (acre-feet)	Change in content (acre-feet)
Sept.	30															1,208.29	440,000	
Oct.	31															1,207.72	425,000	-15,000
Nov.	30															1,208.03	433,000	+8,000
Dec.																1,207.42	414,000	-19,000
CAI	L YR	19	88													-	-	-10,000
Jan.	31															1,208.05	433,000	+19,000
eb.																1,205,19	357,000	-76,000
far.	31															1,205,28	361.000	+4.000
pr.	30															1,205,16	357.000	-4.000
lay	31															1,205,14	355,000	-2,000
June	30															1.204.86	348.000	-7.000
uly	31															1,205,05	354,000	+6.000
lug.	31															1,206.19	384,000	+30,000
Sept.	30															1,207.66	423,000	+39,000
WII	R YR	19	89													_	_	-17.000

NOTE. -- Lake frozen over Dec. 31 to Mar. 30.

#### MISSOURT RIVER MAIN STEM

#### 06467500 MISSOURI RIVER AT YANKTON, SD

LOCATION.--Lat 42°51'58", long 97°23'37", in SW<sub>k</sub>SW<sub>k</sub> sec.18, T.93 N., R.55 W., Yankton County, Hydrologic Unit 10170101, near left bank in downstream end of left pier of Meridian Highway Bridge on U.S. Highway 81, 5.2 mi downstream from Gavins Point Dam, 6.0 mi upstream from James River, and at mile 805.8.

DRAINAGE AREA. -- 279,500 mi<sup>2</sup>, approximately.

PERIOD OF RECORD. --October 1930 to current year. Monthly discharge only for some periods, published in WSP 1309. Gage-height records collected at same site March 1873 to November 1886, March 1905 to May 1908 (fragmentary), August 1921 to September 1950 (except winter months prior to 1932), are contained in reports of the National Weather Service.

GAGE.--Water-stage recorder. Datum of gage is 1,139.68 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 20, 1932, nonrecording gage, and Sept. 20, 1932, to Mar. 9, 1967, water-stage recorder at present site and at datum 20.0 ft higher.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow completely regulated by Gavins Point Dam 5.2 mi upstream since July 1955. Many diversions for irrigation and water supply above station. U.S. Army Corps of Engineers gage-height telemeter and satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 59 years, 26,620 ft 3/s, 19,286,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 480,000 ft<sup>3</sup>/s, Apr. 13, 1952; maximum gage height, 35.5 ft, Apr. 13, 14, 1952 (present datum); minimum daily discharge, 2,700 ft<sup>3</sup>/s, Nov. 15, 16, 1940.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Maximum stage known, 50.5 ft, Apr. 5, 1881, ice jam, present datum.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,400 ft<sup>3</sup>/s at 0530 hours, Nov. 2, gage height, 16.82 ft; minimum daily discharge, 8,040 ft<sup>3</sup>/s, Mar. 11.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30200	34300	12500	12200	15100	13600	25200	29100	31800	32600	32500	30500
2	30100	34400	12500	12500	16100	13000	25200	29300	31100	30200	32400	30500
3	30500	34200	12400	12200	16500	12800	25100	29300	32200	29900	32400	30600
4	31200	34200	12400	12300	16500	14400	25000	29000	31300	32200	32400	29400
5	31700	34300	12400	12200	16500	14900	25100	28800	31300	28000	32300	27300
3	31700	34300	12400	12200	10300	14900	23100	20000	31300	20000	32300	2/300
6	31600	34300	12400	12300	16500	13100	25900	28700	32500	27700	32200	26800
7	31900	34500	12400	11900	16200	12000	26400	29000	32600	32100	32400	26600
8	32100	31500	12400	e12000	16300	10700	26600	29600	32400	29000	32300	25500
9	32100	28700	12500	e12000	16400	9820	26900	30500	32500	28400	32400	23500
10	32600	27300	12400	e12000	16100	8900	28000	31000	32700	32200	32400	23200
					20200	0000	20000	02000				
11	32900	24600	12600	e12000	16100	8040	28600	31500	32700	31000	32400	24800
12	32900	21600	12300	e12000	16100	8190	28600	31900	32200	31200	32400	26000
13	33400	18700	12400	12000	16100	8400	27800	32100	31100	32500	32400	26100
14	33600	16000	12000	12100	16200	8480	28000	32200	32500	32500	32300	26400
15	33500	13600	12600	12100	16300	8390	27900	32200	32600	32500	32100	26700
16	33500	12800	12600	12100	16200	9250	28000	32300	32600	32500	32200	26800
17	33200	13000	12700	12100	16200	9250	28100	32200	32600	32500	32300	27200
18	33400	13000	12300	12100	14800	9000	28400	32200	32500	32500	32400	27300
19	33700	12800	12300	12000	14800	9500	28800	32000	32700	31500	32300	27400
20	33400	12900	12200	12100	14700	9900	29400	32000	32700	29600	32000	27600
21	33400	12600	12400	12200	14600	9830	29500	32200	32500	32100	32300	27700
22	33500	12500	12200	12100	14700	9790	29900	32100	32500	28900	32300	27900
23	33200	12200	12300	12200	14800	10900	29800	31600	32500	28600	32300	28500
24	33700	12500	12500	12100	13400	13800	29700	30900	32500	32100	32400	28300
25	33400	12300	12700	12100	12300	16800	29600	31500	31000	30100	32300	28800
155				77.7	777.7			62.22.20				
26	33600	12400	12700	12100	12000	19500	29600	31100	28400	29700	31600	29200
27	33100	12300	e12500	12200	12500	22300	29700	30800	31900	32200	30600	29200
28	33500	12400	e12500	12100	13600	25000	29000	32100	28200	31800	29800	29200
29	33600	12300	e12500	12100		25300	29100	30900	29700	32600	28900	29200
30	34000	12400	12500	12100		25200	29300	30800	32500	32500	28900	29300
31	34300		12400	13200		25300		31700		32500	29600	
	04000		12400	10200		25000		01,00		02500	20000	
TOTAL	1016800	610600	385500	376700	427600	415340	838200	960600	956300	963700	987500	827500
MEAN	32800	20350	12440	12150	15270	13400	27940	30990	31880	31090	31850	27580
MAX	34300	34500	12700	13200	16500	25300	29900	32300	32700	32600	32500	30600
MIN	30100	12200	12000	11900	12000	8040	25000	28700	28200	27700	28900	23200
	2017000	1211000	764600	747200	848100	823800	1663000	1905000	1897000	1911000	1959000	1641000
			,		3.0200	320000						

CAL YR 1988 TOTAL 9685200 MEAN 26460 MAX 38900 MIN 12000 AC-FT 19210000 WTR YR 1989 TOTAL 8766340 MEAN 24020 MAX 34500 MIN 8040 AC-FT 17390000

e Estimated

#### 06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND

LOCATION.--Lat 45°56'52", long 98°10'29", in SE\NE\nE\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 0.8 mi upstream from North Dakota-South Dakota State line.

DRAINAGE AREA, --5,480 mi<sup>2</sup>, of which about 3,300 mi<sup>2</sup> 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 above National Geodetic Vertical Datum of 1929.

REMARKS.--Estimated daily discharges: Nov. 22 to Mar. 12, Mar. 16 to Apr. 12, and July 20-26. Records fair except those for periods Nov. 22 to Mar. 12 and July 20-26, which are poor. Flow regulated by upstream reservoirs, Jamestown Reservoir (station 06469000), Pipestem Lake, capacity 147,000 acre-ft, and Lake LaMoure

AVERAGE DISCHARGE. -- 8 years, 148 ft3/s, 107,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 2,300 ft<sup>3</sup>/s, Mar. 28, 1987, gage height, 13.76 ft, no flow at times during some years.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, about 1,400 ft3/s, Apr. 3, gage height, 12.47 ft; no flow for many days.

		DISCHARG	E, IN	CUBIC FEET		ND, WATER MEAN VALU		TOBER 1988	TO SEPTEM	BER 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e1.0	e4.2	e.78	e.50	e780	1.5	1.5	.00	.01	.34
2	.00	.00	e5.0		e.78	e.50	e1000	1.5	19	.07	.00	.00
3	5.1	.00	e4.5		e.76	e.49	e1350	1.5	23	.01	.00	.03
4	.00	4.4	e8.0		e.76	e.48	e1300	58	7.1	.00	.00	.07
5	.00	89	e9.0		e.74	e.47	e1280	239	3.6	.00	.00	.01
6	.00	8.6	e9.0	e4.5	e.74	e.47	e1250	53	2.5	.03	.00	. 17
7			e7.0						50		.00	.14
	.00	.00			e.74	e.46	e1150	1.2	38	.00		4.2
8	.00	.00	e6.0		e.72	e.46	e1050	3.3		.00	.00	
9	.00	3.7	e5.6		e.72	e.45	e1000	1.6	.03	1.9	.00	13
10	2.7	6.5	e5.2	e3.2	e.72	0.44	e800	1.5	.00	.00	.00	3.3
11	.00	.00	e5.0	e3.2	e.70	e.44	e700	11	.00	.00	.00	9.7
12	.00	.00	e5.0		e.60	e5.0	e600	33	25	.03	.00	16
13	.00	.01	e5.0		e.60	11	567	80	26	.07	.00	3.9
14	.00	2.0	e5.4		e.60	21	537	80	23	.00	.00	.68
15	.00	44	e5.0		e.60	25	307	36	.00	.00	.00	2.4
13	.00	44	65.0	63.2	e.00	45	307	36	.00	.00	.00	2.4
16	.00	117	e4.8		e.60	e35	339	13	.00	.00	.00	13
17	. 82	.71	e4.8		e.60	e50	213	2.5	.00	.46	.00	5.4
18	.07	.00	e5.6	e3.1	e.60	e90	190	8.0	.00	19	.00	.00
19	.00	.00	e6.0	e3.0	e.50	e100	173	29	.00	4.9	.00	2.8
20	.00	.00	e5.8	e3.0	e.50	e170	118	24	.00	e.00	.00	21
21	.00	.00	e5.2	e2.5	e.50	e240	8.5	3 23	6.6	e.00	.00	94
22	.00	e.00	e5.0		e.50	e280	5.1		.01	e.00	.00	123
23	10	e.00	e4.8		e.50	e310	3.1		.07	e.00	.00	1.2
24	.14	e.00	e4.7		e.50	e330	5.1		.02	e.00	.00	.00
25	2.5	e.00	e4.6		e.50	e350	7.5		2.0	e.00	.00	4.7
26	.00	e.00	e4.5	e1.4	e.50	e370	6.6	3 20	.30	e.00	.00	.02
27	32	e.00	e4.5		e.50	e400	57	.46	.81	10	.00	.00
28	4.2	e.00	64.5		e.50	e450	71	6.8	.26	.00	.00	2.3
29	.00	e.00	e4.4		6.50	e500	2.2		.04	1.0	.00	.01
30	.00	e.10	e4.4			e550	2.1		.09	2.0	.23	.00
31	.07	6.10	e4.3			e700	2.1		.09	.00	2.8	.00
31	.07		84.3	e.80		e/UU		8.0		.00	2.0	
TOTAL	57.60	276.02	163.6		17.36	4992.16	14872.2		228.93	39.47	3.04	321.37
MEAN	1.86	9.20	5.28	2.97	. 62	161	496		7.63	1.27	.098	10.7
MAX	32	117	9.0	6.7	.78	700	1350	239	50	19	2.8	123
MIN	.00	.00	1.0		. 50	. 44	2.1		.00	.00	.00	.00
AC-FT	114	547	325		34	9900	29500		454	78	6.0	637

CAL YR 1988 TOTAL 9471.30 MEAN 25.9 MAX 244 MIN .00 AC-FT 18790 WTR YR 1989 TOTAL 22027.91 MEAN 60.4 MAX 1350 MIN .00 AC-FT 43690

e Estimated

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### 06470878 JAMES RIVER AT NORTH DAKOTA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 45°56'10", long 98°10'26", in SEXSEX 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 mi<sup>2</sup>, approximately, revised, of which about 3,300 mi<sup>2</sup> is probably noncontributing.

### STAGE RECORDS

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 PERIOD OF RECORD. -- Maximum observed, 93.60 ft, Mar. 28, 1987; minimum observed, 86.45 ft, Oct. 3,

EXTREMES FOR CURRENT YEAR. -- Maximum observed, 92.20 ft, Apr. 4; minimum observed, 86.45 ft, Oct. 3.

# GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								88.75	88.56	88.20	87.78	
2								88.78	88.48	88.17	88.01	
3								88.85	88.45	88.05	87.89	
4								88.63	88.48	88.10	87.75	
5								88.70	88.49	88.27	87.63	
6								88.71	88.47	87.93	87.49	
7								88.90	88.36	87.89	87.47	
8								88.61	88.31	87.89	87.51	
9								88.74	88.42	87.77	87.54	
10								88.82	88.46	87.70	87.57	
11								89.03	88.48	87.76	87.58	
12								88.86	88.36	87.81	87.56	
13								88.68	88.32	87.76	87.52	
14								88.66	88.27	87.75	87.49	
15								88.71	88.40	87.76	87.44	
16								88.82	88.44	87.77	87.43	
17								88.84	88.39	87.84	87.49	
18								88.75	88.37	87.82	87.80	
19								88.68	88.39	87.72	87.76	87.61
20								88.72	88.54	87.72	87.54	87.48
21								88.70	88.20	87.73	87.46	87.57
22								88.66	88.28	87.73	87.45	87.60
23								88.62	88.28	87.73	87.43	87.60
24								88.56	88.27	87.75	87.49	87.75
25								88.76	88.26	87.80	87.61	87.59
26								88.52	88.26	87.74	87.51	87.46
27								88.73	88.23	87.58	87.42	87.60
28								88.74	88.25	87.51	87.53	87.60
29							88.67	88.35	88.23	87.66	87.45	87.44
30							88.68	88.37	88.13	87.64	87.42	87.49
31								88.48		87.65		
MEAN				2.2			222	88.70	88.36	87.81		
MAX								89.03	88.56	88.27		
MIN								88.35	88.13	87.51		

#### 06470980 JAMES RIVER NEAR HECLA, SD

LOCATION.--Lat 45°53'34", long 98°10'13", in SWkSEkSEk sec. 16, T.128 N., R.61 W., Brown County, SD, Hydrologic Unit 10160003, on left bank 30 ft upstream from bridge on county road 1.0 mi northwest of Hecla, and 3.0 mi downstream from the North Dakota-South Dakota border.

DRAINAGE AREA. -- 5,520 mi<sup>2</sup> approximately, of which about 3,300 mi<sup>2</sup> is probably noncontributing.

#### STAGE RECORDS

PERIOD OF RECORD. -- February 1982 to current year.

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

REMARKS.--Records of stream velocity and discharge are also collected at this location. These records which have been used to supplement the discharge record for station 06740875, James River at Dakota Lake Dam near Ludden, ND are available in the files of the District office.

EXTREMES FOR PERIOD OF RECORD. --Maximum gage height, 92.72 ft, Apr. 1, 1987; minimum, 86.15 ft, Sept. 18, 1988.

EXTREMES FOR CURRENT YEAR. -- Maximum gage height, 91.55, Apr. 7; minimum, 86.50 ft, Oct. 10.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT		64,220									
		NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	86.85	86.67	86.90	87.28				88.65	88.44	88.04	87.63	87.14
2	86.73	86.83	86.91	87.28				88.66	88.40	88.04	87.74	87.21
3	86.71	86.73	86.92	87.28		87.51	91.01	88.70	88.37	87.94	87.69	87.27
4	86.63	86.66	86.92	87.28		87.53	91.35	88.61	88.38	87.94	87.60	87.22
5	86.78	86.78	86.93	87.28		87.54	91.48	88.71	88.39	88.02	87.53	87.23
6	86.82	86.78	86.94	87.29		87.55	91.51	88.65	88.35	87.87	87.38	87.32
7	86.89	86.79	86.95	87.34		87.55	91.52	88.73	88.34	87.78	87.44	87.16
8	86.80	86.83	86.96	87.35		87.55	91.47	88.55	88.28	87.77	87.46	87.12
9	86.75	86.76	86.96	87.34		87.56	91.24	88.59	88.32	87.72	87.45	87.11
10	86.66	86.69	86.98	87.34		87.57	90.90	88,63	88.32	87.65	87.46	87.12
11	86.63	86.82	86.99	87.38		87.58	90.64	88.74	88.33	87.67	87.45	87.19
12	86.72	86.93	87.01	87.39		87.61	90.38	88,67	88.34	87.73	87.42	87.14
13	86.88	86.91	87.01	87.40		87.65	90.14	88.56	88.29	87.68	87.39	87.19
14	86.79	86.73	87.03	87.40		87.76	90.00	88.56	88.24	87.68	87.30	87.23
15	86.72	86.75	87.02	87.41		87.88	89.71	88.58	88,29	87.66	87.33	87.20
16	86.69	86.85	87.03	87.40		88.05	89.66	88.63	88.29	87.67	87.34	87.16
17	86.63	86.91	87.03	87.40		88.33	89.49	88.66	88.28	87.69	87.39	87.15
18	86.66	86.88	87.04	87.39		88.87	89.31	88.61	88.26	87.69	87.56	87.48
19	86.69	86.89	87.04	87.40		89.39	89.17	88.58	88.24	87.64	87.55	87.23
20	86.85	86.89	87.05	87.40			89.00	88.61	88.32	87.65	87.31	87.06
21	86.68	86.89	87.05	87.40			88.77	88.57	88.18	87.63	87.33	87.28
22	86.76	86.89	87.06	87.40			88.81	88.55	88.18	87.63	87.32	87.47
23	86.72	86.88	87.08	87.41			88.67	88.51	88.18	87.60	87.31	87.40
24	86.60	86.89	87.08	87.42			88.58	88.50	88.16	87.61	87.36	87.57
25	86.60	86.89	87.08	87.42			88.36	88.66	88.16	87.62	87.42	87.29
26	86.63	86.89	87.14	87.42			88.41	88.47	88.17	87.57	87.26	87.20
27	86.81	86.90	87.22	87.43			88.23	88.54	88.13	87.43	87.22	87.43
28	86.65	86.89	87.25	87.44			88.41	88.58	88.10	87.40	87.32	87.25
29	86.68	86.89	87.27	87.44			88.61	88.32	88.11	87.57	87.26	87.08
30	86.69	86.89	87.27	87.45			88.60	88.34	88.03	87.56	87.20	87.33
31	86.71		87.27	87.46				88.40		87.57	87.14	
MEAN	86.72	86.83	87.04	87.38				88.58	88.26	87.70	87.41	87.24
MAX	86.89	86.93	87.27	87.46				88.74	88.44	88.04	87.74	87.57
MIN	86.60	86.66	86.90	87.28				88.32	88.03	87.40	87.14	87.06

### 06470988 SAND LAKE BAY - PLATFORM 2

LOCATION.--Lat 45°44'54", long 98°16'30", in SWkSEkSEk sec.4, T.126 N., R.62 W., Brown County, Hydrologic Unit 10150003, on floating platform 9.4 mi north of Columbia.

REMARKS. -- Records for 1989 water year will be published in a separate open-file report.

#### JAMES RIVER BASIN

#### 06470990 SAND LAKE - OPEN PLATFORM 1

LOCATION.--Lat 45°44'02", long 98°16'51", in NE\ne\nW\ sec.15, T.126 N., R.62 W., Brown County, Hydrologic Unit 10160003, on floating platform 8.2 mi north of Columbia.

REMARKS. -- Records for 1989 water year will be published in a separate open-file report.

#### JAMES RIVER BASIN

### 06470991 SAND LAKE BAY SITE NO. 2 NEAR HOUGHTON, SD

LOCATION.--Lat 45°42'55", long 98°15'42", in NWASELNWA sec.23, T.126 N., R.62 W., Brown County, Hydrologic Unit 10160003, on floating platform 6.8 mi north of Columbia.

REMARKS. -- Records for 1989 water year will be published in a separate open-file report.

#### JAMES RIVER BASIN

#### 06470992 SAND LAKE NEAR COLUMBIA, SD

LOCATION.--Lat 45°40'10", long 98°18'31", in NW&SW& sec.4, T.125 N., R.62 W., Brown County, Hydrologic Unit 10180003, near outlet control structure 3 mi north of Columbia.

REMARKS. -- Records for 1989 water year will be published in a separate open-file report.

# 06471000 JAMES RIVER AT COLUMBIA, SD (National stream-quality accounting network station)

LOCATION.--Lat 45°36'13", long 98°18'36", in NWkNWk sec.33, T.125 N., R.62 W., Brown County, Hydrologic Unit 10160003, on left bank 20 ft downstream from highway bridge, 0.6 mi south of Columbia, 0.9 mi downstream from Chicago and North Western Transportation Company bridge, 0.3 mi upstream from Elm River, and 12.7 mi downstream from Columbia Road Dam.

DRAINAGE AREA. -- 5,857 mi<sup>2</sup>, of which about 3,376 mi<sup>2</sup> is probably noncontributing.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- October 1945 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,272.91 ft above National Geodetic Vertical Datum of 1929. From Oct. 1, 1945, to Oct. 4, 1957, nonrecording gage. From Oct. 5, 1957, to Sept. 30, 1980, water-stage recorder. Both gages described above at site 3.3 mi upstream from present site and at different datum.

REMARKS.--Records poor. Flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Gage-height telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--44 years, 112 ft<sup>3</sup>/s, 81,140 acre-ft/yr; median of yearly mean discharges, 67 ft<sup>3</sup>/s, 48,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 5,420 ft<sup>3</sup>/s, May 24, 25, 1950, gage height, 16.89 ft, from graph based on gage readings; maximum gage height, 17.11 ft, Mar. 24, 1987, backwater from Elm River; maximum daily reverse flow, 1,860 ft<sup>3</sup>/s, Apr. 8, 1952, backwater from Elm River.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 866 ft<sup>3</sup>/s at 0015 hours, Apr. 18, gage height, 13.38 ft; maximum gage height, 16.93 ft, Apr. 1, backwater from Elm River; maximum daily reverse flow, 900 ft<sup>3</sup>/s, Mar. 30, backwater from Elm River.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		DISCHARGE	IN CODIC	, reel r	EK SEC	MEAN VALUE		OBER 1986	IO SEFIE	DER 1909		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	e50	e360	e1.5	e1.0	.00	.00
2	.00	.00	.00	.00	.00	.00	e200	e300	e1.5	e1.0	.00	.00
3	.00	.00	.00	.00	.00	.00	e450	e230	e1.5	e1.0	.00	.00
4	.00	.00	.00	.00	.00	.00	e550	e170	e1.5	e1.0	.00	.00
5	.00	.00	.00	.00	.00	.00	e650	e120	e1.5	e.90	.00	.00
6	.00	.00	.00	.00	.00	.00	e650	e70	e1.5	e.50	.00	.00
7	.00	.00	.00	.00	.00	.00	e650	e40	e1.5	e.10	.00	.00
8	.00	.00	.00	.00	.00	.00	e700	e20	e1.5	e.01	.00	.00
9	.00	.00	.00	.00	.00	.00	e750	e15	e1.0	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	e830	e15	e1.0	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	e820	e15	e1.0	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	e810	e10	e3.0	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	e800	e6.0	e2.5	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	e810	e5.0	e2.5	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	e820	e5.0	e2.5	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	e830	e4.0	e2.0	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	e850	e3.0	e2.0	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	e860	e2.0	e2.0	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	e850	e2.0	e2.0	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	e840	e2.0	e2.0	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	e830	e2.0	e2.0	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	e780	e2.0	e1.9	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	e760	e2.0	e1.5	.00	.00	.00
24	.00	.00	.00	.00	.00	e.50	e720	e2.0	e1.5	.00	.00	.00
25	.00	.00	.00	.00	.00	e1.0	e670	e2.0	e1.5	.00	.00	.00
26	.00	.00	.00	.00	.00	e-10	e600	e2.0	e1.5	.00	.00	.00
27	.00	.00	.00	.00	.00	e-100	e550	e1.5	e1.0	.00	.00	.00
28	.00	.00	.00	.00		e-500	e520	e1.5	e1.0	.00	.00	.00
29	.00	.00	.00	.00		e-700	e490	e1.5	e1.0	.00	.00	.00
30	.00	.00	.00	.00		e-900	e420	e1.5	e1.0	.00	.00	.00
31	.00		.00	.00		e-500		e1.5		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	-2708.50	20110	1413.5	49.4	5.51	0.00	0.00
MEAN	.00	.00	.00	.00	.00	-87.4	670	45.6	1.65	.18	.00	.00
MAX	.00	.00	.00	.00	.00	1.0	860	360	3.0	1.0	.00	.00
MIN	.00	.00	.00	.00	.00	-900	50	1.5	1.0	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	-5370	39890	2800	98	11	.0	.0

CAL YR 1988 TOTAL 2706.46 MEAN 7.39 MAX 81 MIN .00 AC-FT 5370 WTR YR 1989 TOTAL 18869.91 MEAN 51.7 MAX 860 MIN -900 AC-FT 37430

e Estimated

#### 06471000 JAMES RIVER AT COLUMBIA, SD--Continued (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

PERIOD OF RECORD . -- October 1948 to September 1964. October 1966 to current year.

PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: October 1966 to September 1981; April 1986 to November 1987 (seasonal records only), November 1987 to current year.

pH: December 1987 to current year.

WATER TEMPERATURE: October 1966 to September 1981; April 1986 to November 1987 (seasonal records only), November 1987 to current year.

DISSOLVED OXYGEN: November 1987 to current year.

REMARKS.--Daily records of specific conductance, pH, water temperature, and dissolved oxygen for water year 1989 are available from the District office and will be published in a separate open-file report.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum observed, 2,500 microsiemens, Mar. 1, 1974, Jan. 27-29, Jan. 31, 1979; minimum observed, 240 microsiemens, Mar. 17, 1972.
WATER TEMPERATURE: Maximum observed, 36.5°C, June 21, 1988; minimum observed, 0.0°C on many days during

winter periods.

pH: Maximum observed, 9.9, Mar. 18, 1988; minimum observed, 7.3, July 13, 1988.
DISSOLVED OXYGEN: Maximum observed, 17.7 mg/L, Apr. 20, 1989; minimum observed, 0.0 mg/L, June 2, 1988.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			WAIER QU	ALIII DAI	A, MAILE	IEAR OCIO	DEK 1900	TO SEPTE	IDEK 1908			
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)
APR												
07	1200	654	183	7.24		3.0	5.0	4.1	724	8.0	66	5.4
26	1250	598	490	7.81		16.0	16.0	3.0	724	8.1	87	
MAY	0010		700						700	7.0		
11 JUN	0940	15	792	8.37	206	22.0	15.5	9.3	728	7.6	80	13
22	1425	1.8	815	8.64		24.0	22.0	23	725	6.6	80	
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)		SODIUM PERCENT (00932)		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)
APR												
07	K27	110		13	5.0	8.9	22	0.5	11	51	28	6.5
26			160	34	19	40	33	1	11	152	78	18
MAY 11	K51	170	260	59	28	57	31	2	13	225	150	30
JUN	AJ1	170	200	29	20	37	31	2	13	223	150	30
22			220	39	30	80	42	2	13	204	150	40
DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	DIS- SOLVED	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	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, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
APR												
07 26	0.10	6.0	129 319	8 12	114 291	0.18	228 515	0.040	0.040	0.460	0.510	0.500
MAY 11	0.20	2.8	487	27	466	0.66	19.7	<0.010	<0.010			<0.100
JUN		2.0						-0.010				100
22			525	42	476	0.71	2.57		<0.010			

## 06471000 JAMES RIVER AT COLUMBIA, SD--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	NO2+NO3 DIS- A SOLVED (MG/L	NITRO- GEN, MMONIA TOTAL (MG/L AS N) 00610)	AMMO A DI SOL (MG AS	N, GE NIA AMMO S- DI VED SOL //L (MG N) AS N	IN, GEN, DNIA MONI IS- ORGA VED TOT IS/L (MG IH4) AS	A + NIT NIC GE AL TOT J/L (MG N) AS N	AL TOT (/L (MG (O3) AS	ROUS DI TAL SOI G/L (MC P) AS	ROUS PHOR IS- ORT LVED TOT E/L (MG	RUS, ORT THO, DIS TAL SOLV E/L (MG/ P) AS E	COUS ALUCHO, INUCED SOL	M, S- ARSENIC VED TOTAL
APR 07 26 MAY	0.550 <0.100	0.660				8 10					300 029 -	120 1
11 JUN	<0.100	0.040	0.	050 0	.06 1	6 -	- 0.	330 0	.080 0.	136 0.	050	<10 3
22	<0.100		0.	040 0	.05 -			0.	. 160 -	0.	155 -	
DATE APR 07 26	ARSEN DIS SOLV E (UG/ AS A	ED SOL	ARIUM, DIS- DLVED (UG/L AS BA) 01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	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)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)
MAY 11		2	59	<0.5	160	<1	<1	<1	<3	2	<0.010	<0.01
JUN 22		8			210		<1			22		<0.01
DATE	IRON TOTA RECO ERAB (UG/ AS F	L I V- LE S L (E) A	IRON, DIS- SOLVED (UG/L AS FE) (1046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	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, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)
APR 07	3	70	200	<5	5	60	40	0.1	<10	7	<1	<1
26 MAY			20	<5			57	<0.1	75	-		<1
11 JUN	4	40	12	3	41	850	600	<0.1	<10	<10	<1	<1
22			17	4			390	<0.1				<1
DATE	SILVE DIS SOLV E (UG/ AS A	R, ED S L (G)	STRON- TIUM, DIS- SOLVED (UG/L AS SR)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	PLANK- TON BIOMASS ASH WT (MG/L) (81353)	PLANK- TON BIOMASS DRY WT (MG/L) (81354)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
APR 07	<1	.0	58	<6	21	8.50	0.800	11	830	8	14	97
26					13					10	16	91
MAY 11 JUN	<1	.0	270	<6	5	18.0	<0.300	7.5	720	19	0.77	94
22					- 4					47	0.23	98

06471000 JAMES RIVER AT COLUMBIA, SD--Continued
WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE  MAY  11	TIME 0940	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)		OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	(UG/L) (77825)	ALDRIN, TOTAL (UG/L) (39330)	ALDRIN, DIS- SOLVED (UG/L) (39331)
JUN 07	1315	E1.5	870	8.57	28.0	23.0	720	4.8	59			
****	1015	22.5	070	0.37	20,0	CHLO:		4.0	33			
DATE	ALDRIN, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39333)	AME- TRYNE TOTAL (82184)	ATRA- ZINE, TOTAL (UG/L) (39630)	CHLOR- DANE, TOTAL (UG/L) (39350)	CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	DANE, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39351)		DDD, TOTAL (UG/L) (39360)	DDD, DIS- SOLVED (UG/L) (39361)	DDD, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39363)	DDE, TOTAL (UG/L) (39365)	DDE, DIS- SOLVED (UG/L) (39366)
MAY 11		<0.10	0.10	<0.1	<0.1	-4	<0.10	<0.010	<0.01		<0.010	<0.01
JUN 07	<0.1					<1.0		22		<0.1		
07	<b>~0.1</b>	-		199		~1.0		-		~0.1		7.5
DATE	DDE, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39368)	DDT, TOTAL (UG/L) (39370)	DDT, DIS- SOLVED (UG/L) (39371)	DDT, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39373)	DI- AZINON, TOTAL (UG/L) (39570)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- AZINON, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39571)	DI- ELDRIN TOTAL (UG/L) (39380)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	DI- ELDRIN, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39383)	ENDO- SULFAN, TOTAL (UG/L) (39388)	ENDO- SULFAN DISSOLV (UG/L) (82354)
MAY 11	1,44	<0.010	<0.01	:	<0.01	<0.01		<0.010	<0.01		<0.010	<0.01
JUN 07	<0.1			<0.1	1200		<0.1			<0.1		
07	-0.1			-0.1	1,132,1		-0.1			-0.1		
DATE	ENDO- SULFAN, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39389)	ENDRIN, TOTAL (UG/L) (39390)	ENDRIN, DIS- SOLVED (UG/L) (39391)	ENDRIN, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39393)	ETHION, TOTAL (UG/L) (39398)	ETHION DISSOLV (UG/L) (82346)	ETHION, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39399)	HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR, DIS- SOLVED (UG/L) (39411)	HEPTA- CHLOR, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39413)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)	HEPTA- CHLOR EPOXIDE DIS- SOLVED (UG/L) (39421)
MAY 11	-	<0.010	-0.01		-0.01	-0.01		<0.010	-0.01	-	<0.010	<0.01
JUN	15.0		<0.01		<0.01	<0.01		~0.010	<0.01		~0.010	-0.01
07	<0.1			<0.1			<0.1			<0.1		
DATE	HEPTA- CHLOR EPOXIDE TOT. IN BOTTOM MATL. (UG/KG) (39423)	LINDANE TOTAL (UG/L) (39340)	DIS- SOLVED (UG/L)	TERIAL (UG/KG)	MALA- THION, TOTAL (UG/L)		MALA- THION, TOTAL IN BOT- TOM MA- TERIAL (UG/KG) (39531)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	OXY- CHLOR DISSOLV (UG/L)		PARA- THION, TOTAL (UG/L)	METHYL PARA- THION, DIS- SOLVED (UG/L) (39602)
MAY		-0.015							-0.00		-0.01	-0.00
JUN		<0.010			<0.01			<0.01			<0.01	
07	<0.1			<0.1			<0.1			<0.1		

## 06471000 JAMES RIVER AT COLUMBIA, SD--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	METHYL PARA- THION, TOT. IN BOTTOM MATL. (UG/KG) (39601)	THI	ON, I	METHYL- TRI- THION DISSOLV (UG/L) (82344)	TH TOT BO	THYL TRI- ION, I. IN OTTOM MATL. 5/KG)	(UG	EX, TAL	MIREX DIS- SOLVE (UG/L 39756	TOM TOM D TEM	REX, TAL BOT- MA- RIAL (KG)	TOT	ON, AL (L)	PAR THI DI SOL (UG	ON, S- VED	PAR THI TOT IN B TOM TER (UG/ (395	ON, AL OT- MA- IAL KG)	PCB TOTA (UG/1	AL.	PCB, DIS- SOLVEI (UG/L)	0
MAY																					
11 JUN		<0	.01	<0.01			<0	.01	<0.0	1 .		<0	.01	<0	.01	-	-	<(	0.1	<0.1	1
07	<0.1	-	-			<0.1	-	-			<0.1	-	-	9.5	-	<	0.1				
	Day		NAPH-																		
DATE	PCF TOTA IN BC TOM N TERI (UG/I (395)	AL OT- AA- IAL (G)	THA- LENES POLY- CHLOR TOTAL (UG/L) (39250	R. PCN DISS	L)	PCN TOTAL IN BO TOM M TERI (UG/KI (3925)	L T- A- AL G)	PER THAN TOTA (UG/)	E T L D L) (	ER- HANE ISSOLV UG/L) 82348)	IN TOM TER (UG	R- IANE BOT- I MA- IIAL 5/KG) 886)	TO (U	OME- ONE TAL G/L)	TE TC	ROME- RYNE OTAL JG/L)	PRO- PAZI TOTA (UG/	NE L L)		TAL G/L)	
MAY 11	_		<0.1	10 <0	. 10			<0	. 1	<0.10				<0.1		<0.1	<0	.10	<(	0.01	
JUN																		177			
07	<1				-	<1	.0				<	1.00					-	-			
DATE	SIMA ZIN TOTA (UG/ (390)	NE AL (L)	SIME- TRYNE TOTAL (UG/I (39054	APHE TOT	AL /L)	TOX APHEN DIS SOLV (UG/)	E, ED L)	TOXA PHEN TOTA IN BO TOM M TERI (UG/K)	E, L T- IA- AL (G)	TOTAL TRI- THION (UG/L)	(U	ON SOLV G/L)	TH TO IN TOM TE (UG	RI- ION, IAL BOT- MA- RIAL /KG)	TC (U	,4-D, DTAL JG/L)	2, 4 TOT (UG/ (821	AL L)	(UC	TAL G/L)	
	(380.	,,,	(39034	(384	00)	(3940	1)	(3940	3) (	39786)	(02	342)	(39	101)	(38	3/30.)	(021	03-)	(39,	740)	
MAY		10	-0				•			-0.05								01			
11 JUN	<0.	. 10	<0.		1	<1.	U			<0.01	<	0.01				0.05	<0	.01	<(	0.01	
07		-		-	-			<10						<0.1			-	-			

#### 06471200 MAPLE RIVER AT NORTH DAKOTA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 45°56'20", long 98°27'08", in SWkSEk 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. -- 716 mi<sup>2</sup>, of which about 332 mi<sup>2</sup> is probably noncontributing.

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

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,365 ft above National Geodetic Vertical Datum of 1929, 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 estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--33 years, 20.2 ft<sup>3</sup>/s, 14,630 acre-ft/yr; median of yearly mean discharges, 14 ft<sup>3</sup>/s, 10,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,930 ft<sup>3</sup>/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 discharges greater than base discharge of 50 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 29	1545	*900	a*9.00	Apr. 1	0700	530	7.27

a Backwater from ice. No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	517	10	. 89	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	365	9.6	.89	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	248	8.6	.77	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	177	9.0	.70	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	136	8.8	. 63	.00	.00	.00
					.00	.00	100	0.0				
6	.00	.00	.00	.00	.00	.00	104	7.3	. 55	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	85	6.8	.46	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	73	6.7	.41	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	67	5.9	.30	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	48	5.0	.21	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	40	5.0	.21	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	40	4.0	.16	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	35	4.0	.22	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	32	3.9	.17	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	29	3.6	.16	.00	.00	.00
15												.00
13	.00	.00	.00	.00	.00	.00	24	3.0	.11	.00	.00	.00
16	.00	.00	.00	.00	.00	e20	23	2.4	.07	.00	.00	.00
17	.00	.00	.00	.00	.00	e120	20	2.0	. 04	.00	.00	.00
18	.00	.00	.00	.00	.00	e90	18	2.0	.06	.00	.00	.00
19	.00	.00	.00	.00	.00	e70	16	1.9	.03	.00	.00	.00
20	.00	.00	.00	.00	.00	e50	15	1.7	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	930	15	1.7	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	e40	14	1.5	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	e30	12	1.5	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	e25	12	1.5	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e40	11	1.4	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	e75	11	1.1	.00	.00	.00	.00
		.00	.00	.00	.00	6/3						
26	.00	.00	.00	.00	.00	e150	11	.91	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	e300	11	. 62	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	e550	11	.65	.00	.00	.00	.00
29	.00	.00	.00	.00		e800	11	.97	.00	.00	.00	.00
30	.00	.00	.00	.00		e600	11	1.2	.00	.00	.00	.00
31	.00	.00	.00	.00		475		1.0		.00	.00	
31	.00	N.E.E.	.00	.00	100	4/3	1,225	1.0		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	3435.00	2187	118.55	6.83	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	111	72.9	3.82	. 23	.00	.00	.00
MAX	.00	.00	.00	.00	.00	800	517	10	.89	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	11	.62	.00	.00	.00	.00
AC-FT	.00	.00	.0	.0	.00	6810	4340	235	14	.0	.0	.0
	. 0			. 0	. 0	0010	4540	203		. •		

CAL YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT ... WTR YR 1989 TOTAL 5747.38 MEAN 15.7 MAX 800 MIN .00 AC-FT 11400

e Estimated

#### 06471500 ELM RIVER AT WESTPORT, SD

LOCATION.--Lat 45°39'22", long 98°29'48", in SWkNWk sec.12, T.125 N., R.64 W., Brown County, Hydrologic Unit 10160004, on right bank 12 ft downstream from highway bridge, 0.5 mi north of Westport, 0.7 mi upstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, 9.3 mi downstream from Willow Creek, and 30.4 mi upstream from mouth.

DRAINAGE AREA. -- 1,493 mi<sup>2</sup>, of which about 444 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- October 1945 to current year.

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,309.3 ft above National Geodetic Vertical Datum of 1929. Frior to Aug. 6, 1951, and Apr. 8 to Sept. 9, 1952, nonrecording gage 12 ft upstream at same datum. Aug. 6, 1951, to Apr. 7, 1952, water-stage recorder at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. Flow regulated for Aberdeen municipal water supply by dam forming Elm Lake and other small reservoirs upstream, combined capacity, about 16,000 acre-ft. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --44 years, 46.9 ft<sup>3</sup>/s, 33,980 acre-ft/yr; median of yearly mean discharges, 30 ft<sup>3</sup>/s, 21.700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 12,600 ft<sup>3</sup>/s, Apr. 10, 1969, gage height, 22.11 ft; no flow for many days in most years prior to 1960.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 28	0545	*3.300	a*15.02	No other	peak greate	er than base d	lischarge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice.
Minimum daily discharge, 0.12 ft<sup>3</sup>/s, Dec. 10, 11.

MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP 20 4.7 5.1 1.6 e.20 e.50 e.50 e1100 50 4.2 7.2 9.6 2 5.1 .22 1.5 e.20 e.20 e.50 918 50 4.2 7.0 9.2 4.6 e.20 e.20 3 4.8 .20 1.8 e.50 587 52 3.9 7.2 10 4.8 2.1 .20 e2.0 e.20 e.20 e.50 433 51 5.3 8.8 11 4.8 5 e.20 .24 e1.0 6.9 6 1.0 .20 e.20 273 10 e.20 e.50 38 .84 .23 .21 e.20 e.20 e.50 220 37 8.2 6.0 10 4.5 .22 e.20 e.20 4.5 .67 .20 e1.0 184 38 6.9 7.1 12 .60 .23 7.0 19 4.3 .14 e.10 e. 20 e2.0 e160 32 10 10 . 53 .21 . 12 e.20 26 7.4 14 18 4.3 e.10 e3.0 e140 .21 .12 e.50 11 .41 e.10 e3.0 e130 20 8.0 15 18 4.8 .15 12 . 41 .29 e.20 e.60 15 e3.0 e120 18 7.9 10 4.6 13 7.3 .40 .33 . 22 e.20 e.60 e5.0 e110 16 10 16 4.9 e.60 14 .36 .29 e1.0 e.20 e3.0 e100 13 7.0 9.6 15 5.0 15 .38 4.5 e.90 e.20 e.60 e2.0 e90 11 7.5 9.6 13 5.1 16 .33 7.3 e. 80 e.20 e.60 e2.0 e80 9.8 9.2 17 .35 7.9 e.50 e.20 e.50 e2.0 e70 9.7 7.6 8.8 5.2 5.1 .30 7.7 e.50 e.50 e.20 e2.0 e60 8.6 7.3 8.3 6.2 6.9 19 . 26 7.3 e.50 e.50 e.20 e48 8.4 7.4 8.7 9.1 13 e2.0 . 27 6.6 e.50 e.50 8.0 7.4 5.7 14 e. 20 48 11 e2.0 21 .25 5.9 e.50 e.50 e.20 7.1 5.2 16 43 7 3 11 e2 0 22 5.7 6.6 5.2 .24 e.50 e.50 e.20 e5.0 39 7.1 10 13 23 e.50 e.20 5.1 .24 5.1 e.50 e40 35 6.5 6.9 10 13 24 .21 4.5 e.50 e.50 e.50 e30 33 6.2 6.9 11 5.0 14 25 .21 3.5 e.50 e.50 e.50 e200 29 5.0 7.0 12 5.0 14 e.50 26 .18 2.4 e.20 e.50 27 4.5 6.6 4.8 e500 27 .23 1.9 e.20 e.50 e.50 e1500 7.2 17 4.5 14 28 4.4 4.7 7.6 22 5.2 .16 1.6 e.20 e.50 e.50 e3000 42 24 13 .17 1.6 e.20 e.50 --- e2500 51 4.6 6.6 4.8 e.50 --- e2000 30 .18 e.20 17 5.0 1.7 49 4.3 6.4 .22 e.20 e.50 --- e1300 8 1 4.9 4.3 10.00 11112.50 TOTAL 27.80 17.68 10.10 5587 600.4 205.3 339.7 283.3 253.3 78.45 9.14 MEAN .90 2.61 . 57 .33 .36 358 186 19.4 6 84 11.0 8.44 MAX 5.1 7.9 2.0 .50 .60 3000 1100 52 8.2 24 19 16 MIN .16 .20 .12 .10 . 20 . 50 27 4.3 3.9 6.0 4 5 4.3 AC-FT 55 156 35 20 20 22040 11080 1190 407 674 562 502

CAL YR 1988 TOTAL 2058.93 MEAN 5.63 MAX 37 MIN .12 AC-FT 4080 WTR YR 1989 TOTAL 18525.53 MEAN 50.8 MAX 3000 MIN .10 AC-FT 36750

e Estimated

#### 06471550 JAMES RIVER BELOW COLUMBIA. SD

LOCATION.--Lat 45°36'17", long 98°18'15", in SWASELSWA sec.28, T.125 N., R.62 W., Brown County, Hydrologic Unit 10160003, on left bank 0.46 mi below mouth of Elm River and approximately 0.5 mi southeast of Columbia.

DRAINAGE AREA. --7,393 mi<sup>2</sup>, of which 3,820 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD. -- September 1988 to September 1989.

GAGE. -- Water-stage recorder. Datum of gage is 1,274.11 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft. Several observations of water temperature and specific conductance were made during the year.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,700 ft<sup>3</sup>/s at 1415 hours, Mar. 31, gage height, 15.26 ft, backwater from ice; no flow for many days.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	e.05	e.20	e.10	e.20	e.10	e1600	414	8.6	e2.5	e.50	e3.0
2	.00	e.05	e.30	e.05	e.10	e.10	e1500	365	8.0	e2.5	e.40	e2.5
3	.00	e.10	e.30	e.10	e.10	e.10	e1400	306	7.2	e2.5	e.10	e2.5
4	.00	e.05	e.30	e.10	e.05	e.10	e1250	249	6.8	e2.0	e.01	e2.0
5	.00	e.05	e.30	e.10	e.05	e.10	e1100	195	6.6	e2.0	e.01	e2.0
6	.00	e.05	e.30	e.10	e.05	e.10	e1000	141	6.5	e2.0	e.01	e1.5
7	.00	e.10	e.30	e.10	e.10	e.20	e930	98	6.2	e2.0	e.01	e1.5
8	.00	e.10	e.20	e.05	e.10	e.20	e920	68	5.8	e2.0	e.01	e1.5
9	.00	e.10	e.20	e.02	e.10	e.30	e900	57	e5.5	e2.0	e.00	e1.0
10	.00	e.10	e.20	e.02	e.10	e.30	e900	52	e5.0	e1.5	e.00	e1.0
11	.00	e.15	e.20	e.05	e.10	e.40	e930	44	e5.0	e2.0	e.00	e1.0
12	.00	e.20	e.30	e.05	e.20	e.30	e960	36	e8.0	e3.0	e.00	e1.0
13	.00	e.20	e.35	e.05	e.20	e.30	e980	28	e7.0	e2.5	e.00	e.50
14	.00	e.20	e.30	e.05	e.20	e.20	e980	23	e6.0	e2.5	e.00	e.50
15	.00	e.30	e.30	e.05	e.20	e.20	e980	18	e6.0	e2.5	e.00	e.50
16	.00	e.40	e.25	e.10	e.15	e.20	e990	14	e5.5	e2.0	e.00	e.10
17	e.00	e.50	e.25	e.10	e.10	e.10	e990	18	e5.0	e2.0	e.00	e.10
18	e.01	e.60	e.25	e.10	e.10	e.10	e990	13	e5.0	e2.0	e.00	e.10
19	e.01	e.50	e.30	e.10	e.10	e.10	e1000	11	e5.0	e2.0	e.01	e.10
20	e.01	e.40	e.30	e.10	e.10	e.10	e1020	12	e4.5	e1.5	e.01	e.10
21	e.01	e.30	e.30	e.10	e.10	e.10	1030	12	e4.0	e1.5	e.10	e.50
22	e.01	e.30	e.40	e.10	e.10	e.10	941	11	e3.5	e1.5	e.50	e1.2
23	e.01	e.30	e.45	e.10	e.10	e1.5	889	10	e3.0	e1.0	e1.5	e1.5
24	e.01	e.20	e.35	e.10	e.10	e2.0	834	10	e3.0	e1.0	e2.5	e2.0
25	e.01	e.20	e.25	e.10	e.10	e50	749	10	e3.5	e1.0	e3.0	e1.5
26	e.01	e.20	e.20	e.10	e.10	e100	652	9.3	e3.5	e.90	e4.0	e1.0
27	e.05	e.20	e.20	e.10	e.10	e300	584	8.7	e3.0	e.70	e5.0	e1.0
28	e.05	e.20	e.20	e.20	e.10	e500	551	8.4	e3.0	e.60	e4.5	e1.0
29	e.05	e.20	e.20	e.20		e800	522	7.9	e3.0	e1.0	e4.0	e.50
30	e.05	e.20	e.20	e.20		e1300	466	7.5	e2.5	e.80	e3.5	e.50
31	e.05		e.20	e.20		e1600		8.1		e.70	e3.0	
TOTAL	0.34	6.50	8.35	2.99	3.20	4657.30	28538	2264.9	155.2	53.70	32.67	33.20
MEAN	.011	.22	. 27	.096	.11	150	951	73.1	5.17	1.73	1.05	1.11
MAX	.05	.60	.45	.20	. 20	1600	1600	414	8.6	3.0	5.0	3.0
MIN	.00	.05	. 20	.02	.05	.10	466	7.5	2.5	.60	.00	.10
AC-FT	.7	13	17	5.9	6.3	9240	56610	4490	308	107	65	66

WTR YR 1989 TOTAL 35756.35 MEAN 98.0 MAX 1600 MIN .00 AC-FT 70920

e Estimated

#### 06473000 JAMES RIVER AT ASHTON, SD

LOCATION.--Lat 44°59'54", long 98°28'50", in NWkNWkNEk sec.36, T.118 N., R.64 W., Spink County, Hydrologic Unit 10160006, on right bank at downstream side of highway bridge, 0.9 mi east of Ashton, 6.1 mi upstream from Snake Creek, and 14.2 mi upstream from Turtle Creek.

DRAINAGE AREA. --9,742 mi<sup>2</sup>, of which 4,069 mi<sup>2</sup> is probably noncontributing.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- October 1945 to current year.

REVISED RECORDS.--WSP 1209: 1947. WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,244.4 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 26, 1957, nonrecording gage at present site and Nov. 26, 1957, to Oct. 7, 1974, water-stage recorder at site 900 ft upstream all at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Occasional backwater and reverse flow caused by Snake Creek during most years. Several observations of water temperature and specific conductance were made during the year. Gage-height telemeter at station.

AVERAGE DISCHARGE. --44 years, 166 ft<sup>3</sup>/s, 120,300 acre-ft/yr; median of yearly mean discharges, 120 ft<sup>3</sup>/s, 86,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 5,680 ft<sup>3</sup>/s, Apr. 24, 1969, gage height, 20.63 ft; maximum gage height, 21.17 ft, Apr. 13, 1969, backwater from Snake Creek; maximum daily reverse flow, 2,100 ft<sup>3</sup>/s, Apr. 9, 1969, backwater from Snake Creek.

EXTREMES FOR CURRENT YEAR. --Maximum discharge, 1,330 ft<sup>3</sup>/s at 0950 hours, Apr. 20, gage height, 12.85 ft, backwater from Snake Creek; maximum gage height, 14.97 ft, Apr. 1, backwater from Snake Creek; no flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

			_,			MEAN VALUE	S					
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	e600	e1250	135	40	5.3	e.50
2	.00	.00	.00	.00	.00	.00	e800	e1200	124	44	e5.0	e.40
3	.00	.00	.00	.00	.00	.00	e950	e1200	115	44	e4.5	e.30
4	.00	.00	.00	.00	.00	.00	e1000	1190	106	40	e4.5	e.25
5	.00	.00	.00	.00	.00	.00	e1000	1160	98	36	e3.5	e.20
6	.00	.00	.00	.00	.00	.00	e1050	1120	91	33	e3.0	e.15
7	.00	.00	.00	.00	.00	.00	e1060	1080	84	31	e2.0	e.10
8	.00	.00	.00	.00	.00	.00	e1050	1030	80	27	e1.5	e.00
9	.00	.00	.00	.00	.00	.00	e1040	968	76	25	e1.5	e.00
10	.00	.00	.00	.00	.00	e1.0	e1040	902	72	22	e1.5	e.00
11	.00	.00	.00	.00	.00	e5.0	e1050	856	68	19	e1.5	e.00
12	.00	.00	.00	.00	.00	e10	e1080	809	66	16	e1.5	e.00
13	.00	.00	.00	.00	.00	e50	e1100	758	65	15	e1.5	e.00
14	.00	.00	.00	.00	.00	e100	e1120	705	62	13	e1.0	e.00
15	.00	.00	.00	.00	.00	e75	e1150	654	59	12	e.90	e.00
16	.00	.00	.00	.00	.00	e50	e1190	615	55	11	e.70	e.00
17	.00	.00	.00	.00	.00	e40	e1230	575	52	9.8	e.50	e.00
18	.00	.00	.00	.00	.00	e25	e1280	524	50	9.4	e.50	e.00
19	.00	.00	.00	.00	.00	e20	e1310	472	47	8.8	e1.5	e.00
20	.00	.00	.00	.00	.00	e20	e1320	425	43	8.1	e1.5	e.01
21	.00	.00	.00	.00	.00	e20	e1300	386	42	7.3	e1.5	e.50
22	.00	.00	.00	.00	.00	e25	e1250	362	38	7.0	e1.0	e.50
23	.00	.00	.00	.00	.00	e50	e1250	342	34	6.5	e1.0	e.30
24	.00	.00	.00	.00	.00	e75	e1200	314	36	5.9	e1.0	e.20
25	.00	.00	.00	.00	.00	e100	e1150	281	38	5.4	e.90	e.10
26	.00	.00	.00	.00	.00	e150	e1150	252	39	5.3	e.90	e.05
27	.00	.00	.00	.00	.00	e200	e1100	227	45	5.4	e.85	e.05
28	.00	.00	.00	.00	.00	e250	e1100	205	52	4.7	e.84	e.05
29	.00	.00	.00	.00		e300	e1200	186	42	6.0	e.80	e.05
30	.00	.00	.00	.00		e350	e1250	168	41	5.9	e.70	e.01
31	.00		.00	.00		e400		150		5.5	e.60	
TOTAL	0.00	0.00	0.00	0.00	0.00	2316.00	33370	20366	1955	529.0	53.49	3.72
MEAN	.00	.00	.00	.00	.00	74.7	1112	657	65.2	17.1	1.73	.12
MAX	.00	.00	.00	.00	.00	400	1320	1250	135	44	5.3	. 50
MIN	.00	.00	.00	.00	.00	.00	600	150	34	4.7	. 50	.00
AC-FT		.0	.0	.0	.0	4590	66190	40400	3880	1050	106	7.4

CAL YR 1988 TOTAL 5182.59 MEAN 14.2 MAX 97 MIN .00 AC-FT 10280 WTR YR 1989 TOTAL 58593.21 MEAN 161 MAX 1320 MIN .00 AC-FT 116200

e Estimated

### 06473000 JAMES RIVER AT ASHTON, SD--Continued

#### WATER-QUALITY RECORDS

PERIOD OF RECORD. -- October 1977 to current year.

PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: June 1985 to November 1987 (seasonal records only), December 1987 to September 1988 (discontinued).

PH: June to September 1985, December 1987 to September 1988 (discontinued).

WATER TEMPERATURE: October 1977 to November 1987 (seasonal records only), December 1987 to September 1988 (discontinued). DISSOLVED OXYGEN: June to September 1985, October 1987 to September 1988 (discontinued).

EXTREMES FOR PERIOD OF DAILY RECORD .--

SPECIFIC CONDUCTANCE: Maximum daily, 2,020 microsiemens, Nov. 18, 1986; minimum daily, 480 microsiemens, Mar. 24, 1988.

pH: Maximum daily, 9.2, July 24, 25, 1985; minimum daily, 6.2, May 31, 1988.
WATER TEMPERATURE: Maximum observed, 32.5°C, June 21, 1988; minimum daily, 0.0°C on several days during 1978-80, 1983, 1984.
DISSOLVED OXYGEN: Maximum observed, 18.6 mg/L, Dec. 4, 1987; minimum daily, 5.7 mg/L, Sept. 25, 1985.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)
MAR											
31	1340	414	310	7.51	14.0	2.0	26	731	7.8	59	
APR											
07	0905	1070	313	7.44	3.0	7.0			7.4		4.6
27	1000	1100	490	7.73	10.0	13.0	3.9	724	7.0	70	
MAY 10	0940	905	550	8.01	18.0	17.0	4.6	732	7.4	80	2.2
JUN 20	1005	43	920	8.24	23.0	19.5	21	717	7.6	88	
JUL 28	1000	4.6	950	8.07	31.0	26.5	66	724	4.5	59	
AUG 28	1016	0.04	1110	0.50	04 5	00.5	16	705	7.2	89	2.6
SEP	1015	0.84	1140	8.52	24.5	22.5	16	725	7.3	89	3.6
25	1330	<0.10	1170	8.42	16.5	15.0	14	734	11.6	120	
DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)	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)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
MAR											
31 APR	99	23	10	13	20	0.6	14	74	60	6.3	202
07											
27 MAY	160	35	17	37	32	1	12	139	80	18	311
10 JUN	180	41	20	41	31	1	12	162	99	21	356
20 JUL	340	80	33	59	26	1	21	259	180	37	627
28 AUG	330	75	35	66	29	2	21	260	180	45	619
28 SEP	400	90	43	90	31	2	23	322	220	69	787
25	420	92	46	95	32	2	22	318	240	7.2	778

## 06473000 JAMES RIVER AT ASHTON, SD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE  MAR 31 APR 07 27 MAY 10 JUN 20 JUL 28 AUG 28 SEP	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530) 51  12 16 36 171 39	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301) 180  283 332 568 582 732	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303) 0.27  0.42 0.48 0.85 0.84 1.07	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302) 226  924 870 72.8 7.69	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615) 0.150  0.010	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613) 0.130  <0.010 <0.010 <0.010 <0.010	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630) 1.10  <0.100	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631) 1.10  <0.100 <0.100 <0.100 <0.100	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610) 1.20  0.030
25	60	695	1.06			<0.010		-		<0.100	-
DATE	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS NO3) (71887)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	
MAR											
31	1.20	1.5	3.5	20	0.850	0.760	0.720	0.750	3	2	
APR 07											
27	0.030	0.04				0.200		0.154		1	
MAY											
10	<0.010		1.3		0.290	0.240	0.220	0.185	3	3	
JUN 20	0.040	0.05				0.480		0.495		6	
JUL 28	0.060	0.08				0.540		0.350		12	
AUG											
28 SEP	0.040	0.05	1.7		0.630	0.480	0.470	0.410	16	13	
25	0.020	0.03				0.220		0.208		7	
DATE	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	
MAD									100		
MAR 31	70	<1	<1	3	<0.010	<0.01	1900	310	<5	160	
APR 07											
27	100		<1	1		<0.01		23	<5		
MAY 10	100	<1	2	5	<0.010	<0.01	470	15	<1	180	
JUN 20	200		<1	3		<0.01		9	<1		
JUL 28	240		<1	2		<0.01		8	<1		
AUG 28	290	<1	<1	6	<0.010	<0.01	1400	9	<1	2800	
SEP											
25	280		<1	<1		<0.01		<3	<1		

> 06473000 JAMES RIVER AT ASHTON, SD--Continued WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE   TIME   PER   ANCE   ARD   AIRE   AIRE   (MM   DIS   CENT   TOTAL   ALDRIN   DIS   DIS   CENT   TOTAL   ALDRIN   DIS   CENT   TOTAL   ALDRIN   DIS   CENT   TOTAL   ALDRIN   DIS   CENT   TOTAL   ALDRIN   DIS   CENT   TOTAL   CUG/L	DAT	NE D SO E (U AS	IS- LVED G/L MN)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	NI TO (I	ELE- IUM, OTAL UG/L S SE)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) 01145)	SO: (U	NC, IS- LVED ( G/L 1 ZN)	CHLOR- PHYTO PLANK TON CHROMO FLUORO (UG/L (70953	CH FL	ROMO UOROM UG/L)	SEDI- MENT, SUS- PENDED (MG/L) 80154)	CHA	EDI- ENT, DIS- ARGE, SUS- ENDED (DAY)	SI Z F . 06	SED. SUSP. EEVE DIAM. PINER CHAN 62 MM 0331)	
OTIS    CHARGE, CIPIC CONC.	31		130	0.2		<1	<1		29	2.50		0.400	44		49		99	
27 5 <0.1 <1 4 50 149 96  MAY 10 38 <0.1 <1 <1 <1 4 9.10 0.700 16 39 96  JUL 20 680 <1 16 102 12 100  JUL 28 2900 <0.1 <1 116 102 12 100  AUG 28 2100 0.2 <1 <1 14 18.0 2.40 96 0.22 98  SEP 25 1200 <0.1 <1 14 18.0 2.40 96 0.22 98  SEP 25 1200 <0.1 <1 <1																		
10 38 < 0.1 <1 <1 <1 4 9.10 0.700 16 39 96  JUL 20 680 <1 16 102 12 100  JUL 28 2900 <0.1 <1 11 208 2.6 100  AUG 28 2100 0.2 <1 <1 11 208 2.6 100  BERRO-	27		5	<0.1			<1		4				50	14			96	
20 580 < <1 16 102 12 100  JUL 28 2900 <0.1 <1 11 208 2.6 100  AUG 28 2100 0.2 <1 <1 11 208 2.6 100  BERNO 25 1200 <0.1 <1 <1 14 18.0 2.40 96 0.22 98  DIS- 25 1200 <0.1 <1 <3 102 12 100  DIS- CHARGE, SPE- INST. CIFIC CUBIC CON- FEET DUCT- (STAND- AIR ATURE (MM DIS- SECOND (US/CM) UNITS) (DEG C) (DEG C) (DEG C) (DEG C) (DEG C) (MG/L)	10		38	<0.1		<1	<1		4	9.10		0.700	16	3	39		96	
28 2900 <0.1 <1 11 208 2.6 100  AUG 28 2100 0.2 <1 <1 <1 14 18.0 2.40 96 0.22 98  SEP 25 1200 <0.1 <1 <3  DIS-CHARGE, INST. CIFIC CON-PH ATURE ATURE ATURE (PM DIS-CENT TOTAL SOLVED (100/61) (00061) (00095) (000400) (00020) (00010) (00025) (00030) (00301) (77825) (39330) (39331)  MAY 10 0940 905 550 8.01 18.0 17.0 732 7.4 80 <0.10 <0.01 <0.010 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <0.01 <	20		680				<1		16				102		12		100	
DIS-	28		2900	<0.1			<1		11				208		2.6		100	
DISCHARGE, SPE-		-	2100	0.2		<1	<1		14	18.0		2.40	96		0.22		98	
DIS-  CHARGE, SPE-  INST. CIFIC CON-  CUBIC CON-  CON-  CON-  CON-  CON-  CUBIC CON-  CON-  CON-  CON-  CUBIC CON-  CO	SEP					22												
CHARGE   SPE	23		1200	-0.1			~1		-3									
10 0940 905 550 8.01 18.0 17.0 732 7.4 80 <0.10 <0.010 <0.010	DATE	TIME	CHARG INST CUBI FEE PER SECO	E, SE C CI C CC T DU AN OND (US	FIC N- ICT- ICE (/CM)	(STAND ARD UNITS)	ATU	RE R C)	WATER (DEG (	M P R- E R	ETRIC RES- SURE (MM OF HG)	OXYGEN DIS- SOLVE (MG/L	DI SOL , (PE CE D SAT ) ATI	S- VED R- NT UR- ON)	TOTA RECOV (UG/	OR AL VER (L)	TOTAL (UG/L)	SOLVED (UG/L)
JUL 28 1000 4.6 950 8.07 31.0 26.5 724 4.5 59 <0.10 <0.010 <0.01  SEP 25 1330 <0.10 1170 8.42 16.5 15.0 734 11.6 120 <0.10 <0.010 <0.010 <0.010  CHLOR-  ATRA- CHLOR- DANE, CYAN- DDD, DDE, DDE, DDT, DIS- AZINON TOTAL TOTAL SOLVED TOTAL SOLVED TOTAL SOLVED TOTAL TOTAL SOLVED TOTAL SOLVED TOTAL SOLVED TOTAL TOTAL SOLVED TOTAL		040	905		550	8 0	1 1	9 0	17	0	722	7		80	<0	10	<0.010	<0.01
SEP 25 1330 <0.10 1170 8.42 16.5 15.0 734 11.6 120 <0.10 <0.01 <0.01  CHLOR-  ATRA- CHLOR- DANE, CYAN- DATE TRYNE TOTAL TOTAL SOLVED TOTAL SOLVED TOTAL SOLVED TOTAL SOLVED TOTAL TOTAL (UG/L) (UG/	JUL																	
DATE TRYNE TOTAL TOTAL SOLVED T	SEP	1000	4.	ь	950	8.0	7 3	1.0	26	. 5	724	4.	5	59	<0.	.10	<0.010	<0.01
ATRA- CHLOR- DANE, CYAN- DDD, DDD, DDE, DDT, DDT, DIS- AZINE DDD, DIS- DDE, DDT, DIS- AZINON, DATE TRYNE TOTAL TOTAL SOLVED TOTAL TOTAL SOLVED SOLVED SOLVED SOLVED SOLVED SOLVED TOTAL SOLVED SOLVE	25	1330	<0.	10	1170	8.4	2 1	6.5	15	. 0	734	11.	6	120	<0.	10	<0.010	<0.01
10 <0.10 0.10 <0.1 <0.1 0.10 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.010 <0.01 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.		TRYNE TOTAL	ZINE TOTA (UG/	L TO	NE, TAL	DANE, DIS- SOLVE (UG/L	CYAN AZIN D TOTA ) (UG/	E L L)	TOTAL (UG/L)	SOI (U	IS- LVED G/L)	TOTAL (UG/L)	SOLV (UG/	ED L)	TOTAL (UG/L	.,	DIS- SOLVED (UG/L)	AZINON,
28 <0.10 0.10 <0.1 <0.1 0.10 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010 <0.010		<0.10	0.	10	<0.1	<0.	1 0	.10	<0.010	) <	0.01	<0.010	<0.	01	<0.01	10	<0.01	<0.01
25 <0.10 0.10 <0.1 <0.1 0.10 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010		<0.10	0.	10	<0.1	<0.	1 0	.10	<0.010	) <	0.01	<0.010	<0.	01	<0.01	LO	<0.01	<0.01
		<0.10	0.	10	<0.1	<0.	1 0	.10	<0.010	) <	0.01	<0.010	<0.	01	<0.01	10	<0.01	<0.01
AZINON, DI- ELDRIN ENDO- ENDO- ENDRIN, HEPTA- CHLOR, CHLOR DIS- ELDRIN DIS- SULFAN, SULFAN ENDRIN, DIS- ETHION, ETHION CHLOR, DIS- EPOXIDI DATE SOLVED TOTAL SOLVED TOTAL DISSOLV TOTAL SOLVED TOTAL DISSOLV TOTAL SOLVED TOTAL (UG/L)	DATE	DIS- SOLVED (UG/L)	ELDR TOTA (UG/	IN D L SC L) (U	DRIN IS- LVED G/L)	ENDO- SULFAN TOTAL (UG/L	ENDO , SULF. DISSO ) (UG/	AN OLV L)	TOTAL (UG/I	) (I	DIS- DLVED UG/L)	TOTAL (UG/L	DISS() (UG/	OLV L)	TOTAL (UG/L	2,	DIS- SOLVED (UG/L)	EPOXIDE
MAY 10 <0.01 <0.010 <0.01 <0.010 <0.01 <0.010 <0.01 <0.01 <0.01 <0.01 <0.010 <0.01 <0.010		<0.01	<0.0	10 -	0 01	<0.01	0 <0	01	<0.01	10	<0.01	<0.0	1 <0	01	<0.01	0	<0.01	<0.010
JUL	JUL																	<0.010
SEP	SEP																	<0.010

JAMES RIVER BASIN

## 06473000 JAMES RIVER AT ASHTON, SD--Continued

## WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	HEPTA- CHLOR EPOXIDE DIS- SOLVED (UG/L) (39421)	LINDAN TOTAL (UG/L (39340	SOLV (UG	F/L) (U	LA- ION, TAL G/L)	MALA THIC DIS SOLV (UG) (3953	ON,	TH- XY- LOR, TAL (G/L)	METHOXY- CHLOI DISSO (UG/I (823)	R OLV L)	METH PARA THIC TOTA (UG/ 3960	YL PAR THI N, DI L SOL L) (UG	ON, THE S- THE VED TO	THYL RI- ION, TAL G/L) 790)	METHYL TRI- THION DISSOL (UG/L) (82344	MIREX, V TOTAL
MAY 10 JUL	<0.01	<0.01	0 <0	0.01 <	0.01	<0.	.01 <	0.01	<0	.01	<0.	01 <0	.01 <	0.01	<0.0	1 <0.01
28 SEP	<0.01	<0.01	0 <0	0.01 <	0.01	<0.	.01 <	0.01	<0	.01	<0.	01 <0	.01 <	0.01	<0.0	1 <0.01
25	<0.01	<0.01	0 <0	0.01	0.01	<0.	.01 <	0.01	<0	.01	<0.	01 <0	.01 <	0.01	<0.0	1 <0.01
DATE	MIR DI SOL (UG (397	S- T VED T /L) (	ARA- HION, DTAL UG/L) 9540)	PARA- THION, DIS- SOLVED (UG/L) (39542)	PCB TOT. (UG/) (395	ÁL L)	PCB, DIS- SOLVED (UG/L) (39517)	LE PO CH TO (UG	PH- HA- NES, LY- LOR. TAL /L) 250)	PCN DISSO (UG/L (8236	)	PER- THANE TOTAL (UG/L) (39034)	PER- THANE DISSOLV (UG/L) (82348)	TOI	3/L)	PROMETRYNE TOTAL (UG/L) 39057)
MAY 10 JUL	<0	.01	<0.01	<0.01	<	0.1	<0.1	. <	0.10	<0.	10	<0.1	<0.10	<	0.1	<0.1
28	<0	.01	<0.01	<0.01	<	0.1	<0.1	<	0.10	<0.	10	<0.1	<0.10		0.1	<0.1
25	<0	.01	<0.01	<0.01	<	0.1	<0.1	. <	0.10	<0.	10	<0.1	<0.10	<	0.1	<0.1
DATE	PRO- PAZI TOTA (UG/	NE SI L T L) (	LVEX, DTAL UG/L) 9760)	SIMA- ZINE TOTAL (UG/L) (39055)	SIM TRY TOT. (UG (390	NE AL /L)	TOX- APHENE, TOTAL (UG/L) (39400)	APH D SO (U	OX- ENE, IS- LVED G/L) 401)	TOTA TRI THIO (UG/	N L)	TRI- THION DISSOLV (UG/L) (82342)	2,4-D, TOTAL (UG/L) (39730)	TOT (UG/	TAL (L)	,4,5-T TOTAL (UG/L) 39740)
MAY 10	<0	. 10		<0.10	<	0.1	<1	<	1.0	<0.	01	<0.01			_	
JUL 28	<0	. 10	<0.01	<0.10	<	0.1	<1	<	1.0	<0.	01	<0.01	0.10	<0	0.01	<0.01
SEP 25	<0	.10	<0.01	<0.10	<	0.1	<1	<	1.0	<0.	01	<0.01	0.02	<0	0.01	<0.01

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#### 06473700 SNAKE CREEK NEAR ASHTON, SD

LOCATION.--Lat 44°57'33", long 98°30'55", in SE%NE%SE% sec.10, T.117 N., R.64 W., Spink County, Hydrologic Unit 10160006, on right bank 500 ft upstream from U.S. Highway 281 bridge, 2.7 mi south of Ashton, and 2.7 mi upstream from mouth.

DRAINAGE AREA. -- 2.657 mi<sup>2</sup>, of which 48.4 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD. --October 1955 to September 1969, October 1976 to September 1979 (October 1969 to September 1972 maximum discharge only). October 1984 to September 1989 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 1,265 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 1, 1957, water-stage recorder at site 7.6 mi upstream at different datum. Oct. 1, 1957, to May 26, 1958, wire-weight gage; May 27, 1958, to Sept. 30, 1969, water-stage recorder; Oct. 1, 1969, to Sept. 30, 1972, crest-stage gage; and Oct. 1, 1976, to Sept. 30, 1979, water-stage recorder at site 18.3 mi upstream at different datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--22 years, 30.0 ft<sup>3</sup>/s, 21,740 acre-ft/yr; median of yearly mean discharges, 9.3 ft<sup>3</sup>/s, 6,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 6,980 ft<sup>3</sup>/s, Apr. 10, 1969, gage height, 17.21 ft; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 75 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 30	1110	*2.740	a*12.87	No other	peak grea	ter than base of	lischarge.

a From observed technician's reading. No flow for several months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MEAN VALUES

1 .00 .00 .00 .00 .00 e2140	AY JUN JUL AUG SEP 89 22 8.6 1.8 .19 82 21 8.3 1.7 .16 75 21 8.2 1.6 .13 70 19 7.9 1.6 .12 63 18 7.7 1.4 .09
	82 21 8.3 1.7 .16 75 21 8.2 1.6 .13 70 19 7.9 1.6 .12
	75 21 8.2 1.6 .13 70 19 7.9 1.6 .12
	75 21 8.2 1.6 .13 70 19 7.9 1.6 .12
	70 - 19 7.9 1.6 .12
4 .00 .00 .00 .00 .00 .00 e830	
	58 17 7.3 1.2 .06
7 .00 .00 .00 .00 .00 .00 e420	57 16 7.1 1.1 e.01
8 .00 .00 .00 .00 .00 .00 e340	58 14 7.1 .82 e.01
	58 14 6.8 .73 e.01
	60 13 6.6 .65 .01
11 .00 .00 .00 .00 .00 e.00 216	64 14 6.2 .51 .03
	64 e15 6.1 .35 e.01
13 .00 .00 .00 .00 .00 e.00 176	59 e15 5.9 .30 e.01
	53 e15 5.7 .31 e.01
	49 e15 5.7 .28 e.01
16 .00 .00 .00 .00 e1.0 139	45 e15 5.5 .23 .00
	43 e15 5.1 .20 .00
	41 e15 5.0 .31 .00
	40 13 5.0 .64 .00
	38 12 4.3 .44 .00
21 .00 .00 .00 .00 .00 e100 105	36 11 3.9 .35 .12
22 .00 .00 .00 .00 e300 95	36 11 3.5 .33 .06
	35 11 3.1 .28 .03
	34 10 2.8 .24 .03
	30 10 2.5 .21 e.01
26 .00 .00 .00 .00 .00 e1200 81	27 9.9 2.4 .20 e.01
27 .00 .00 .00 .00 .00 e1400 79	26 9.6 2.2 .20 e.01
	24 9.4 2.0 .20 e.01
	24 9.1 2.0 .19 e.01
	23 9.0 1.9 .20 e.01
	22 1.8 .20
TOTAL 0.00 0.00 0.00 0.00 0.00 13921.00 10362 14	
MEAN .00 .00 .00 .00 .00 449 345 47	.8 14.0 5.10 .61 .039
	89 22 8.6 1.8 .19
	22 9.0 1.8 .19 .00
AC-FT .0 .0 .0 .0 .0 27610 20550 29	

CAL YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .0
WTR YR 1989 TOTAL 26363.13 MEAN 72.2 MAX 2640 MIN .00 AC-FT 52290

e Estimated

#### 06473750 WOLF CREEK NEAR REE HEIGHTS, SD

LOCATION.--Lat 44°36'25", long 99°13'54", in SW\sW\sw\sec.11, T.113 N., R.70 W., Hand County, Hydrologic Unit 10160009, on left bank on downstream side of highway bridge, 0.3 mi downstream from small left-bank tributary, 6.5 mi north of Ree Heights, and 13.8 mi upstream from Lake Louise dam.

DRAINAGE AREA. -- 334 mi<sup>2</sup>.

PERIOD OF RECORD. -- September 1959 to September 1981, October 1984 to September 1989 (discontinued).

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,614.16 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1981, water-stage recorder on right downstream side of bridge at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated by small reservoir 0.5 mi upstream, capacity, about 1,100 acre-ft. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 27 years, 3.77 ft<sup>3</sup>/s, 2,730 acre-ft/yr; median of yearly mean discharges, 0.11 ft<sup>3</sup>/s, 80 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 990 ft<sup>3</sup>/s, Apr. 5, 1969, gage height, 9.33 ft; maximum gage height, 9.57 ft, Mar. 14, 1966, backwater from ice; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 40 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
a		b	c*6.40	Apr. 8	2245	*60	6.03

- a Sometime during period Mar. 24-27.
- b Backwater from ice.
- c From floodmark.
- No flow for many months.

		DISCHARGE,	IN CUB	C FEET	PER SECON	ID, WATER MEAN VALUE	YEAR OCTO	BER 1988	TO SEPTEM	BER 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	1.1	7.3	.01	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	1.1	4.3	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.76	2.6	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.42	2.1	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	7.2	1.7	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	12	1.0	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	10	.73	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	13	. 53	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	47	.32	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	.00	19	.18	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	11	.10	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	4.6	.06	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	2.2	.04	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	1.2	.03	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.75	.01	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.43	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.29	.01	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	. 16	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	e1.0	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	e5.0	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	e3.0	.03	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	e1.0	.04	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	e.50	.04	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e.50	e.50	.03	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	e5.0	e.50	.02	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	e10	e.50	.12	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	e5.0	e.50	. 13	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	e2.5	e3.2	.07	.00	.00	.00	.00
29	.00	.00	.00	.00		e2.0	15	.05	.00	.00	.00	.00
30	.00	.00	.00	.00		.76	12	.04	.00	.00	.00	.00
31	.00		.00	.00		1.2		.03		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	26.96	174.91	21.61	0.01	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	. 87	5.83	.70	.000	.00	.00	.00
MAX	.00	.00	.00	.00	.00	10	47	7.3	.01	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.16	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	53	347	43	02	.0	.0	.0

CAL YR 1988 TOTAL 0.00 MEAN .00 MAX .00 MIN .00 AC-FT .0 WTR YR 1989 TOTAL 223.49 MEAN .61 MAX 47 MIN .00 AC-FT 443

e Estimated

#### 06474000 TURTLE CREEK NEAR TULARE, SD

LOCATION.--Lat 44°44'06", long 98°35'09", in SE\SE\ sec.25, T.115 N., R.65 W., Spink County, Hydrologic Unit 10160009, on right bank 200 ft upstream (revised) of highway bridge, 3.9 mi west of Tulare, and 8.9 mi downstream from Wolf Creek.

DRAINAGE AREA. -- 1.124 mi 2.

PERIOD OF RECORD. -- August 1953 to September 1956, September 1965 to September 1981, October 1984 to September 1989 (discontinued).

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,300 ft, by barometer. Prior to Oct. 6, 1965, nonrecording gage at same site and datum. Oct. 7, 1965, to Sept. 30, 1981, and Oct. 1, 1984, to June 23, 1989, water-stage recorder 200 ft downstream from site and at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor and those for June 23 to September 30, which are fair. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.-24 years, 18.2 ft<sup>3</sup>/s, 13,190 acre-ft/yr; median of yearly mean discharges, 3.0 ft<sup>3</sup>/s, 2,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, about 6,000 ft<sup>3</sup>/s, Apr. 5, 1969, gage height, 18.51 ft, backwater from ice; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 50 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft 3/s)	Gage height (ft)
Mar. 14		100	a	Mar. 28	1445	*1,000	a*11.33

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow for many days.

						MEAN VALU	ES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	e.04	e.07	e.37	e.28	e.17	196	6.3	e1.2	e2.4	e.28	.00
2	.00	e.04	e.10	e.30	e.24	e.16	137	5.2	e1.1	e2.5	e.25	.00
3	.00	0.04	e.15	e.32	e.20	e.15	108	3.9	e1.0 .	e1.7	e.22	.00
4	.00	e.07	e.20	e.33	e.17	e.15	89	7.9	e.90	e1.6	e.20	.00
5	.00	e.07	e.30	e.34	e.16	e.14	71	6.1	e.80	e1.5	e.17	.00
6	.00	e.08	e.40	e.34	e.16	e.14	63	4.1	e.70	e2.6	e.14	.00
7	.00	e.09	e.35	e.33	e.16	e.14	58	3.1	e.60	e2.9	e.11	.00
8	.00	e.09	e.30	e.32	e.16	e.15	55	4.8	e.50	e2.3	e.10	.00
9	.00	e.08	e.27	e.28	e.17	e.20	47	3.6	e.35	e1.6	e.08	.00
10	.00	e.10	e.24	e.25	e.17	e.60	31	2.8	e.30	e1.1	e.08	.00
11	.00	e.20	e.20	e.26	e.18	e1.0	23	1.9	e.30	e.86	e.13	.00
12	.00	e.30	e.25	e.27	e.19	e10	18	1.8	e.50	e.73	e.11	.00
13	.00	e.27	e.40	e.27	e.18	e50	17	1.9	e.70	e.61	e.10	.00
14	.00	e.26	e.37	e.28	e.18	e75	18	1.9	e.90	e.50	e.09	.00
15	.00	e.20	e.30	e.30	e.17	e50	9.8	1.8	e.70	e.50	e.08	.00
16	.00	e.18	e.28	e.32	e.16	e25	14	1.7	e.50	e.45	e.07	.00
17	.00	e.17	e.26	e.34	e.15	e25	11	1.7	e.30	0.44	e.05	.00
18	.00	e.15	e.30	e.35	e.14	e5.0	9.1	1.8	e.40	e.57	e.03	.00
19	.00	e.14	e.50	e.37	e.13	e1.0	7.8	1.9	e.50	e.46	e.02	.00
20	.00	e.13	e.45	e.38	e.14	e30	7.2	e2.0	e.55	e.44	.00	.00
21	.00	e.12	e.40	e.35	e.14	e50	5.7	e3.0	e.60	e.42	.00	e.04
22	.00	e.09	e.38	e.34	e.14	e100	3.4	e4.0	e.50	e.41	.00	e.03
23	.00	e.09	e.35	e.32	e.15	e200	4.0	e4.0	e.30	e.40	.00	e.02
24	.00	e.10	e.33	e.30	e.17	e400	4.8	e3.0	e.32	e.39	.00	e.01
25	.00	e.10	e.30	e.28	e.17	e600	4.6	e2.5	e.36	e.38	.00	.00
26	.00	e.09	e.37	e.27	e.16	e800	6.1	e2.4	e.37	e.37	.00	.00
27	e.05	e.07	e.38	e.27	e.16	e900	5.1	e3.0	e.35	e.35	.00	.00
28	e.10	e.05	e.40	e.28	e.16	e950	9.4	e2.3	e.39	e.34	.00	.00
29	e.05	e.05	e.40	e.30		e900	8.7	e1.8	e.41	e.34	.00	.00
30	e.04	e.05	e.40	e.32		496	7.2	e1.6	e.84	e.33	.00	.00
31	e.04		e.38	e.30		299		e1.4		e.31	.00	
TOTAL	0.28	3.51	9.78	9.65	4.74	5969.00	1048.9	95.2	17.24	29.80	2.31	0.10
MEAN	.009	. 12	.32	.31	. 17	193	35.0	3.07	. 57	. 96	.075	.003
MAX	.10	.30	. 50	.38	.28	950	196	7.9	1.2	2.9	. 28	.04
MIN	.00	.04	. 07	. 25	. 13	.14	3.4	1.4	.30	.31	.00	.00
AC-FT	. 6	7.0	19	19	9.4	11840	2080	189	34	59	4.6	.2

CAL YR 1988 TOTAL 144.50 MEAN .39 MAX 3.7 MIN .00 AC-FT 287 WTR YR 1989 TOTAL 7190.51 MEAN 19.7 MAX 950 MIN .00 AC-FT 14260

e Estimated

#### 06474300 MEDICINE CREEK NEAR ZELL, SD

LOCATION.--Lat 44°45'52", long 98°42'13", in NWkNWk sec.19, T.115 N., R.65 W., Spink County, Hydrologic Unit 10160009, on right bank at downstream side of bridge on State Highway 26, 3.8 mi upstream from Cottonwood Lake, and 9.2 mi south of Zell.

DRAINAGE AREA . -- 202 mi 2

PERIOD OF RECORD. -- September 1959 to September 1981, October 1984 to September 1989 (discontinued).

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,320 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 1, 1981, water-stage recorder on downstream side at center of bridge at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--27 years, 6.33 ft<sup>3</sup>/s, 4,590 acre-ft/yr; median of yearly mean discharges, 2.0 ft<sup>3</sup>/s, 1,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,210 ft<sup>3</sup>/s, Apr. 5, 1969, gage height, 12.41 ft; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 40 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 13		160	a	Mar. 26	1045	*850	a*10.09

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow for many days.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.02	.01	.02	.00	.00	.00	58	4.2	.12	5.5	.06	e.01
	.01	.02	.02	.00	.00	.00	41	4.4	.10	11	.08	e.01
2	.01	.02	.01	.00	.00	.00	32	3.9	.09	8.5	.07	e.01
4	.01	.02	.01	.00	.00	.00	27	3.6	.09	7.8	e.06	e.01
5	.01	.01	.01	.00	.00	.00	22	2.9	.07	19	e.06	e.01
6	.02	.01	.02	.00	.00	.00	19	2.3	.06	18	e.06	e.01
7	.02	.01	.01	.00	.00	.00	17	1.9	.04	14	e.05	e.01
8	.01	.01	.01	.00	.00	.00	16	1.8	.04	11	e.05	e.00
9	.01	.02	.00	.00	.00	.00	14	1.4	.03	8.6	e.05	e.00
10	.00	.02	.00	.00	.00	e.50	12	1.1	.03	6.2	e.04	e.00
11	.00	.02	.00	.00	.00	e.50	11	. 83	.03	4.4	e.04	e.01
12	.00	.02	.00	.00	.00	e5.0	9.0	.64	.03	3.1	e.04	e.05
13	.01	.02	.00	.00	.00	e20	7.7	. 50	.03	2.0	e.04	e.02
14	.01	.02	.00	.00	.00	e150	6.3	.49	.04	1.3	e.03	e.02
15	.01	.01	.00	.00	.00	e100	5.3	. 47	.04	.92	e.03	e.01
16	.01	.01	.00	.00	.00	e75	4.7	. 55	.04	.60	e.03	e.01
17	.01	.01	.00	.00	.00	e50	4.8	.55	.05	.39	e.02	e.01
18	.00	.01	.00	.00	.00	e40	3.5	. 67	.04	.38	e.02	e.00
19	.01	.01	.00	.00	.00	e30	3.1	. 63	.04	.31	e.02	e.00
20	.01	.01	.00	.00	.00	e20	3.1	.51	.04	.22	e.01	e.00
21	.01	.01	.00	.00	.00	e15	2.4	.41	.05	.14	e.01	e.00
22	.01	.01	.00	.00	.00	e10	2.1	.40	.06	.09	e.01	e.00
23	.00	.01	.00	.00	.00	e20	1.7	.69	.05	.08	e.01	e.00
24	.01	.01	.00	.00	.00	e50	1.6	.84	.04	.07	e.01	e.00
25	.01	.01	.00	.00	.00	e150	1.7	. 62	.04	.06	e.01	e.06
26	.01	.01	.00	.00	.00	e700	2.1	.36	.05	.06	e.01	e.02
27	.01	.01	.00	.00	.00	e650	2.3	.25	.05	.06	e.01	e.03
28	.01	.00	.00	.00	.00	e370	3.2	.20	.11	.06	e.01	e.06
29	.01	.00	.00	.00		230	4.2	. 18	.06	.06	e.01	e.05
30	.01	.00	.00	.00		128	6.4	.13	.05	.05	e.01	e.07
31	.01		.00	.00		82		. 13		.05	e.01	
TOTAL	0.29	0.36	0.11	0.00	0.00	2896.00	344.2	37.55	1.61	124.00	0.97	0.49
MEAN	.009	.012	.004	.00	.00	93.4	11.5	1.21	.054	4.00	.031	.016
MAX	.02	.02	.02	.00	.00	700	58	4.4	. 12	19	.08	.07
MIN	.00	.00	.00	.00	.00	.00	1.6	. 13	.03	.05	.01	.00
AC-FT	.6	.7	.2	.0	.0	5740	683	74	3.2	246	1.9	1.0

CAL YR 1988 TOTAL 37.14 MEAN .10 MAX 1.9 MIN .00 AC-FT 74 WTR YR 1989 TOTAL 3405.58 MEAN 9.33 MAX 700 MIN .00 AC-FT 6750

e Estimated

241

# 06475000 JAMES RIVER NEAR REDFIELD, SD

LOCATION.--Lat 44°54'38", long 98°28'18", in NWkNWkNWk sec.31, T.117 N., R.63 W., Spink County, Hydrologic Unit 10160006, on right bank near downstream side of highway county bridge, 2.8 mi northeast of Redfield, and 0.7 mi downstream from Turtle Creek.

DRAINAGE AREA. -- 13,911 mi<sup>2</sup>, of which 4,118 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD. -- March 1950 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area. WDR SD-84-1: Datum. WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,239.50 ft above National Geodetic Vertical Datum of 1929. From March 1950 to July 25, 1951, nonrecording gage. From July 26, 1951, to Sept. 30, 1981, water-stage recorder. Both gages described above at site 4.5 mi downstream from present site and at different datum. From Oct. 1, 1981, to Oct. 8, 1986, water-stage recorder at site 0.6 mi downstream at same datum.

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Flow below 100 ft<sup>3</sup>/s for water years 1964-79 may be unreliable because of wind effect. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 39 years, 207 ft3/s, 150,000 acre-ft/yr; median of yearly mean discharges, 130 ft3/s, 94.200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. -- Maximum discharge, 7,310 ft3/s, Apr. 13, 1969, gage height, 24.93 ft; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR .-- Maximum discharge, 3,140 ft3/s at 1130 hours, Apr. 1, gage height, 16.06 ft; no flow for many months. DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		DISCHARGE	, IN COB	IC FEEL	PER SEC	MEAN VALU		DEK 1900	IO SEPIER	1DER 1909		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	e.00	3130	1590	156	66	8.4	.44
2	.00	.00	.00	.00	.00	e.00	3050	1490	143	60	6.4	.39
3	.00	.00	.00	.00	.00	e.00	2870	1410	133	57	5.7	.34
4	.00	.00	.00	.00	.00	e.00	2620	1370	124	55	5.8	.25
5	.00	.00	.00	.00	.00	e.00	2390	1320	116	49	4.5	.20
6	.00	.00	.00	.00	.00	e.00	2200	1270	109	45	3.3	. 17
7	.00	.00	.00	.00	.00	e.00	2060	1250	101	41	2.8	.11
8	.00	.00	.00	.00	.00	e.00	1930	1210	93	38	2.5	.02
9	.00	.00	.00	.00	.00	e.00	1830	1170	90	34	2.1	e.01
10	.00	.00	.00	.00	.00	e1.0	1750	1130	86	31	2.0	.11
11	.00	.00	.00	.00	.00	e10	1700	1090	82	28	2.1	.25
12	.00	.00	.00	.00	.00	e100	1670	1030	79	26	2.3	.18
13	.00	.00	.00	.00	.00	e150	1660	957	77	24	2.0	.19
14	.00	.00	.00	.00	.00	e200	1640	879	76	22	1.8	.20
15	.00	.00	.00	.00	.00	e150	1640	805	74	21	1.1	.15
16	.00	.00	.00	.00	.00	e100	1660	742	72	19	. 93	.12
17	.00	.00	.00	.00	.00	e100	1680	698	70	18	.76	.10
18	.00	.00	.00	.00	.00	e100	1730	639	69	18	.61	e.01
19	.00	.00	.00	.00	.00	e75	1770	565	68	17	.77	e.01
20	.00	.00	.00	.00	.00	e75	1780	498	65	16	.77	.12
21	.00	.00	.00	00	.00	e100	1770	444	62	15	.92	1.3
22	.00	.00	.00	.00	.00	e200	1760	402	59	15	. 94	1.1
23	.00	.00	.00	.00	e.00	e300	1720	371	53	14	.86	. 97
24	.00	.00	.00	.00	e.00	e500	1700	334	51	13	.74	. 82
25	.00	.00	.00	.00	e.00	e900	1680	287	55	12	. 53	.74
26	.00	.00	.00	.00	e.00	e1500	1700	256	58	11	.49	.77
27	.00	.00	.00	.00	e.00		1680	238	59	10	. 55	.74
28	.00	.00	.00	.00	e.00	2350	1660	223	82	9.1	. 56	.65
29	.00	.00	.00	.00		2730	1660	203	84	12	.51	. 64
30	.00	.00	.00	.00		3020	1640	184	76	11	. 52	. 59
31	.00		.00	.00		3110		169		9.8	.42	
TOTAL	0.00	0.00	0.00	0.00	0.00	17771.00	57730	24224	2522	816.9	63.68	11.69
MEAN	.00	.00	.00	.00	.00	573	1924	781	84.1	26.4	2.05	.39
MAX	.00	.00	.00	.00	.00	3110	3130	1590	156	66	8.4	1.3
MIN	.00	.00	.00	.00	.00	.00	1640	169	51	9.1	.42	.01
AC-FT	.0	.0	.0	.0	.0	35250	114500	48050	5000	1620	126	23
					. •	-5250	550					

4094.67 MEAN 11.2 MAX 75 MIN .00 AC-FT CAI. YR 1988 TOTAL. 8120 WTR YR 1989 TOTAL 103139.27 MEAN 283 MAX 3130 MIN .00 AC-FT 204600

e Estimated

# 06476000 JAMES RIVER AT HURON, SD

LOCATION.--Lat 44°21'49", long 98°11'56", in SWkSEkNEk sec.6, T.110 N., R.61 W., Beadle County, Hydrologic Unit 10160006, on right bank 15 ft upstream from city dam at Huron, 135 ft downstream from Chicago and North Western Transportation Co. bridge, and 165 ft upstream from bridge on business loop U.S. Highway 14.

DRAINAGE AREA. -- 15,869 mi<sup>2</sup>, of which 4,148 mi<sup>2</sup> is probably noncontributing.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- August 1928 to September 1932, August 1943 to current year. Monthly discharge only for some periods, published in WSP 1309. Gage-height records collected at site about 100 ft downstream for period of open water each year July 1902 to June 1914 and for period March to June 1915-23 are in reports of the National Weather Service.

REVISED RECORDS. -- WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder and concrete dam. Datum of gage is 1,223.44 ft above National Geodetic Vertical Datum of 1929. Aug. 29, 1928, to Mar. 15, 1929, nonrecording gage at site 100 ft downstream at about same datum. Mar. 16, 1929, to June 30, 1932, nonrecording gage 165 ft downstream at present datum. Aug. 3, 1943, to Oct. 17, 1951, nonrecording gage at site 15 ft downstream at present datum.

REMARKS.--Records good except those for daily discharges less than 100 ft<sup>3</sup>/s, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973.

AVERAGE DISCHARGE.--50 years, 248 ft<sup>3</sup>/s, 179,700 acre-ft/yr; median of yearly mean discharges, 160 ft<sup>3</sup>/s, 116,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 9,000 ft<sup>3</sup>/s, Apr. 13, 1969, gage height, 16.70 ft; no flow for long periods in most years.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Flood between Apr. 11 and 13, 1881, reached a stage of 19.8 ft, from U.S. Weather Bureau publication. Flood of Mar. 22, 1922, reached a stage of 16.5 ft.

EXTREMES FOR CURRENT YEAR. -- Maximum discharge, 3,320 ft<sup>3</sup>/s at 0300 hours, Apr. 3, gage height, 12.91 ft; no flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JIII. AUG SEP .00 .00 .00 e.20 e.50 e1.5 e3170 e1400 e177 24 .00 .00 .00 .00 .00 e.20 e.50 e1.5 e3250 e1390 e150 24 .00 .00 e1370 3 .00 .00 .00 e.10 e.50 e5.0 e3280 e130 35 .00 .00 .00 .00 e.10 e.50 e5.0 e3240 e1360 e110 .00 .00 5 .00 .00 .00 e.10 e.50 e5.0 e3070 e1300 e105 17 .00 .00 6 .00 .00 .00 e.10 e.20 e2850 e1220 e105 28 .00 .00 e5.0 .00 .00 .00 e.20 e2700 e1120 e105 e17 .00 .00 e.10 e5.0 8 .00 .00 e104 19 .00 .00 .00 e.10 e1170 e5.0 e2400 e.10 .00 23 .00 .00 00 e80 g 0.0 e.10 e. 10 e5.0 e2100 e1100 .00 .00 e6.0 .00 10 .00 .00 35 e70 e.10 e.10 e1750 e1060 .00 .00 e958 e62 00 00 .00 e.50 11 e.10 e.10 99 e1600 12 .00 .00 e.10 e.05 e.20 226 e1550 e928 e80 e.10 .00 .00 e1550 13 .00 .00 e.50 e.05 e.20 367 e978 e81 3.7 .00 .00 14 .00 .00 e.50 .00 e.20 602 e1550 e950 e75 9.1 .00 .00 15 .00 .00 e.50 e.50 e1500 e854 e55 9.7 .00 .00 e.05 735 16 .00 .00 e.20 e.05 e1550 e677 e50 5.5 .00 .00 e.50 634 17 .00 .00 e.20 e720 e39 1.3 .00 .00 .00 e1.0 567 e1550 e.20 11 .00 .00 18 .00 .00 .00 e1570 e701 e48 e1.5 489 6.6 .00 e.20 e46 .00 .00 19 .00 .00 e1.5 441 e1570 e662 20 .00 .00 e.20 .00 e1.5 408 e1600 e600 e32 1.3 .00 .00 .00 21 .00 .00 e.10 .00 383 e1600 e500 48 .33 .00 e.10 .00 .00 22 .00 .00 e.05 e1.5 347 e1570 e450 36 .00 23 .00 .00 e.20 e.10 e1.5 373 e1570 e400 32 .00 .00 .00 e.20 .00 .00 e.10 e1.5 655 e1580 e380 30 .00 00 25 .00 .00 e.20 e.10 e1.5 1140 e1550 e342 24 .00 .00 .00 26 .00 .00 e.50 e.10 1620 e1500 e342 32 .00 .00 .00 e1.5 e.50 18 .00 .00 .00 27 .00 1990 e310 .00 e1450 e.10 e1.5 e.50 13 .00 .00 .00 e300 .00 .00 2390 e1410 28 e.10 e1.5 .00 e2570 e280 16 .00 .00 29 .00 .00 e.20 e.20 e1460 e262 .00 .00 .00 .00 e.20 ---26 30 .00 e.40 e2860 e1440 .00 .00 31 .00 e.20 e.50 e3050 e245 0.00 0.00 1979 268.13 TOTAL 0.00 0.00 5.50 3.25 22.40 22019.0 58530 24329 .18 .10 .00 MEAN .00 .00 .80 710 1951 785 66.0 8.65 .00 MAX .00 .00 .50 .50 1.5 3050 3280 1400 177 35 00 .00 MIN .00 .00 .00 .00 .10 1.5 1410 245 00 .00 .00 AC-FT .0 .0 11 6.4 43670 116100 48260 3930 532 .0 .0

CAL YR 1988 TOTAL 6278.65 MEAN 17.2 MAX 414 MIN .00 AC-FT 12450 WTR YR 1989 TOTAL 107156.28 MEAN 294 MAX 3280 MIN .00 AC-FT 212500

e Estimated

# 06476000 JAMES RIVER AT HURON, SD--Continued

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# WATER-OUALITY RECORDS

PERIOD OF RECORD. -- October 1948 to September 1952, October 1955 to current year.

PERIOD OF DAILY RECORD. -SPECIFIC CONDUCTANCE: September 1956 to October 1970, September 1971 to current year. WATER TEMPERATURE: September 1956 to October 1970, September 1971 to current year.

REMARKS. -- Water temperature and specific conductance samples collected once daily by observer.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum daily, 3,170 microsiemens, Mar. 14, 1965; minimum daily, 175 microsiemens,

Mar. 30, Apr. 2, 1960.
WATER TEMPERATURE: Maximum daily, 31.0°C, June 2, 1968; minimum daily, 0.0°C on many days during winter periods.

EXTREMES FOR CURRENT YEAR .--

SPECIFIC CONDUCTANCE: Maximum observed daily, 1,020 microsiemens, July 6; minimum observed daily, 290 microsiemens, Apr. 3.

WATER TEMPERATURE: Maximum observed, 29.0°C, July 21; minimum observed daily, 2.0°C, Mar. 29.

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			WATER QUA	ALITY DA	TA, WATER	YEAR OCT	OBER 1988	TO SEPTE	MBER 1989	1		
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
JAN 25	1330	<0.10	2260	7.85	-2.0	0.5	10	733	7.4	54	750	160
APR	5.2.2.6	222	72925		4.2	1.5		Valeto-	122.00	2.0		
11 24 MAY	1115 1100	1600 1550	390 380	7.89	13.0 25.0			732 720	10.8	88 117	120 110	29 27
31	1050	226	770	8.37	19.0	16.0	11	730	8.6	91	270	60
07	0915	19	1010	8.68	29.0	26.0	9.2	733	6.6	85	350	79
								-		6.6.0		3
DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	PERCENT	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)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
JAN 25	85	200	36	3	21	433	650	140	1610	33	1520	2.19
APR	12	27	30			89	79		258	40	232	0.35
11 24 MAY	11	23	28	0.9	13 11	94	59	13 12	226	61	200	0.31
31	28	60	32	2	14	208	140	34	502	64	462	0.68
07	37	80		2	<0.10	256	210	49	677	21		0.92
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NO2+NO3	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS NO3) (71887)
JAN												
25 APR			<0.010				<0.100		0.100	0.13		
11		0.060	0.050	0.640	0.660	0.700	0.710	0.480	0.500	0.64	2.0	12
24 MAY	946		<0.010				<0.100		0.020	0.03		
31 JUL	306	<0.010	<0.010			<0.100	<0.100	0.040	<0.010		1.4	
07	34.7		0.010				<0.100		0.290	0.37		

# 06476000 JAMES RIVER AT HURON, SD--Continued

DATE	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS)	SOLVED (UG/L AS AS)	DIS- SOLVED (UG/L	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	(MG/L AS CN)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)
JAN 25		0.320		0.260		5	510		<10	1	Barry M	<0.01
APR 11										3		
24 MAY		0.430 0.190	0.409	0.358 0.142	2	2		<1	<1 <1	3		<0.01
31 JUL	0.190	0.160	0.167	0.120	3	3	160	<1	<1	2	<0.010	<0.01
07		0.720		0.634		10	240		<1	6		<0.01
DATE	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)
JAN 25		10	<5		740	<0.1		<1	30			
APR 11		170	<5	230	110	<0.1	<1	<1	27	62	268	100
24 MAY		79	<5		7	0.2		<1	11	60	251	99
31	670	14	<1	730	480	<0.1	<1	<1	8	25	15	98
07		9	2		1400	<0.1		<1	13			
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	ALA- CHLOR TOTAL RECOVER (UG/L) (77825)	ALDRIN, TOTAL (UG/L) (39330)	ALDRIN, DIS- SOLVED (UG/L) (39331)
MAY 31	1050	226	770	8.37	19.0	16.0	730	8.6	91	<0.10	<0.010	<0.01
JUL 07	0915	19	1010	8.68	29.0	26.0	733	6.6	85	0.10	<0.010	<0.01
DATE	AME- TRYNE TOTAL (82184)	ATRA- ZINE, TOTAL (UG/L) (39630)	CHLOR-DANE, TOTAL (UG/L) (39350)	CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	CYAN- AZINE TOTAL (UG/L) (81757)	DDD, TOTAL (UG/L) (39360)	DDD, DIS- SOLVED (UG/L) (39361)	DDE, TOTAL (UG/L) (39365)	DDE, DIS- SOLVED (UG/L) (39366)	DDT, TOTAL (UG/L) (39370)	DDT, DIS- SOLVED (UG/L) (39371)	DI- AZINON, TOTAL (UG/L) (39570)
MAY 31	<0.10	0.20	<0.1	<0.1	0.10	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
JUL 07	<0.10	0.40	<0.1	<0.1	0.40	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
DATE	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN TOTAL (UG/L) (39380)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	ENDO- SULFAN, TOTAL (UG/L) (39388)	ENDO- SULFAN DISSOLV (UG/L) (82354)	(UG/L)		ETHION, TOTAL (UG/L)		HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR, DIS- SOLVED (UG/L) (39411)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)
MAY 31	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01	<0.01	<0.010	<0.01	<0.010

# 06476000 JAMES RIVER AT HURON, SD--Continued

CTA TETE	OTTAT TIME	DAMA	LTA MITTO	TETTAT	OCHODEN	1000	ma	SEPTEMBER	1000	
WAILK	UUALIII	DATA	WAILK	Y P. AR	UL. TUBER	1988	TU	DEPTEMBER	1303	

			WATER QU	JALITY DATA	, WATER	YEAR OCTO	BER 1988	TO SEPTEM	BER 1989			
DATE	HEPTA- CHLOR EPOXIDE DIS- SOLVED (UG/L) (39421)	LINDANI TOTAL (UG/L (39340	SOLVED (UG/L)	THION, TOTAL (UG/L)	MALA- THION, DIS- SOLVED (UG/L) (39532)	METH- OXY- CHLOR, TOTAL (UG/L) (39480)	METH- OXY- CHLOR DISSOLV (UG/L) (82350)	METHYL PARA- THION, TOTAL (UG/L) (39600)	METHYL PARA- THION, DIS- SOLVED (UG/L) (39602)	METHYL TRI- THION, TOTAL (UG/L) (39790)	METHYL- TRI- THION DISSOLV (UG/L) (82344)	MIREX, TOTAL (UG/L) (39755)
MAY 31	<0.01	<0.01	0 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
JUL		-0.01			<0.01	<0.01	<0.01	~0.01		~0.01	~0.01	
07	<0.01	<0.01	0 <0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
DATE	DI SOL	S- TI VED TO	ARA- THE HION, I OTAL SO UG/L) (U	ARA- HION, HIS- PCI DLVED TO' HG/L) (UG/ 9542) (399	AL SOLUTION (UC	TI LEI CB, POI IS- CHI LVED TO: G/L) (UG	/L) (UG	SOLV TO	JG/L) (UG	NE TO	ONE TO TAL TO IG/L) (1	ROME- RYNE DTAL JG/L) 9057)
MAY												
31 JUL	<0	0.01	<0.01	0.01	0.1	<0.1 <	0.10 <	0.10	<0.1 <	0.10	<0.1	<0.1
07	<0	.01	<0.01	0.01	0.1	<0.1 <	0.10 <	0.10	<0.1	0.10	<0.1	<0.1
DATE	PRO- PAZI TOTA (UG/ (390	INE SI	LVEX, Z DTAL TO UG/L) (U	IMA- SIN ZINE TRY DTAL TO: IG/L) (UC 0055) (390	NE APHI	OX- APHI ENE, DI TAL SOI G/L) (UC	IS- THE COLUMN THE COL	ION DIS	ON 2, SSOLV TO JG/L) (U	TAL TO	TAL TO	4,5-T DTAL UG/L) 9740)
MAY		. 10	-0.01	.0.10				0.01	-0.01	0.10	.0.01	-0 01
JUL 31	<0	0.10	<0.01	0.10	0.1	<1 <:	1.0 <	0.01	<0.01	0.10	0.01	<0.01
SPECIFI	C CONDUC	CTANCE,	IN MICROSI	EMENS PER		ER AT 25		WATER Y	EAR OCTOBE	R 1988 TO	SEPTEMB	ER 1989
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							380	505	785			
2							330	520				
3							290 355	530 530				
5							390	540		955		
6					1222		380	540		1020		
7								540				
8								540	865			
10							390	550				
11					1222		380	570	885			
12							390	580				
13 14							400	580	885	1000		
15							400		890	950		
16							390	595	890	980		
17							375	600	895	1000		
18							365	610	900	1000		
19 20							360 370	650	910 940	925 960		
21										980		
22							360 360			980		
23							350					
24 25							350	685				
26								700				
27								710				
28							420					
29 30						360 440	440 460	760				
31							460	785				
								4.00				

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# JAMES RIVER BASIN

# 06476000 JAMES RIVER AT HURON, SD--Continued

# WATER TEMPERATURE, IN DEGREES CELSIUS, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 INSTANTANEOUS VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1							4.0	13.0	17.0			
2							5.0	13.0				
3							7.0	14.0				
4							7.0	15.0				
5							8.0	12.0	17.0	26.0		
6							7.0	10.0		29.0		
7								11.0				
8								14.0	19.0			
9												
10							6.0	16.0				
11							5.5	16.0	20.0			
12							6.0	15.5				
13							8.0	15.0	17.0			
14							8.0			26.0		
15									20.0	24.5		
16							9.0	19.5	20.0	24.0		
17							8.0	18.5	20.0	24.0		
18							9.0	18.5	19.0	24.0		
19							11.0		22.0	25.5		
20							12.0		24.0	26.0		
21							14.0			29.0		
22							13.5					
23							15.0					
24							19.0					
25								19.0				
26								17.0				
27								15.0				
28							15.0					
29						2.0	13.0					
30						2.0	13.0	16.0				
31								15.5				

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# 06476500 SAND CREEK NEAR ALPENA. SD

LOCATION.--Lat 44°09'15", long 98°26'06", in NEkNEk sec.19, T.108 N., R.63 W., Jerauld County, Hydrologic Unit 10160006, on left bank 5 ft downstream from highway bridge, 4.0 mi southwest of Alpena, 7.0 mi upstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, and 10.5 mi upstream from interlink with Cain Creek

DRAINAGE AREA. -- 261 mi 2.

PERIOD OF RECORD. -- March 1950 to September 1989 (discontinued).

REVISED RECORDS. -- WSP 1309: 1950(M). WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,315 ft, from barometer. Prior to Sept. 17, 1951, nonrecording gage at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --39 years, 9.08 ft<sup>3</sup>/s, 6,580 acre-ft/yr; median of yearly mean discharges, 5.4 ft<sup>3</sup>/s, 3,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 2,240 ft<sup>3</sup>/s, Mar. 28, 1960, gage height, 13.35 ft; maximum gage height, 14.1 ft, Mar. 28, 1950, backwater from ice; no flow for many days in each year.

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

D-4-		Discharge	Gage height			Discharge	Gage height
Date	Time	(ft <sup>3</sup> /s)	(ft)	Date	Time	(ft <sup>3</sup> /s)	(ft)
Mar. 14		150	a	Mar. 26	0930	*208	*10.34

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow for many months.

						MEAN VALU	ES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	43	1.8	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	32	1.9	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	23	2.9	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	16	2.8	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	13	1.8	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	12	1.5	.00	.00	.00	.00
7	.00	.00	.00	.00	.00	.00	11	1.4	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	9.1	. 93	.00	.00	.00	.00
9	.00	.00	.00	.00	.00	.00	9.0	. 63	.00	.00	.00	.00
10	.00	.00	.00	.00	.00	e.00	8.8	.59	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	e.50	8.5	. 57	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	e10	7.7	.31	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	e100	6.8	.10	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	e130	5.9	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	e120	5.9	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	e80	5.0	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	e50	4.5	.16	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	e10	4.4	.27	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	e5.0	3.8	.25	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	e5.0	3.8	.04	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	e1.0	3.4	.03	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	e1.0	3.4	.09	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	e10	2.6	.07	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	e60	1.7	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	e100	.99	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	197	.77	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	171	. 90	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	157	1.5	.00	.00	.00	.00	.00
29	.00	.00	.00	.00		115	1.7	.00	.00	.00	.00	.00
30	.00	.00	.00	.00		82	2.0	.00	.00	.00	.00	.00
31	.00		.00	.00		61		.00		.00	.00	
TOTAL	0.00	0.00	0.00	0.00	0.00	1465.50	252.16	18.14	0.00	0.00	0.00	0.00
MEAN	.00	.00	.00	.00	.00	47.3	8.41	.59	.00	.00	.00	.00
MAX	.00	.00	.00	.00	.00	197	43	2.9	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.77	.00	.00	.00	.00	.00
AC-FT	.0	.0	.0	.0	.0	2910	500	36	.0	.0	.0	.0

CAL YR 1988 TOTAL 1266.55 MEAN 3.46 MAX 130 MIN .00 AC-FT 2510 WTR YR 1989 TOTAL 1735.80 MEAN 4.76 MAX 197 MIN .00 AC-FT 3440

e Estimated

#### 06477000 JAMES RIVER NEAR FORESTBURG. SD

LOCATION.--Lat 43°58'26", long 98°04'14", in SW\sW\sw\sw\sec.20, T.106 N., R.60 W., Sanborn County, Hydrologic Unit 10160011, on right bank 5.0 ft downstream from highway bridge, 3.8 mi southeast of Forestburg, 5.4 mi downstream from Chicago, Milwaukee, St. Paul and Pacific Railroad bridge, and 6.1 mi downstream from Sand Creek.

DRAINAGE AREA. -- 17,590 mi<sup>2</sup>, of which about 4,148 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- March 1950 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,208,34 ft above National Geodetic Vertical Datum of 1929 (Bureau of Reclamation bench mark). Prior to Sept. 5, 1951, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Gage-height telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --39 years, 308 ft<sup>3</sup>/s, 223,100 acre-ft/yr; median of yearly mean discharges, 206 ft<sup>3</sup>/s, 149,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft<sup>3</sup>/s, Apr. 9, 1969, gage height, 17.16 ft; no flow at times some years.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Floods in March 1920 and March 1922 reached a stage of about 18 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,080 ft<sup>3</sup>/s at 0300 hours, Apr. 8, gage height, 13.36 ft; minimum daily discharge, 0.79 ft<sup>3</sup>/s, Sept. 6.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MEAN VALUES DAY OCT SEP NOV DEC JAN FEB MAR APR MAY TIIN. .TITT. AUG 4.1 8.4 4.8 e2.0 e2.5 e3.0 2390 1360 284 50 15 1.1 4.2 7.5 4.2 e2.0 e2.0 e3.0 2480 1350 262 45 8.7 1.2 3 3.1 6.2 2590 1320 237 43 7.8 1.0 e2. 0 e1.5 e3.0 3.1 219 5.1 4.9 e2.0 e1.0 e3.0 2730 1310 46 4.7 1.1 5 2.4 5.0 e2.0 e1.0 e3.0 2870 1290 197 43 3.7 1.0 .79 6 2.1 5.1 4.9 e2.0 e1.0 2970 1280 179 37 3.6 e3.0 1.7 5.6 4.7 e1.5 e1.0 e3.0 3000 1240 164 33 3.4 .89 8 1.5 5.4 4.6 e1.5 2980 1190 150 28 3.4 .92 e1.0 e3.0 9 1.6 4.7 4.4 1160 140 27 3.2 .88 e1.5 e1.0 e3.0 2840 10 25 2.9 e1.0 e10 1130 128 1.0 2460 1090 e1.5 4.5 12 2.6 6.0 e50 2230 1040 101 24 3.6 e1.5 e1.5 1.7 22 13 8.1 5.6 4.4 2050 1010 3.3 1.7 e1.5 e1.5 e75 109 14 15 5.2 4.4 21 3.2 e1.5 e1.5 e160 1900 992 117 1.7 15 18 3.0 3.9 1750 964 108 18 3.1 1.7 e1.5 e1.5 e250 19 16 3.7 99 3.1 4.4 e1.5 e1.5 e400 1660 914 14 1.6 17 21 5.1 4.4 e1.5 e1.5 e550 1590 872 86 15 3.1 1.8 18 21 5.3 4.2 e2.0 e2.0 e700 1550 835 82 20 2.8 1.6 19 20 5.3 3.6 e2.0 e3.0 e900 1520 799 80 16 2.2 20 18 5.0 3.4 e3.0 e750 1490 753 17 2.1 21 16 5.0 3.0 e2.0 e3.0 e650 1490 700 70 15 1.9 1.3 22 16 5.2 3.5 e2.0 e550 636 68 13 1.8 1.0 e3.0 1490 23 16 5.1 3.2 1470 577 67 10 1.7 e2.0 e450 e3.0 1.4 24 5.0 1.5 1.7 18 63 9.0 3.1 e2. 0 e3 0 e400 1460 523 25 4.9 480 61 7.3 1.3 A2. 0 e3.0 e550 1460 18 15 26 4.7 e3.0 443 79 6.0 2.2 1.9 3.1 e2.0 9800 1450 27 104 2.1 4.1 2.7 e2.5 e3.0 e1200 1420 402 5.3 1.7 28 15 4.6 2.4 e3.0 e3.0 1640 1390 356 100 4.8 1.5 1.6 29 15 5.1 e2.0 e3.0 1910 1370 311 71 8.1 1.3 1.6 30 13 4.9 e2.0 e3.0 ---293 57 24 1.4 2100 1370 31 11 294 24 1.2 e2.0 e3.0 2260 340.9 3665 694.5 103.6 TOTAL 151 6 118.1 61.0 55.5 16407.0 60090 26914 3.81 MEAN 11.0 5.05 1.97 1.98 2003 868 122 22.4 3.34 1.39 529 5.0 MAX 8.4 2260 3000 284 50 15 1.9 21 3.0 3.0 1360 2.0 57 4.8 MIN 1.0 2.4 1.5 1.0 3 0 1370 293 1.2 .79 7270 AC-FT 676 301 234 121 110 32540 119200 53380 1380 205 83

CAL YR 1988 TOTAL 17049.01 MEAN 46.6 MAX 403 MIN .00 AC-FT 33820 WTR YR 1989 TOTAL 108642.98 MEAN 298 MAX 3000 MIN .79 AC-FT 215500

e Estimated

# 06477500 FIRESTEEL CREEK NEAR MOUNT VERNON, SD

LOCATION.--Lat 43°46'30", long 98°14'33", in SWkSWk sec.26, T.104 N., R.62 W., Davison County, Hydrologic Unit 10160011, near center of span on downstream side of highway bridge, 4.5 mi north of Mount Vernon, 5.2 mi downstream from West Firesteel Creek, and 12 mi northwest of Mitchell.

DRAINAGE AREA. -- 521 mi 2.

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

REVISED RECORDS. -- WDR SD-86-1: Drainage area.

GAGE. -- Water-stage recorder. Datum of gage is 1,297.22 ft above National Geodetic Vertical Datum of 1929. Prior to Nov. 28, 1972, nonrecording gage and crest-stage gage.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 34 years, 25.6 ft<sup>3</sup>/s, 18,550 acre-ft/yr; median of yearly mean discharges, 9.3 ft<sup>3</sup>/s, 6,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 6,610 ft<sup>3</sup>/s, Apr. 4, 1969, gage height, 15.34 ft; maximum gage height, 17.12 ft, Apr. 3, 1969, backwater from ice; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 100 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 14	0030	*300	a*6.88	Mar. 26	2315	133	5.10

a Backwater from ice. No flow for many days.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

							-					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.14	.07	e.06	.00	e.03	e.01	41	1.4	.03	.00	.00	.00
2	.13	.07	.06	.00	.00	e.01	31	1.3	.02	.00	.00	.00
3	.16	.08	.06	.00	.00	e.01	24	1.1	.02	.00	.00	.00
4	.13	.14	.07	.00	.00	e.01	19	1.1	.02	.00	.00	.10
5	.03	.24	.08	.00	.00	e.01	15	1.1	.01	.00	.00	.02
6	.02	.25	.09	.00	.00	e.01	12	.98	.01	.00	.00	.00
7	.02	.25	.10	.00	.00	e.01	9.7	.88	.01	.00	.00	.01
8	.02	.15	.07	.00	.00	e.01	8.3	.75	.00	.00	.00	.01
9	.03									.00	.00	
		.14	.06	.00	.00	e.01	7.4	. 67	.00			.01
10	.02	.12	.04	.00	.00	e1.0	6.3	. 52	.01	.00	.00	.01
11	.02	. 13	.04	.00	.00	e5.0	5.3	.44	.00	.00	.00	.02
12	.02	.41	.07	.00	.00	e50	4.7	.34	.00	.00	.00	.02
13	.02	.20	. 13	.00	.00	e200	4.1	.31	.00	.00	.00	.01
14	.02	.05	.16	.00	.00	e200	3.7	.30	.00	.00	.00	.01
15	.03	.09	.14	.00	.00	e100	3.4	.26	.00	.00	.00	.01
16	.03	. 13	.05	.00	.00	e90	3.1	. 23	.00	.00	.00	.01
17	.03	.08	.05	e.01	.00	e60	2.9	. 54	.00	.00	.00	.01
18	.03	.05	.04	e.01	.00	e50	2.8	.40	.00	.00	.00	.01
19	.03	.05	.07	e.10	.00	e40	2.8	.32	.00	.00	.00	.01
20	.03	.04	.07	e.10	.00	e30	2.5	.22	.00	.00	.00	.01
21	.03	.05	.06	e.10	.00	e20	2.3	. 25	.00	.00	.00	.01
22	.03	.06	.06	e.10	.00	e20	2.1	.42	.00	.00	.00	.01
23	.04	.08	.10	e.08	.00	23	2.0	.27	.00	.00	.00	.02
24	.04	.11	.10	e.08	.00	22	1.9	.20	.00	.00	.00	.01
25	.04	.11	.04	e.03	.00	78	1.6	.08	.00	.00	.00	.01
26	.04	e.10	e.04	e.03	.00	125	1.6	.05	.23	.00	.00	.01
27	.10	e.06	e.04	e.03	e.01	120	1.4	.03	.03	.00	.00	.01
28	.12	e.06	e.03	e.03	e.01	105	1.6	.02	.01	.00	.00	.01
29	.12	e.06	e.02	e.03	0.01	96	1.7	.02	.00	.00	.00	.01
30	.06	e.06	.00	e.05		77	1.6	.02	.00	.00	.00	.01
31	.07		.00	e.04		55		.03		.00	.00	
TOTAL	1.65	3.49	2.00	0.82	0.05	1567.09	226.8	14.55	0.40	0.00	0.00	0.39
												.013
		.41	.16	. 10	.03	200	41	1.4		.00		. 10
MIN	.02	.04	.00	.00	.00	.01	1.4	.02	.00	.00	.00	.00
AC-FT	3.3	6.9	4.0	1.6	.1	3110	450	29	. 8	.0	. 0	.8
MEAN MAX MIN	.053 .16 .02	.12 .41 .04	.065 .16 .00	.026 .10 .00	.002 .03 .00	50.6 200 .01	7.56 41 1.4	.47 1.4 .02	.013 .23 .00	.00 .00 .00	.00 .00	

CAL YR 1988 TOTAL 2602.64 MEAN 7.11 MAX 302 MIN .00 AC-FT 5160 WTR YR 1989 TOTAL 1817.24 MEAN 4.98 MAX 200 MIN .00 AC-FT 3600

e Estimated

# 06478500 JAMES RIVER NEAR SCOTLAND, SD (National stream-quality accounting network station)

LOCATION.--Lat 43°11'09", long 97°38'07", in SWkSWk sec.30, T.97 N., R.57 W., Hutchinson County, Hydrologic Unit 10160011, on right bank 5.0 ft downstream from highway bridge, 0.3 mi upstream from Dawson Creek, and 5.2 mi northeast of Scotland.

DRAINAGE AREA. -- 20,653 mi<sup>2</sup>, of which 4,148 mi<sup>2</sup> is probably noncontributing.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD. -- September 1928 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 786: Drainage area. WSP 956: 1937-38. WSP 1279: 1932, 1948. WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area. WDR SD-88-1: Datum.

GAGE.--Water-stage recorder and rock and earth control. Datum of gage is 1,168.02 ft (revised) above National Geodetic Vertical Datum of 1929. Prior to Nov. 28, 1972, at site 0.25 mi downstream at present datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Occasional backwater caused by Dawson Creek; reverse flow occurred for part of May 15, 1961, from information by local residents. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --61 years, 428 ft<sup>3</sup>/s, 310,100 acre-ft/yr; median of yearly mean discharges, 220 ft<sup>3</sup>/s, 159,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 29,400 ft<sup>3</sup>/s, June 23, 1984, gage height, 20.45 ft; no flow for many days in some years.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,540 ft<sup>3</sup>/s at 1000 hours, Apr. 18, gage height, 11.87 ft; minimum daily discharge, 8.2 ft<sup>3</sup>/s, Sept. 5.

MEAN VALUES AUG .TITT. SEP DAY OCT NOV DEC JAN FEB MAR APR MAY JUN e30 e25 9.9 e25 9.2 e25 8.8 e25 9.3 e20 8.2 8.7 e20 e20 e19 q e19 e20 e25 e25 e300 e350 e350 e300 e250 9.6 e40 e230 e200 9.0 e35 9.2 e250 9.9 9.9 e300 e350 e500 e600 e700 9.0 e700 8.3 e28 8.8 9.0 e27 e30 ------e30 392.0 360.8 TOTAL MEAN 20.0 30.4 30.5 32.5 27.9 51.6 12.6 12.0 MAX MIN 8.3 8.2 AC-FT 

CAL YR 1988 TOTAL 41798.2 MEAN 114 MAX 700 MIN 8.8 AC-FT 82910 WTR YR 1989 TOTAL 117619.8 MEAN 322 MAX 2530 MIN 8.2 AC-FT 233300

e Estimated

251

# 06478500 JAMES RIVER NEAR SCOTLAND, SD--Continued (National stream-quality accounting network station)

#### WATER-OUALITY RECORDS

PERIOD OF RECORD. -- October 1955 to September 1964, October 1966 to September 1973, October 1974 to current year.

PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: October 1974 to September 1981; June 1985 to September 1988 (discontinued), seasonal records only.

pH: June to August 1985.

WATER TEMPERATURE: January 1953 to September 1969, October 1974 to September 1983; June 1985 to September 1988 (discontinued), seasonal records only.

DISSOLVED OXYGEN: June to August 1985. SUSPENDED-SEDIMENT DISCHARGE: October 1981 to September 1983.

REMARKS .-- Prior to October 1969, continuous temperature thermograph at station.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum daily, 2,660 microsiemens, Jan. 9, 1977; minimum daily, 300 microsiemens, Mar. 19, 1977.

WATER TEMPERATURE: Maximum, 32.5°C, Aug. 1, 2, 1987; minimum daily, 0.0°C on many days during winter periods. SEDIMENT CONCENTRATION: Maximum daily mean, 953 mg/L, June 21, 1983; minimum daily mean, 12 mg/L, Nov. 8,

SEDIMENT LOAD: Maximum daily, 5,890 tons, June 21, 1983; minimum daily, 1.7 tons, Oct. 2, 11, 1981. pH: Maximum daily, 8.6, June 17, 19, 20, 1985; minimum daily, 7.5, June 30, 1985, July 2, 1985. DISSOLVED OXYGEN: Maximum daily, 16.3 mg/L, June 30, 1985; minimum daily, 1.0 mg/L, June 27, 1985.

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC FRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT											
12 DEC	1115	14	1750	8.36	239	16.0	12.0	14	735	9.2	89
06	1125	34	2520	8.28		8.0	3.0	6.2	729	15.0	118
FEB 07	1215	19	2600	8.03	335	3.0	1.0	2.9	731	16.5	122
MAR											79
30 APR	1000	1130	820			7.0	5.5	26	735	9,6	
12 MAY	1145	2250	420	7.23		13.0	10.0	47	732	9.0	83
17	1130	1090	650	8.18	156	24.0	21.0	59	724	9.1	108
JUL 20	1030	56	1360	8.50		22.5	26.5	18	734	10.8	140
AUG 03	1030	16	1410	8.28	234	30.0	28.0	27	721	4.0	54
SEP					204						
07	1030	11	1680	8.08		18.5	23.0	18	722	5.9	73
DATE	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	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 PERCENT (00932)	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)
OCT											
12 DEC	K44	140	940	220	94	110	20	2	20	241	890
06			1200	280	130	100	15	1	13	242	1300
FEB 07	K12	<4	1300	310	130	140	19	2	19	331	1300
MAR			210				26	2	11	157	180
30			240	54	26	67	36				
12 MAY			130	34	12	25	27	0.9	12	99	86
17	K80	190	220	50	23	48	31	1	12	170	130
JUL 20			530	120	56	92	27	2	19	232	470
AUG 03	100	140	570	130	59	95	26	2	19	231	510
SEP 07			710	160	75	110	25	2	20	247	690

# 06478500 JAMES RIVER NEAR SCOTLAND, SD--Continued

		WAIL	R QUALITY	DATA, WA	TER YEAR	OCTOBER 1	988 TO SE	PTEMBER I	989		
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)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	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, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NITRATE TOTAL (MG/L AS N) (00620)
OCT 12	37	0.40	18	1630	32	1560	2.22	61.6		<0.010	
DEC 06	29			2060	1	2000	2.80	189		0.010	
FEB 07	52	0.50	12	2260	8	2170	3.07	116		<0.010	
MAR 30	47			514	96	486	0.70	1570	0.070	0.050	0.630
APR 12 MAY	13			273	172	246	0.37	1660		0.040	
17 JUL	23	0.20	8.5	418	200	389	0.57	1230	0.010	<0.010	
20 AUG	42			950	994	941	1.29	144		<0.010	
03 SEP	47	0.30	19	1070		1020	1.46	46.2		<0.010	
07	49			1280	38	1250	1.74	38.0		<0.010	-
DATE	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, TOTAL (MG/L AS NO3) (71887)	PHOS- PHOROUS TOTAL (MG/L AS P) (00665)	PHOS- PHOROUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS, ORTHO, TOTAL (MG/L AS P) (70507)
OCT 12			<0.100	0.070	0.050	0.06	0.80		0.020	0.040	
DEC 06	0.180		0.190		0.100	0.13				0.010	
FEB 07			0.170	0.090	0.110	0.14	0.50		0.050	0.030	
MAR 30	0.680	0.700	0.730	1.00	1.00	1.3	2.4	14	0.730	0.470	1.20
APR 12	0.650		0.690		0.280	0.36				0.220	
MAY 17		<0.100	<0.100	0.030	0.030	0.04	1.2		0.100	0.050	0.061
JUL 20			<0.100		0.030	0.04				0.070	
AUG 03			<0.100	0.050	0.070	0.09	1.2		0.330	0.120	
SEP 07			<0.100		0.080	0.10				0.090	
DATE	PHOS- PHOROUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	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 12	0.020	<10		2	110	<0.5	600		<1	2	<3
DEC 06	<0.001			1			510		<10		
FEB 07	<0.010	30		1	<100	<10	590		<1	<1	2
MAR 30	0.445		3	3			210	<1	<1		
APR 12	0.180			2			100	16	<1		
MAY 17	0.020	10	4	3	62	<0.5	160	<1	<1	2	<3
JUL 20	0.038			5			410		<1		
AUG 03	0.100	30		5	140	<0.5			<1	<1	<3
07	0.066			6		1	490		<1		

# 06478500 JAMES RIVER NEAR SCOTLAND, SD--Continued

DATE	(UC		CYANIDE TOTAL (MG/L AS CN) (00720)	SOL (MG AS	VED LVED CN)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IRON, DIS- SOLVEI (UG/L AS FE (01046)	D S(	DIS- OLVED UG/L S PB)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, TOTAL RECOV- ERABLE (UG/L AS MN) (01055)	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)
OCT 12		1		<0	.01	44	,	3	<5	160		870	122	<10
DEC 06		1			.01	42	20		<5			110	0.1	2-3
FEB 07		3	-		.01		30		<5	230		840	0.1	3
MAR 30		3	<0.010		.01	2700	64		<5		820	430	0.1	
APR 12		2			.01		180		<5			110	<0.1	
MAY 17		2	<0.010		.01	4800	15		1	35	1200	58		<10
JUL 20		1			.01		<:		<1			2000	<0.1	
AUG 03		1		-	_		<		<1	100		2400	0.1	<10
SEP 07		3		-0	. 01			3		100		1500	<0.1	
07		3		-0	.01	37		•	<1			1300	<b>~0.1</b>	
DATE	(UC	S- LVED S/L NI)	SELE- NIUM, TOTAL (UG/L AS SE) (01147)	SOL (UG	M, S S- VED S/L SE)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM DIS- SOLVEI (UG/L AS SR (01080)	) Di	ANA- IUM, DIS- OLVED UG/L S V) 1085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. Z FINER THAN .062 MM (70331)	
OCT 12		4			1	1.0	2300	,	<6	14	50	1.9	71	
06					2					10	23	2.1	97	
FEB 07		6			3	<1.0	3600	)	<1	10	63	3.2	49	
MAR 30			<1		<1					9	89	272	97	
APR 12			45		<1		-			22	142	863	97	
MAY 17		6	<1		<1	<1.0	330	)	<6	7	167	491	99	
JUL 20					<1					17	54	8.2	99	
AUG 03		5			<1	<1.0	1200		<6	10	187	8.1	97	
SEP 07					<1					20	144	4.3	96	
										100			777	
DATE	TIME	DIS CHARG INST CUBI FEE PER SECO (0006	SE, SP T. CI IC CO ST DU R AN OND (US	FIC N- CT- CE	PH (STANI ARD UNITS)	AII (DEG	RE AT R WA C) (DE	MPER- TURE ATER EG C)	BARO- METRI PRES- SURE (MM OF HG) (00025	OXYGE DIS SOLV (MG/	CEN ED SATU L) ATIC	ED ALA E- CHLO IT TOTA IR- RECOV N) (UG/	OR AL ALDRIN VER TOTAL VL) (UG/I	SOLVED (UG/L)
MAY	1120	1000		650			4 0	21.0	70			00 -0	10 -0.01	0 <0.01
JUL 20	1130	1090		650	8.1		4.0	21.0	72			.08 <0.		
20 SEP	1030	56		1360	8.5		2.5	26.5	73			40 <0.		
07	1030	11		1680	8.0	18 1	8.5	23.0	72	2 5	. 9	73 <0.	10 <0.01	.0 <0.01

# 06478500 JAMES RIVER NEAR SCOTLAND, SD--Continued

DATE	AME- TRYNE TOTAL (82184)	ATRA- ZINE, TOTAL (UG/L) (39630)	CHLOR- DANE, TOTAL (UG/L) (39350)	CHLOR- DANE, DIS- SOLVED (UG/L) (39352)	CYAN- AZINE TOTAL (UG/L) (81757)	DDD, TOTAL (UG/L) (39360)	DDD, DIS- SOLVED (UG/L) (39361)	DDE, TOTAL (UG/L) (39365)	DDE, DIS- SOLVED (UG/L) (39366)	DDT, TOTAL (UG/L) (39370)	DDT, DIS- SOLVED (UG/L) (39371)	DI- AZINON, TOTAL (UG/L) (39570)
MAY 17	<0.10	0.20	<0.1	<0.1	0.10	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
JUL 20	<0.10	0.10	<0.1	<0.1	<0.10	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
SEP 07	<0.10	0.10	<0.1	<0.1	<0.10	<0.010	<0.01	<0.010	<0.01	<0.010	<0.01	<0.01
DATE	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN TOTAL (UG/L) (39380)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	ENDO- SULFAN, TOTAL (UG/L) (39388)	ENDO- SULFAN DISSOLV (UG/L) (82354)	ENDRIN, TOTAL (UG/L) (39390)	SOLVEI (UG/L	ETHION, TOTAL (UG/L)		HEPTA- CHLOR, TOTAL (UG/L) (39410)	HEPTA- CHLOR, DIS- SOLVED (UG/L) (39411)	HEPTA- CHLOR EPOXIDE TOTAL (UG/L) (39420)
MAY 17	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.0	1 <0.01	<0.01	<0.010	<0.01	<0.010
JUL 20	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.0	1 <0.01	<0.01	<0.010	<0.01	<0.010
SEP 07	<0.01	<0.010	<0.01	<0.010	<0.01	<0.010	<0.0	1 <0.01	<0.01	<0.010	<0.01	<0.010
DATE	HEPTA- CHLOR EPOXIDE DIS- SOLVED (UG/L) (39421)	LINDANE TOTAL (UG/L) (39340)	LINDANE DIS- SOLVED (UG/L) (39341)	THION, TOTAL (UG/L)	SOLVEI (UG/L)	CHLOR TOTAL (UG/L	OXY- CHLOR DISSOI		METHYL PARA- THION, DIS- SOLVED (UG/L) (39602)	METHYL TRI- THION,	TRI- THION DISSOLV (UG/L)	MIREX, TOTAL (UG/L) (39755)
17	<0.01	<0.010	<0.01	<0.01	<0.01	<0.0	1 <0.0	01 <0.01	<0.01	<0.01	<0.01	<0.01
20 SEP	<0.01	<0.010	<0.01	<0.01	<0.01	<0.0	1 <0.0	01 <0.01	<0.01	<0.01	<0.01	<0.01
07	<0.01	<0.010	<0.01	<0.01	<0.01	<0.0	1 <0.0	01 <0.01	<0.01	<0.01	<0.01	<0.01
DA:	TE SC	OIS- TI OLVED TO IG/L) (1	ARA- THION, OTAL SUG/L) (	OLVED 1	JG/L) (	PCB, DIS- SOLVED (UG/L) (	TOTAL I	OISSOLV (UG/L)	THANE TOTAL DOCUMENT (UG/L)	HANE ISSOLV UG/L)	TONE TOTAL (UG/L)	PROME- TRYNE TOTAL (UG/L) 39057)
MAY 17	. <	0.01	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	<0.10	<0.1	<0.1
JUL 20		0.01	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	<0.10	<0.1	<0.1
SEP 07		0.01	<0.01	<0.01	<0.1	<0.1	<0.10	<0.10	<0.1	<0.10	<0.1	<0.1
DA:	TE TOT	CINE SINGLE SING	LVEX, OTAL T UG/L) (	ZINE 1 OTAL 1 UG/L) (	OTAL I	PHENE, TOTAL (UG/L)	TOX- LPHENE, DIS- SOLVED (UG/L) 39401)	TRI- T THION D (UG/L)	ISSOLV (UG/L)	TOTAL (UG/L) (	TOTAL UG/L)	,4,5-T TOTAL (UG/L) 39740)
MAY 17		0.10	<0.01	<0.10	<0.1	<1	<1.0	<0.01	<0.01	0.15	<0.01	<0.01
JUL 20		0.10	<0.01	<0.10	<0.1	<1	<1.0	<0.01	<0.01	0.13	<0.01	<0.01
SEP 07	. <	0.10	<0.01	<0.10	<0.1	<1	<1.0	<0.01	<0.01	0.06	<0.01	<0.01

#### 06478513 JAMES RIVER NEAR YANKTON, SD

LOCATION.--Lat 42°59'45", long 97°22'10", in NE½NW½ sec.5, T.94 N., R.55 W., Yankton County, Hydrologic Unit 10160011, on left bank at downstream side of highway bridge, 3.9 mi upstream from Beaver Creek, 17.2 mi upstream from mouth, and 9.0 mi northeast of Yankton.

DRAINAGE AREA. -- 20,942 mi<sup>2</sup>, of which 4,148 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- October 1981 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area. WDR SD-86-1: Drainage area.

GAGE. -- Water-stage recorder. Datum of gage is 1,153.38 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Low flow regulated by dams forming Arrowwood and Jim Lakes, combined capacity, 16,530 acre-ft, and by dam forming Jamestown Reservoir, capacity, 229,470 acre-ft, since May 1953, and by dam forming Pipestem Reservoir, capacity, 147,000 acre-ft, since 1973. Occasional backwater caused by Beaver Creek. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 860 ft3/s, 623,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 26,400 ft<sup>3</sup>/s, June 23, 1984, gage height, 24.34 ft; minimum daily discharge, 0.78 ft<sup>3</sup>/s, Oct. 4, 1981.

DISCHARGE, IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,220 ft<sup>3</sup>/s at 1415 hours, Apr. 20, gage height, 10.72 ft; minimum daily discharge, 7.6 ft<sup>3</sup>/s, Sept. 3.

MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN .TITT. AUG SEP 26 28 840 e30 e30 940 1160 1530 441 148 25 9.6 2 26 28 e35 e30 e25 1250 1520 402 142 22 8.2 e40 3 28 30 e35 1510 365 139 21 7.6 e30 e25 e40 1330 28 29 1500 334 132 19 10 e35 e30 e25 e40 1410 5 26 30 317 129 9.0 e35 e30 e25 e35 1480 1480 18 6 25 28 1460 294 95 16 e35 e30 e25 e35 1560 8 3 24 32 e35 e35 e20 e35 1630 1450 278 88 15 9.4 8 22 38 e30 e35 e20 e40 1690 1440 274 75 11 8.3 9 21 9.6 e30 e30 e20 e70 1740 1420 269 10 21 59 9.9 10 46 e30 e30 e20 e100 1800 1400 247 19 52 9.3 39 e30 e30 e25 e200 1850 1360 210 13 12 16 e30 e300 1320 202 52 15 41 e30 e25 1890 14 13 17 37 e35 192 44 14 e30 e30 e320 1950 1280 14 18 1250 15 13 14 34 e35 e30 2010 166 40 e35 e350 15 16 37 e35 e320 1220 150 52 17 11 e30 A35 2060 16 16 39 e33 21 10 e35 e35 e300 2120 1180 148 51 17 17 39 e33 e35 e35 e250 2150 1140 132 52 18 9.4 18 18 940 e33 e35 e35 e200 2180 1110 141 52 16 7.9 19 18 e35 e33 e35 e35 e250 2210 1100 141 50 18 8.9 2230 20 20 e35 e34 e35 e35 e300 1080 141 58 18 8.6 21 20 e30 e35 e35 e350 2220 1040 58 20 9.0 22 19 e30 e35 e35 e35 e450 2200 979 113 51 16 9.1 23 e30 e35 e35 e500 2140 904 103 45 7.1 e35 24 21 e30 e35 39 8.0 e600 2060 832 126 11 e35 e35 25 21 e30 773 129 35 e30 e35 e35 e650 1960 9.4 11 e700 26 20 e30 e35 1830 719 41 e30 e35 144 32 12 27 29 24 e35 e30 e35 e35 e750 1720 643 173 29 11 28 21 e30 e30 e35 e40 780 1650 583 168 26 20 13 29 22 e35 e30 e35 871 1590 531 162 34 14 13 30 23 e30 e35 ---483 155 32 9.4 12 e40 974 1550 9.5 31 26 e30 e40 1060 459 TOTAL 661 1033 1021 1025 34696 6258 1985 522.5 305.0 845 10950 54620 MEAN 21 3 34.4 32.9 33.1 30.2 353 1119 209 64 0 16.9 10.2 1821 MAX 28 48 40 1530 41 40 40 1060 2230 441 148 14 MIN 16 28 30 30 20 26 9.3 7.1 35 1160 459 103 3940 AC-FT 1310 2050 2030 2030 1680 21720 108300 68820 12410 1040 605

CAL YR 1988 TOTAL 47521.4 MEAN 130 MAX 840 MIN 5.7 AC-FT 94260 WTR YR 1989 TOTAL 113921.5 MEAN 312 MAX 2230 MIN 7.1 AC-FT 226000

e Estimated

# MISSOURI RIVER MAIN STEM

# 06478515 MISSOURI RIVER NEAR GAYVILLE, SD

# STAGE RECORDS

LOCATION.--Lat 42°51'01", long 97°13'12", in SWkNWk sec.27, T.93 N., R.54 W., Yankton County, Hydrologic Unit 10170101, 3.8 mi southwest of Gayville, 4.1 mi downstream from James River, and at mile 796.0.

PERIOD OF RECORD. -- October 1969 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,100.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers).

REMARKS.--Records good. Stage regulated by Gavins Point Dam 15.0 mi upstream. Gage heights for period of October 1969 to September 1980 in files of U.S. Army Corps of Engineers.

GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	48.57		45.71	45.63	46.07	45.53	47.92	48.39	48.49	48.55	48.55	48.40
2	48.56		45.72	45.85	46.29	45.38	47.93	48.40	48.43	48.37	48.57	48.41
3	48.57		45.69	45.63	46.41	45.57	47.93	48.44	48.48	48.28	48.54	48.45
4	48.58		45.69	45.65	47.27	47.36	47.91	48.41	48.45	48.47	48.53	48.37
5	48.75		45.67	45.63	48.32	48.90	47.92	48.35	48.43	48.18	48.51	48.16
6	48.72		45.67	45.62	48.42	47.99	48.02	48.34	48.52	48.02	48.49	48.05
7	48.74		45.65	45.51	47.98	46.91	48.15	48.37	48.55	48.40	48.51	48.04
8	48.78		45.63	46.74	48.24	45.74	48.12	48.38	48.51	48.28	48.51	47.92
9	48.79		45.64	46.63	48.14		48.19	48.46	48.53	48.16	48.52	47.63
10	48.80		45.60	46.28	47.24		48.30	48.51	48.56	48.43	48.54	47.53
11	48.85		45.57	46.19	46.69		48.40	48.58	48.56	48.38	48.54	47.74
12	48.85		45.68	45.74	46.44		48.41	48.57	48.53	48.39	48.54	47.94
13	48.91		45.61	45.75	46.24		48.36	48.59	48.42	48.50	48.53	47.98
14	48.95		45.52	45.79	46.20		48.35	48.59	48.49	48.53	48.51	48.02
15	48.93	46.05	45.60	45.66	46.18		48.39	48.58	48.54	48.54	48.49	48.08
16	48.91	45.98	45.71	45.62	46.16		48.37	48.60	48.54	48.55	48.49	48.09
17	48.90	45.94	45.75	45.58	46.12		48.36	48.59	48.58	48.56	48.51	48.16
18	48.84	45.94	45.59	45.60	45.94		48.43	48.57	48.53	48.54	48.54	48.22
19	48.85	45.89	45.62	45.57	45.79		48.49	48.55	48.57	48.48	48.52	48.17
20	48.82	45.88	45.62	45.58	45.87		48.53	48.54	48.66	48.26	48.49	48.20
21		45.84	45.62	45.60	45.84		48.53	48.57	48.56	48.45	48.55	48.21
22		45.82	45.64	45.58	45.83	45.02	48.55	48.55	48.52	48.24	48.53	48.18
23		45.73	45.55	45.56	45.83	45.15	48.53	48.54	48.52	48.15	48.55	48.27
24		45.78	45.55	45.57	45.62	45.78	48.53	48.45	48.53	48.44	48.55	48.31
25		45.71	45.60	45.57	45.38	46.40	48.50	48.47	48.44	48.36	48.55	48.29
26		45.74	45.78	45.57		46.93	48.45	48.45	48.16	48.28	48.53	48.35
27		45.73	45.50	45.57		47.41	48.44	48.42	48.40	48.46	48.42	48.39
28		45.71	46.04	45.52	45.64	47.77	48.45	48.51	48.20	48.47	48.37	48.34
29		45.70	46.33	45.56		47.88	48.39	48.43	48.21	48.55	48.27	48.34
30		45.69	46.08	45.54		47.86	48.41	48.38	48.55	48.54	48.29	48.38
31			45.66	45.64		47.90		48.45		48.53	48.34	
MEAN			45.69	45.73			48.31	48.48	48.48	48.40	48.50	48.15
MAX			46.33	46.74			48.55	48.60	48.66	48.56	48.57	48.45
MIN			45.50	45.51			47.91	48.34	48.16	48.02	48.27	47.53

# 06478530 LAKE THOMPSON NEAR OLDHAM, SD

# STAGE RECORDS

LOCATION.--Lat 44°13'24", long 97°26'46", in SW\sE\sW\sec.21, T.109 N., R.55 W., Kingsbury County, Hydrologic Unit 10170103, on right bank 8.9 river miles upstream from the stage station Lake Thompson near Ramona, SD (discontinued October 1988) and 6.75 mi west of Oldham.

DRAINAGE AREA. -- 472 mi 2.

PERIOD OF RECORD. -- October 1988 to September 1989.

GAGE. -- Water-stage recorder. Datum of gage is 1,683.25 ft above National Geodetic Vertical Datum of 1964.

REMARKS.--Published records good. Because of the large surface area of the lake, wind conditions have a drastic affect on stage at this point; such as a northerly wind increasing the stage and a southerly wind decreasing the stage.

	GAGE HEIGHT, IN FEET, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES											
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1		4.58	4.54	4.53	4.47	4.49	4.83	4.79	4.61	4.65	4.37	3.98
2		4.52	4.54	4.53	4.48	4.50	4.83	4.80	4.60	4.63	4.27	3.92
3		4.57	4.55	4.53	4.47	4.56	4.83	4.75	4.61	4.64	4.32	3.82
4		4.58	4.54	4.53	4.47	4.60	4.85	4.75	4.60	4.65	4.35	3.93
5		4.60	4.54	4.53	4.47	4.59	4.84	4.75	4.58	4.58	4.34	3.86
6		4.61	4.54	4.53	4.48	4.58	4.84	4.75	4.59	4.61	4.29	3.85
7		4.56	4.54	4.53	4.48	4.59	4.82	4.71	4.57	4.59	4.26	3.90
8		4.53	4.54	4.53	4.47	4.59	4.83	4.67	4.59	4.55	4.22	3.89
9		4.53	4.53	4.53	4.48	4.59	4.84	4.73	4.57	4.54	4.18	3.88
10		4.55	4.53	4.52	4.48	4.60	4.82	4.71	4.51	4.54	4.14	3.86
11		4.44	4.53	4.52	4.47	4.61	4.81	4.63	4.51	4.51	4.14	3.90
12		4.55	4.53	4.52	4.47	4.63	4.80	4.65	4.56	4.53	4.20	3.87
13		4.58	4.53	4.52	4.49	4.63	4.77	4.68	4.56	4.52	4.25	3.84
14		4.57	4.53	4.52	4.48	4.71	4.79	4.67	4.54	4.48	4.24	3.81
15		4.55	4.52		4.48	4.72	4.73	4.67	4.50	4.48	4.23	3.78
16		4.65	4.52		4.48	4.72	4.76	4.63	4.46	4.45	4.19	3.79
17		4.58	4.52	4.43	4.48	4.74	4.75	4.63	4.47	4.43	4.14	3.76
18		4.57	4.52	4.45	4.50	4.75	4.77	4.68	4.51	4.58	4.05	3.65
19		4.59	4.53	4.46	4.50	4.75	4.74	4.69	4.44	4.58	4.10	3.75
20		4.57	4.52	4.48	4.51	4.75	4.76	4.69	4.30	4.56	4.12	3.79
21		4.56	4.52	4.47	4.51	4.75	4.74	4.67	4.49	4.55	4.07	3.79
22		4.56	4.52	4.48	4.51	4.75	4.65	4.68	4.54	4.52	4.09	3.79
23		4.56	4.52	4.47	4.51	4.74	4.70	4.69	4.52	4.50	4.08	3.75
24		4.55	4.51	4.46	4.51	4.75	4.73	4.62	4.50	4.48	4.01	3.61
25		4.55	4.51	4.46	4.51	4.77	4.73	4.66	4.52	4.45	4.00	3.70
26		4.58	4.53	4.46	4.51	4.80	4.76	4.65	4.71	4.44	4.03	3.66
27	4.58	4.68	4.53	4.46	4.51	4.80	4.77	4.58	4.70	4.45	4.02	3.52
28	4.62	4.55	4.53	4.45	4.51	4.79	4.77	4.52	4.67	4.41	4.01	3.61
29	4.59	4.54	4.53	4.45		4.82	4.80	4.59	4.64	4.43	4.01	3.63
30	4.51	4.54	4.53	4.46		4.83	4.79	4.62	4.67	4.44	3.92	3.51
31	4.55		4.54	4.47		4.82		4.61		4.42	3.93	
MEAN		4.56	4.53		4.49	4.69	4.78	4.67	4.55	4.52	4.15	3.78
MAX		4.68	4.55		4.51	4.83	4.85	4.80	4.71	4.65	4.37	3.98
MIN		4.44	4.51		4.47	4.49	4.65	4.52	4.30	4.41	3.92	3.51

#### 06478535 EAST FORK VERMILLION RIVER NEAR RAMONA, SD

LOCATION.--Lat 44°06'35", long 97°23'13", in NEWNWWNW sec.1, T.107 N, R.55 W, Miner County, Hydrologic Unit 10170103, near right downstream wingwall of bridge, 8.3 mi west of Ramona, and 1.9 mi downstream from Lake Thompson outlet.

DRAINAGE AREA. -- 509 mi<sup>2</sup>, revised.

PERIOD OF RECORD. -- November 1986 to September 1989 (discontinued).

GAGE. -- Water-stage recorder. Datum of gage is 1,678.46 ft above National Geodetic Vertical Datum of 1967.

REMARKS.--Record good except those for estimated daily discharges, which are poor. Because of the large surface area of Lake Thompson, wind conditions have a drastic effect on outflow, such as a northerly wind increasing the discharge and a southerly wind decreasing the discharge. There is also some inflow from unnamed tributaries between Lake Thompson and this gage. Several observations of water temperature and specific conductance were made during the year.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 90 ft<sup>3</sup>/s, Mar. 24, 1987, gage height, 6.17 ft; maximum gage height, 6.64 ft, Mar. 5, 1988, backwater from ice; no flow for many days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3.0 ft<sup>3</sup>/s at 1330 hours, Mar. 24, gage height, 4.76 ft, backwater from ice; no flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES TIIN .IIII. AUG SEP DAY OCT NOV DEC APR MAY JAN FEB MAR nn .00 00 00 00 .00 .00 .03 00 00 nn nn .00 .00 .00 .00 .00 .00 .04 .00 .00 .00 .00 .00 .00 .00 e.02 .00 e.02 .00 .00 .00 .00 .00 .00 .00 .00 e.02 .00 .00 e.02 .00 .00 6 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .03 .00 .00 .00 .00 .00 8 .00 .00 .00 .00 .00 .00 . 03 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 00 .01 .00 .00 .00 .00 .00 10 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 e.01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 11 .00 e.01 00 .00 .15 .00 12 .00 .09 .00 .00 .00 .00 .01 .00 .00 13 .00 .01 .00 .00 .00 .00 .02 .00 .00 .00 00 14 .00 .00 .00 .00 .00 .00 .01 .00 00 .00 00 .00 15 .00 .00 .00 .00 .00 .00 .06 .00 .00 .00 .00 .00 16 .00 .00 .00 .00 .00 .00 .02 .00 .00 .00 .00 .00 17 .00 .08 .00 .00 .00 .00 .00 .00 .00 .00 .02 .00 .00 .00 18 .00 .00 .00 .00 .00 .00 .01 .00 .00 .04 19 .00 .00 .00 .02 .00 .00 .00 .00 .00 .00 .00 .00 20 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .00 .00 21 .00 00 00 00 00 00 02 00 .00 .00 .00 .00 .00 22 .00 .00 .00 .00 .00 .00 .00 .06 .00 .00 .00 00 00 23 .00 .00 .00 .00 .00 .00 .03 00 24 .00 .00 .00 .00 .00 e2.0 .02 .00 .00 .00 00 .00 25 .00 .00 .00 .00 .00 e1.0 .00 .00 .00 .00 .00 .00 26 .00 .00 .00 .00 .00 e1.0 .00 . 51 .00 .00 .00 27 .00 .00 .00 .00 .00 e.50 .00 .00 .69 .00 .00 .00 .15 28 .00 .00 .00 .00 .00 .20 .03 .00 .00 .00 .00 29 .00 .00 .00 .00 .08 .02 .00 .00 .00 .00 .00 30 .00 e.02 .00 .00 .00 .00 .00 .00 .00 .00 .00 .02 .00 .00 .00 31 .00 .00 0.00 0.12 0.15 0.00 TOTAL. 0 10 0.00 0 00 0.00 4.82 0 64 0.00 1.35 .004 .005 .00 .00 045 MEAN .00 .003 .00 .00 .16 .021 .00 .69 .08 .15 .00 MAX .00 .09 .00 00 .00 2.0 .06 00 MIN .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .0 AC-FT .0 9.6 1.3 2.7 .0 . 0 . 0 . 0

CAL YR 1988 TOTAL 634.17 MEAN 1.73 MAX 35 MIN .00 AC-FT 1260 WTR YR 1989 TOTAL 7.18 MEAN .020 MAX 2.0 MIN .00 AC-FT 14

e Estimated

# 06478540 LITTLE VERMILLION RIVER NEAR SALEM, SD (Hydrologic bench-mark station)

LOCATION.--Lat 43°47'39", long 97°22'02", in SWk sec.19, T.104 N., R.54 W., McCook County, Hydrologic Unit 10170102, on right bank near downstream end of culvert on county highway, 2.0 mi upstream from small left-bank tributary, and 5.2 mi northeast of Salem.

DRAINAGE AREA. -- 78.6 mi<sup>2</sup>, revised.

PERIOD OF RECORD . -- October 1966 to current year.

REVISED RECORDS .-- WDR SD-84-1: Drainage area.

GAGE. -- Water-stage recorder and concrete dam. Elevation of gage is 1,510 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--23 years, 4.51 ft<sup>3</sup>/s, 3,270 acre-ft/yr; median of yearly mean discharges, 1.9 ft<sup>3</sup>/s, 1,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 900 ft<sup>3</sup>/s, June 20, 1984, gage height, 9.88 ft, backwater from tributary; no flow for many days each year.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 10 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 13	0015	10	a*5.19	Mar. 27	0430	*20	5.05

a Backwater from ice. No flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT NOV SEP DEC JAN FEB MAR APR MAY TUN. JIII. AUG .00 .00 .00 .00 .00 e.00 1.3 .00 .00 .00 .00 .00 2 .00 .00 .00 .00 .00 e.00 .86 .00 .00 .00 .00 .00 3 .00 .00 .00 .00 .00 e.00 .61 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .36 5 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .00 .00 .27 6 .00 .00 .00 .00 .00 e.00 .21 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .00 .19 8 .00 .00 .00 .19 .00 .00 .00 .00 .00 e.06 .00 .00 .00 9 .00 .00 .00 .00 .00 e.11 .09 .00 .00 .00 .00 10 .00 .00 .00 .00 .00 .00 e.60 .03 .00 .00 .00 .00 .00 .00 11 .00 .00 .00 e1.5 .02 .00 .00 .00 .00 .00 12 .00 .00 .00 .00 .00 e7.0 .02 .00 .00 .00 .00 .00 .00 13 .00 .00 .00 .00 e8.0 .02 .00 .00 .00 .00 .00 14 .00 .00 .00 .00 .00 e10 .01 .00 .00 .00 .00 .00 15 .00 .00 .00 .00 .00 e3.0 .01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .01 .00 .00 .00 .00 .00 e.50 17 .00 .00 .00 .00 .00 .00 e.10 . 0 .00 .00 .00 .00 18 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 e.00 .00 19 .00 .00 .00 .00 .00 .00 e.00 .00 00 .00 .00 .00 20 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .00 .00 .00 .00 21 .00 .00 .00 .00 .00 e.01 .00 .00 .00 .00 .00 e.10 22 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 23 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .88 .00 24 .00 .00 .00 .00 .00 1.4 .00 .00 .00 .00 .00 25 .00 .00 .00 .00 .00 .85 .00 .00 .00 .00 .00 .00 26 .00 .00 .00 .00 e.00 .00 .00 .00 .00 .00 .00 6.2 27 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .00 .00 18 28 .00 .00 .00 .00 .00 .00 e.00 .00 .00 .00 .00 13 29 .00 .00 .00 7.6 .00 .00 .00 .00 ---.00 .00 .00 30 .00 .00 .00 ---.00 .00 .00 00 .00 .00 .00 31 .00 .00 .00 ---2.2 ---.00 .00 .00 TOTAL. 0.00 0.00 0.00 0.00 0.00 85.51 4.20 0.00 0.00 0.00 0.00 0.00 .00 2.76 MEAN .00 .00 .00 .00 .00 .14 .00 .00 .00 .00 MAX .00 .00 .00 .00 .00 18 1.3 .00 .00 .00 .00 .00 .00 MIN .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 AC-FT . 0 .0 .0 .0 .0 170 8.3 .0 . 0 .0 . 0

CAL YR 1988 TOTAL 57.07 MEAN .16 MAX 4.0 MIN .00 AC-FT 113 WTR YR 1989 TOTAL 89.71 MEAN .25 MAX 18 MIN .00 AC-FT 178

e Estimated

# 06478690 WEST FORK VERMILLION RIVER NEAR PARKER, SD

LOCATION.--Lat 43°24'55", long 97°12'18", in NE\hek sec.10, T.99 N., R.54 W., Turner County, Hydrologic Unit 10170102, on right bank 10 ft downstream from bridge (revised), 3.7 mi northwest of Parker, and 13.9 mi upstream from confluence with East Fork Vermillion River.

DRAINAGE AREA. -- 377 mi<sup>2</sup>, revised.

PERIOD OF RECORD, -- August 1961 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,340 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to Oct. 11, 1973, nonrecording gage and crest-stage gage at same site and datum.

REMARKS. -- Records poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--28 years, 33.5 ft<sup>3</sup>/s, 24,270 acre-ft/yr; median of yearly mean discharges, 9.0 ft<sup>3</sup>/s, 6,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 4,800 ft<sup>3</sup>/s, June 16, 1984, gage height, 12.57 ft; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 11	1030	*100	a*4.81				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow for many days.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e3.0	e.02	e.08	e.00	e.03	e.00	e6.0	e.90	e.35	.00	.00	.00
2	e1.0	e.02	e.08	e.00	e.02	e.00	e6.0	e.80	e.30	.00	.00	.00
3	e.50	e.03	e.11	e.00	e.01	e.00	e6.0	e.60	e.28	.00	.00	.00
4	e.20	e.03	e.08	e.00	e.00	e.00	e5.5	e.50	e.25	.00	.00	.00
5	e.15	e.03	e.11	e.00	e.00	e.00	e4.8	e.40	e.22	.00	.00	.00
6	e.10	e.03	e.12	e.00	e.00	e.00	e4.2	e.30	e.18	.00	.00	.00
7	e.09	e.04	e.09	e.00	e.00	e.00	e3.6	e.30	e.16	.00	.00	.00
8	e.08	e.04	e.05	e.00	e.00	e.00	e3.0	e.20	e.14	.00	.00	.00
9	e.08	e.04	e.05	e.00	e.00	e.01	e2.7	e.17	e.13	.00	.00	.00
10	e.07	e.04	e.04	e.00	e.00	e1.0	e2.2	e.13	e.10	.00	.00	.00
11	e.07	e.16	e.04	e.00	e.00	e90	e2.0	e.10	e.09	.00	.00	.00
12	e.06	e.31	e.04	e.00	e.00	e70	e1.8	e.08	e.08	.00	.00	.00
13	e.06	e.31	e.04	e.00	e.00	e40	e1.7	e.06	e.06	.00	.00	.00
14	e.06	e.27	e.05	e.00	e.00	e34	e1.6	e.04	e.06	.00	.00	.00
15	e.05	e.28	e.05	e.00	e.00	e20	e1.4	e.02	e.05	.00	.00	.00
16	e.05	e.27	e.04	e.01	e.00	e20	e1.2	e.02	e.04	.00	.00	.00
17	e.05	e.25	e.03	e.02	e.00	e20	e1.3	e.09	e.03	.00	.00	.00
18	e.05	e.24	e.03	e.02	e.00	e25	e1.3	e.15	e.03	.00	.00	.00
19	e.04	e.23	e.04	e.02	e.00	e24	e1.3	e.20	e.02	.00	.00	.00
20	e.04	e.23	e.04	e.03	e.00	e24	e1.2	e.15	e.02	.00	.00	.00
21	e.04	e.24	e.04	e.03	e.00	e23	e1.2	e.09	e.01	.00	.00	.00
22	e.04	e.27	e.04	e.03	e.00	e20	e1.1	e.06	e.01	.00	.00	.00
23	e.04	e.27	e.04	e.04	e.00	e18	e1.1	e.04	e.00	.00	.00	.00
24	e.03	e.26	e.04	e.04	e.01	e23	e1.0	e.03	e.00	.00	.00	.00
25	e.03	e.23	e.04	e.04	e.10	e30	e1.0	e.02	e.00	.00	.00	.00
26	e.03	e.20	e.04	e.02	e.03	e31	e1.0	e.02	e.00	.00	.00	.00
27	e.03	e.17	e.03	e.03	e.01	e21	e1.0	e.02	.00	.00	.00	.00
28	e.03	e.14	e.02	e.04	e.00	e11	e.90	e.01	.00	.00	.00	.00
29	e.02	e.11	e.01	e.03		e8.0	e.90	e.01	.00	.00	.00	.00
30	e.02	e.09	e.00	e.05		e7.0	e.90	e.07	.00	.00	.00	.00
31	e.02		e.00	e.05		e6.0		e.40		.00	.00	
TOTAL	6.13	4.85	1.51	0.50	0.21	566.01	68.90	5.98	2.61	0.00	0.00	0.00
MEAN	.20	.16	.049	.016	.007	18.3	2.30	.19	.087	.00	.00	.00
MAX	3.0	.31	.12	.05	.10	90	6.0	. 90	.35	.00	.00	.00
MIN	.02	.02	.00	.00	.00	.00	.90	.01	.00	.00	.00	.00
AC-FT	12	9.6	3.0	1.0	. 4	1120	137	12	5.2	.0	. 0	.0
							7.					

CAL YR 1988 TOTAL 2858.21 MEAN 7.81 MAX 190 MIN .00 AC-FT 5670 WTR YR 1989 TOTAL 656.70 MEAN 1.80 MAX 90 MIN .00 AC-FT 1300

e Estimated

#### 06479010 VERMILLION RIVER NEAR VERMILLION. SD

LOCATION.--Lat 42°49'02", long 96°55'26", in SE\sE\nW\sec.1, T.92 N., R.52 W., Clay County, Hydrologic Unit 10170102, on left bank 30 ft downstream from bridge, 2.7 mi north of Vermillion, 2.9 mi upstream from Clay Creek, and 10.8 mi upstream from mouth.

DRAINAGE AREA. -- 2,302 mi<sup>2</sup>, revised.

PERIOD OF RECORD . -- October 1983 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 1,125 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor and Apr. 25 to July 12, which are fair. U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 6 years, 413 ft3/s, 299,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 21,400 ft<sup>3</sup>/s, June 23, 1984, gage height, 31.77 ft; minimum daily discharge, 4.9 ft<sup>3</sup>/s, Aug. 25, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

		Discharge	Gage height			Discharge (ft <sup>3</sup> /s)	Gage height
Date	Time	$(ft^3/s)$	(ft)	Date	Time	$(ft^3/s)$	(ft)
Mar. 13	0800	*450	a*9.41				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 4.9 ft<sup>3</sup>/s, Aug. 25.

MEAN VALUES DAY AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN .TITT. 18 18 e20 e18 e13 e8.5 111 37 19 30 8.9 2 18 17 e20 37 18 23 8.1 17 **e18** e10 e8.5 113 3 18 18 e20 e9.0 36 17 19 8.2 14 e17 e8.0 109 20 920 8.1 13 17 e17 e8.0 e7.0 97 35 16 16 5 21 16 e20 e17 e8.0 e6.5 89 35 16 13 8.5 10 6 12 7.5 16 19 e20 e17 e8.0 e6.5 83 33 16 8.8 7 15 19 e20 e17 e6.5 79 31 16 11 7.8 11 e8.0 8 16 19 e20 e16 e7.0 30 16 11 7.9 10 e8.0 9 16 20 e19 e10 70 30 10 7.5 9.0 e9.0 10 16 19 67 29 13 9.9 7.1 8.2 e18 e14 e9.0 e30 15 19 9.9 20 11 e17 e15 e10 e100 64 27 13 6.6 12 14 23 e18 e15 e300 26 14 9.9 7.3 59 e10 62 15 13 25 e20 16 7.9 50 e15 e10 e400 59 24 11 15 26 23 7.3 40 14 e19 e15 e300 56 17 11 e10 15 7.1 31 16 e20 e18 e15 53 24 16 14 e10 e230 16 15 e20 7.0 25 e19 e15 e10 e200 52 23 14 12 17 16 e20 e20 e15 e10 e140 49 22 13 12 6.5 19 18 16 e23 e20 e15 e10 e130 49 21 13 12 5.8 16 19 15 26 e21 e15 e9.0 e120 47 23 14 11 6.2 13 20 17 e21 e22 e15 e100 45 22 10 6.4 21 19 e20 e20 e15 e9.0 43 21 13 6.0 10 115 22 18 24 e20 e15 e8.5 149 40 20 13 27 5.7 9.1 18 24 e20 135 20 13 20 5.5 7.5 e15 e8.0 38 24 e22 5.1 7.2 17 24 19 13 16 e15 e7.0 122 36 25 17 25 4.9 7.7 e21 A15 e7.5 116 37 18 14 13 26 16 e23 37 16 7.5 7 2 e20 e15 e8.0 113 18 11 27 19 e22 e22 e14 e8.0 126 37 18 19 10 7.0 5.8 28 17 e20 e20 e14 e8.0 133 38 19 19 9.2 54 5.8 29 16 e20 e19 e14 136 38 19 17 13 146 5.7 ---30 16 e20 e18 e13 126 37 18 20 11 69 5.8 31 18 ---9.4 39 e18 e13 18 TOTAL 511 635 611 472 252.0 1809 776 462 439.3 497.4 481.8 3508.5 16.1 MEAN 16.5 21.2 19.7 16.0 15.2 9.00 60.3 25.0 15.4 14.2 113 32 59 MAX 19 26 22 37 20 146 18 13 400 113 17 MIN 17 7.0 9.2 4.9 5 7 14 13 6 5 36 18 13 1540 871 987 956 AC-FT 1010 1260 1210 936 500 6960 3590 916

CAL YR 1988 TOTAL 27562.8 MEAN 75.3 MAX 551 MIN 9.9 AC-FT 54670 WTR YR 1989 TOTAL 10455.0 MEAN 28.6 MAX 400 MIN 4.9 AC-FT 20740

e Estimated

# 06479215 BIG SIOUX RIVER NEAR FLORENCE. SD

LOCATION.--Lat 45°10'51", long 97°11'09", in NE%NE%NE% sec.17, T.120 N., R.52 W., Grant County, Hydrologic Unit 10170202, on right bank near downstream side of county highway bridge, 11.0 mi northeast of Florence, and 2.2 mi upstream from Indian Creek.

DRAINAGE AREA.--638  $\mathrm{mi}^2$ , of which 570  $\mathrm{mi}^2$  is partly or entirely noncontributing.

PERIOD OF RECORD. -- June 6, 1984, to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,780 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 5 years, 55.6 ft3/s, 8,040 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 1,810 ft<sup>3</sup>/s, Mar. 29, 1986, gage height, 9.08 ft; no flow Aug. 9-11, 1985.

EXTREMES FOR CURRENT YEAR, -- Peak discharges greater than base discharge of 40 ft<sup>3</sup>/s and maximum (\*):

D	m.,	Discharge	Gage height			Discharge	Gage height
Date	Time	(ft <sup>3</sup> /s)	(ft)	Date	Time	(ft <sup>3</sup> /s)	(ft)
Mar. 11		250	a	Mar. 27	1145	*500	a*8.34

DISCHARGE. IN CUBIC FEET PER SECOND. WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 0.01 ft<sup>3</sup>/s, Oct. 1-31 and Aug. 5-9.

		DISCHAR	GE, IN CO.	DIC FEEL		MEAN VALUE		DEK 1900	TO SEFIEM	DEK 1909		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.01	.02	e.07	e.05	e.10	e.07	66	24	1.1	.08	.05	.79
2	.01	.02	e.08	e.04	e.07	e.06	47	20	1.0	.07	.03	.68
3	.01	.03	e.09	e.04	e.05	e.06	38	17	1.0	.05	.02	. 52
4	.01	.03	.11	e.05	e.04	e.06	36	16	. 83	.05	.02	. 43
5	.01	.03	.12	e.05	e.04	e.07	31	16	.74	.04	.01	.38
6	.01	.03	. 12	e.05	e.04	e.09	26	15	. 68	.03	.01	.31
7	.01	.04	e.11	e.05	e.04	e.10	22	13	.61	.04	.01	.24
8	.01	.04	e.09	e.04	e.05	e.15	21	11	. 50	.04	.01	.15
9	.01	.04	e.07	e.04	e.05	e.40	18	11	.46	.04	.01	.11
10	.01	.05	e.05	e.03	e.05	e5.0	16	9.3	. 43	.04	.03	.10
11	.01	.06	e.06	e.03	e.05	e220	13	8.2	.37	.05	.03	.12
12	.01	.08	e.06	e.04	e.05	e180	11	7.3	.34	.05	.03	.10
13	.01	.09	e.07	e.04	e.06	e140	10	6.5	.29	.05	.10	.10
14	.01	.09	e.07	e.05	e.06	e60	9.2	5.9	.28	.04	.06	.10
15	.01	.09	e.05	e.05	e.06	e20	8.1	5.3	.26	.04	.05	.08
16	.01	e.07	e.05	e.06	e.05	e5.0	7.4	4.6	.21	.05	.04	.07
17	.01	e.06	e.05	e.07	e.04	e2.0	6.8	4.5	.21	.05	.03	.06
18	.01	e.05	e.06	e.07	e.04		6.5	4.7	.22	.07	.02	.04
19	.01	e.05	e.07	e.08	e.04	e.40	6.3	4.6	. 18	.07	.88	.04
20	.01	e.04	e.07	e.08	e.04	e.45	6.0	4.3	.15	.05	.24	.07
21	.01	e.05	e.07	e.09	e.04	e.55	5.7	4.0	.16	.05	.11	.17
22	.01	e.06	e.07	e.10	e.04	e.70	5.3	3.7	. 15	.05	.08	.14
23	.01	e.07	e.07	e.09	e.05	e35	4.8	3.6	. 13	.04	.06	. 10
24	.01	e.09	e.06	e.08	e.06	e100	4.9	3.2	. 12	.05	.04	.40
25	.01	e.08	e.04	e.08	e.08	e200	6.1	2.6	. 15	.05	.04	6.0
26	.01	e.08	e.04	e.08	e.07	e350	7.9	2.2	.22	.04	.30	7.7
27	.01	e.07	e.04	e.09	e.07	e460	11	1.9	. 17	.03	.25	5.6
28	.01	e.06	e.03	e.10	e.07	189	17	1.5	. 13	.02	.14	3.4
29	.01	e.06	e.04	e.11		109	25	1.3	.10	.34	.09	2.0
30	.01	e.06	e.05	e.12		84	24	1.2	.09	.12	.09	1.2
31	.01		e.05	e.13		69		1.1		.06	.32	
TOTAL	0.31	1.69	2.08	2.08	1.50	2231.86	517.0	234.5	11.28	1.85	3.20	31.20
MEAN	.010	.056	.067	.067	.054	72.0	17.2	7.56	.38	.060	.10	1.04
MAX	.01	.09	.12	.13	.10	460	66	24	1.1	.34	.88	7.7
MIN	.01	.02	.03	.03	.04	.06	4.8	1.1	.09	.02	.01	.04
AC-FT	.6	3.4	4.1	4.1	3.0	4430	1030	465	22	3.7	6.3	62
110 11	. 0	5.4	7.1	7.1	3.0	4430	1030	403	22	0.,	0.0	02

CAL YR 1988 TOTAL 221.90 MEAN .61 MAX 13 MIN .01 AC-FT 440 WTR YR 1989 TOTAL 3038.55 MEAN 8.32 MAX 460 MIN .01 AC-FT 6030

e Estimated

# 06479438 BIG SIOUX RIVER NEAR WATERTOWN, SD

LOCATION.--Lat 45°00'22", long 97°09'53", in NE\nE\nE\sec.16, T.118 N., R.52 W., Codington County, Hydrologic Unit 10170202, on left bank at downstream side of county highway bridge, 4.9 mi downstream from Mahoney Creek, 6.5 mi upstream from inlet-outlet to Lake Kampeska, and 7.5 mi northwest of Watertown.

DRAINAGE AREA. -- 1,007 mi<sup>2</sup>, of which 779 mi<sup>2</sup> is probably noncontributing.

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

REVISED RECORDS .-- WDR SD-78-1: 1973-74(M). 1976-77(M). WDR SD-84-1: Drainage area.

GAGE. -- Water-stage recorder. Datum of gage is 1,725.81 ft above National Geodetic Vertical Datum of 1929 (South Dakota Department of Transportation bench mark).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--17 years, 24.7 ft<sup>3</sup>/s, 17,900 acre-ft/yr; median of yearly mean discharge, 13 ft<sup>3</sup>/s, 9,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 4,970 ft<sup>3</sup>/s, Mar. 30, 1986, gage height, 11.08 ft; no flow at times in 1974-82, 1984, 1988-89.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 300 ft 3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 11 Mar. 24	1030	500	a *9.09	Mar. 27	1015	*900	a8.98

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow Oct. 2, 24-26.

MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AIIG SEP .02 .02 e.20 e.65 e.30 64 6.0 1.2 .26 .23 2 .00 .01 e.20 e.17 e.50 e.25 94 55 5.1 1.0 .26 .26 3 .02 .01 e.35 e.17 e.35 e.25 75 46 4.8 .93 .25 .47 . 04 .02 e.52 e.20 e.25 e.25 62 41 4.6 . 87 .22 2.1 5 .05 .03 .75 e.20 e.25 e.30 53 39 4.1 .87 .19 2.3 6 .07 .06 .87 e.20 e.25 e.35 48 38 3.5 .84 .17 1.4 e.20 .76 .71 .06 .10 . 87 e.25 e.40 3.5 .16 34 43 . 57 8 .07 e.70 .09 e.65 e.17 e.30 36 31 3.2 .74 .14 . 57 9 . 07 .09 e.50 e.17 e.30 e1.5 30 29 3.0 . 73 . 14 10 .04 .12 e.30 e.15 e.30 e20 30 26 2 9 68 .15 62 .87 11 .05 e.25 e.15 e.30 e400 29 24 2.9 68 .18 e300 12 .05 .14 e.30 e.18 e.30 26 22 2.7 .68 .23 .84 e.18 .50 13 .04 .15 e.35 e.40 e200 20 2.7 .57 .74 14 .04 .16 e.30 e.20 e.40 e150 22 18 2.8 .39 .51 .54 15 .04 e.23 e.20 21 16 3.1 e.40 e60 16 .05 e.11 e.23 e.23 20 15 2.7 . 26 .21 .42 e.30 e20 17 .04 e.23 e.30 2.5 . 23 .19 .35 e.10 e.20 e8.0 20 14 e.25 .03 e.09 .30 18 e.30 19 .17 .41 e.20 e5.0 37 19 .03 e.09 e.30 e.20 .30 . 19 e.35 e3 0 18 15 2.5 20 .30 . 03 e.08 e.30 e.35 e.20 e4.0 18 15 2.3 . 30 . 17 .17 .30 21 .01 e.09 1.9 .25 e.30 e.40 e.20 e5.0 17 13 22 .04 e.10 e.30 e.50 e.20 e8.0 12 1.8 .23 .16 .26 18 23 e.25 .02 e.11 e.30 e.45 17 11 1.6 .22 .16 .24 e60 24 .00 e.12 e.25 e.40 e.30 e200 16 10 1.6 .19 . 17 .41 25 .00 e.13 e.20 e.40 e.35 e400 21 9.0 1.8 .17 .17 .33 26 .00 e.15 e.20 e.40 e.30 e600 33 7.6 2.0 .17 .21 .26 27 .02 e.20 7.7 1.7 .17 .23 .34 e.15 e.45 e.30 e800 40 28 .03 .17 . 23 .39 e.14 e.15 e.50 e.30 e611 46 6.6 1.5 29 . 23 .60 .29 .03 e.14 e.16 e.60 ---289 58 6.2 1.5 .30 30 ---.33 .03 . 40 e.15 e.20 e.70 186 64 6.2 1.3 .25 31 .03 e.20 e.80 ---149 ---6.2 . 29 TOTAL. 6.86 17.65 1.05 3.01 10.37 9.87 8.50 4482.30 1132 672.5 84.3 15.48 . 59 .22 MEAN .034 .10 .33 .32 .30 145 37.7 21.7 2.81 . 50 2.3 MAX .07 .16 .87 .80 .65 800 114 64 6.0 1.2 . 51 MIN .00 .01 .15 .20 . 25 16 6.2 1.3 .17 .23 31 AC-FT 2.1 6.0 21 20 17 8890 2250 1330 167 14 35

CAL YR 1988 TOTAL 1565.90 MEAN 4.28 MAX 90 MIN .00 AC-FT 3110 WTR YR 1989 TOTAL 6443.89 MEAN 17.7 MAX 800 MIN .00 AC-FT 12780

e Estimated

# 06479525 BIG SIOUX RIVER NEAR CASTLEWOOD, SD

LOCATION.--Lat 44°43'54", long 97°02'39", in SW\sW\sec.26, T.115 N., R.52 W., Hamlin County, Hydrologic Unit 10170202, on right bank at upstream side of highway bridge on State Highway 22, 3.25 mi east of intersection of U.S. Highway 81 and State Highway 22, and 1.0 mi northwest of Castlewood.

DRAINAGE AREA. -- 1,997 mi<sup>2</sup>, of which 1,427 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- October 1976 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE. --Water-stage recorder. Datum of gage is 1,667.52 ft above National Geodetic Vertical Datum of 1929 (South Dakota Department of Transportation bench mark).

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--13 years, 61.9 ft<sup>3</sup>/s, 44,850 acre-ft/yr; median of yearly mean discharges, 35 ft<sup>3</sup>/s, 25,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 2,250 ft<sup>3</sup>/s, Mar. 30, 1986, gage height, 11.73 ft; no flow for many days in most years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 450 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 25	0045	*400	a*9.81				

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 0.77 ft<sup>3</sup>/s, Aug. 3.

MEAN VALUES DAY OCT NOV DEC JUN JUL AUG SEP JAN FEB APR MAY 1 4.4 6.0 e4.5 e3.5 e3.5 e2.2 78 33 7.2 2.5 4.4 7.5 2.2 1.6 3.6 5.8 e5.0 e3.0 e2.7 e2.0 57 28 6.7 5.4 3 2.0 4.2 3.2 6.2 e5.0 e3.0 e2.5 e2.0 43 23 6.2 .77 7.3 2.9 20 6.2 2.8 3.5 8.6 e5.0 e3.0 e2.0 e2.0 38 5 3.1 7.3 2 4 44 e5.0 e3.3 e2.0 e2.2 32 24 6.0 6 3.2 6.0 e5.0 e3.0 e2.0 e2.2 30 6.0 2.5 12 3.5 5.9 e5.0 e2.8 e2.0 e2.2 30 15 5.8 1.4 2.4 7.6 8 3.7 6.0 e4.7 e2.7 e2.0 e2.3 5.6 1.2 1.2 6.2 e31 9 4.1 5.9 e4.3 e2.7 16 5.5 1.3 1.3 5.9 e2.0 e3.6 e31 10 3.8 e2.0 e15 31 6.9 e150 8.3 e2.0 24 6.4 12 3.9 11 e4.0 e2.7 21 11 5.6 8.1 11 11 e2.0 e140 13 10 e2.8 20 5.7 7.9 10 6.1 4.1 84.4 e2.0 e100 9.6 5.7 4.6 8.5 e5.0 e3.0 19 9.0 5.8 23 5.0 e2.0 e60 4.5 5.3 7.1 4.8 e4.7 e3.0 e2.0 e33 17 8.8 17 3.5 16 5.1 6.1 e4.5 e3.2 e2.0 8.5 4.0 13 e20 4.4 17 9.5 4.9 e5.6 e4.5 e3.3 e1.8 e13 17 8.4 3.9 2.4 4.4 18 4.7 e5.5 e5.0 e3.3 e1.8 e8.0 17 9.7 4.3 20 6.8 4.3 19 4.5 e5.5 e5.0 e3.3 e6.0 6.9 32 11 4.2 20 e5.3 e5.0 e3.3 e1.7 e5.0 13 9.5 4.4 11 31 4.4 21 4.8 e5.5 e5.0 e3.8 e1.7 e5.0 12 8.6 3.3 6.5 15 4.5 22 5.8 e6.0 e5.0 e4.0 e1.7 e7.0 11 7.9 4.9 5.1 12 4.5 23 5.1 e5.5 e5.0 e3.8 12 7.9 5.5 4.3 9.1 4.0 e1.7 e15 24 5.2 e5.5 12 4.3 2.6 8.0 e3.7 e4.8 e2.0 e150 8.0 4.1 4.4 e5.5 94.7 e3.7 e350 11 7.4 3.1 5.1 3.9 e2.0 26 4.7 .90 9.3 e5.0 64.4 e3.6 e2.0 e250 13 6.0 6.9 4.1 27 3.7 5.6 15 7.5 1.0 .. 20 e4.5 e4.3 e4.0 e2.0 e170 15 5.4 28 7.9 e4.0 e4.2 e4.0 e2.2 e150 46 4.6 1.4 11 3.4 29 8.2 e4.5 e4.0 e4.0 e130 105 5.3 5.3 2.4 8.0 3.8 30 7.8 e4.5 e3.8 e4.0 ---95 47 6.6 3.2 19 7.3 3.5 7.3 31 7.3 e3.7 e4.0 ---87 7.2 6.8 TOTAL 147.6 184.2 142.5 102.9 57.1 1979.7 864 376.4 169.8 176.40 286.27 202.1 MEAN 4.60 3.32 4.76 6.14 2.04 63.9 28.8 12.1 5.66 5.69 9.23 6.74 8.2 11 5.0 33 31 44 MAX 4.0 3.5 350 105 15 32 2.9 2.7 1.7 3.4 MIN 4.0 3.7 3 1 2.0 11 4.6 AC-FT 337 350 568 401 293 365 283 204 113 3930 1710

CAL YR 1988 TOTAL 2927.15 MEAN 8.00 MAX 170 MIN .20 AC-FT 5810 WTR YR 1989 TOTAL 4688.97 MEAN 12.8 MAX 350 MIN .77 AC-FT 9300

e Estimated

# 06479928 BATTLE CREEK NEAR NUNDA. SD

LOCATION.--Lat 44°09'10", long 96°53'18", in SE\SE\SE\sec.13, T.108 N., R.51 W., Lake County, Hydrologic Unit 10170202, on left bank 21 ft from downstream bridge abutment, and 6.0 mi east of Nunda.

DRAINAGE AREA. -- 163 mi<sup>2</sup>, of which 4.8 mi<sup>2</sup> probably is noncontributing.

# WATER-DISCHARGE RECORDS

PERIOD OF RECORD, -- December 1987 to current year.

GAGE. --Water-stage recorder. Elevation of gage is 1,590 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records good except those for estimated daily discharges, which are poor.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 350 ft<sup>3</sup>/s, Mar. 26, 1989, gage height, 8.23 ft, backwater from ice; no flow for many days each year.

EXTREMES FOR CURRENT PERIOD. -- Peak discharges greater than base discharge of 50 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12		100	a	Mar. 26	1100	*350	a*8.23

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. No flow for many days.

MEÁN VALUES												
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.08	.00	.00	.00	20	1.5	.20	.10	.00	.00
2	.00	.00	e.10	.00	.00	.00	15	1.2	.17	.08	.00	.00
3	.00	.00	e.13	.00	.00	.00	13	1.1	.10	.03	.00	.00
4	.00	.00	e.16	.00	.00	.00	12	1.1	.05	.00	.00	.00
5	.00	.00	e.19	.00	.00	.00	9,6	1.0	.04	.00	.00	.00
6	.00	.00	e.20	.00	.00	.00	8.3	. 96	.03	.00	.00	.00
7	.00	.00	e.20	.00	.00	e.01	7.2	. 86	.02	.00	.00	.00
8	.00	.00	e.15	.00	.00	e.03	7.0	.80	.00	.00	.00	.00
9	.00	.00	e.10	.00	.00	e.10	6.2	.76	.01	.00	.00	.00
10	.00	.00	e.07	.00	.00	e1.0	5.3	.69	.00	.00	.00	.00
11	.00	.00	e.03	.00	.00	e30	4.8	. 57	.00	.00	.00	.00
12	.00	.00	e.04	.00	.00	e75	4.2	.49	.00	.00	.00	.00
13	.00	.00	e.05	.00	.00	e70	3.7	. 47	.00	.00	.00	.00
14	.00	e.02	e.05	.00	.00	e50	3.3	.43	.00	.00	.00	.00
15	.00	e.05	e.03	.00	.00	e20	2.8	.43	.00	.00	.00	.00
16	.00	e.01	e.01	.00	.00	e10	2.6	.40	.00	.00	.00	.00
17	.00	.00	e.01	.00	.00	e5.0	2.4	.37	.02	.00	.00	.00
18	.00	.00	e.01	.00	.00	e2.0	2.2	.52	.03	.07	.00	.00
19	.00	.00	e.02					.65	.00	.14	.00	.00
20	.00			.00	.00	e1.0	1.6					.00
20	.00	.00	e.05	.00	.00	e.90	1.5	.70	.00	. 11	.00	.00
21	.00	.03	e.05	.00	.00	e.80	1.2	. 59	.00	.03	.00	.00
22	.00	.09	e.05	.00	.00	e.70	1.1	. 54	.00	.00	.00	.00
23	.00	.19	e.05	.00	.00	e1.0	1.1	. 36	.00	.00	.00	.00
24	.00	.34	e.05	.00	.00	e10	1.1	.34	.00	.00	.00	.00
25	.00	.16	e.04	.00	.00	e50	2.2	.31	.00	.00	.00	.00
26	.00	.20	e.02	.00	.00	e300	2.1	.20	. 93	.00	.00	.00
27	.00	.12	e.01	.00	.00	e150	2.2	.19	.41	.00	.00	.00
28	.00	e.08	.00	.00	.00	93	1.9	. 17	.12	.00	.00	.00
29	.00	e.08	.00	.00		52	1.8	12	.18	.00	.00	.00
30	.00	e.08	.00	.00		34	1.7	. 13	.18	.00	.00	.00
31	.00		.00	.00		24		.21		.00	.00	
TOTAL	0.00	1.45	1.95	0.00	0.00	980.54	149.1	18.16	2.49	0.56	0.00	0.00
MEAN	.00	.048	.063	.00	.00	31.6	4.97	.59	.083	.018	.00	.00
MAX	.00	.34	.20	.00	.00	300	20	1.5	.93	.14	.00	.00
MIN	.00	.00	.00	.00	.00	.00	1.1	.12	.00	.00	.00	.00
AC-FT	.00	2.9	3.9	.00	.00	1940	296	36	4.9	1.1	.0	.00
AC FI	. 0	4.5	3.5	.0	.0	1940	250	30	4.5	1.1	.0	.0

CAL YR 1988 TOTAL 1568.69 MEAN 4.29 MAX 90 MIN .00 AC-FT 3110 WTR YR 1989 TOTAL 1154.25 MEAN 3.16 MAX 300 MIN .00 AC-FT 2290

e Estimated

# 06479928 BATTLE CREEK NEAR NUNDA, SD--Continued

# WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD . --

SUSPENDED-SEDIMENT DISCHARGE: December 1987 to September 1989 (discontinued).

REMARKS. -- Records fair except those for estimated daily concentrations, which are poor.

EXTREMES FOR PERIOD OF DAILY RECORD.-SEDIMENT CONCENTRATION: Maximum daily mean, 296 mg/L, June 1, 1989; minimum daily mean, 0 mg/L on many days.
SEDIMENT LOAD: Maximum daily, 42 tons, Mar. 26, 1989; minimum daily, 0 ton on many days.

EXTREMES FOR CURRENT YEAR.-SEDIMENT CONCENTRATION: Maximum daily mean, 296 mg/L, June 1; minimum daily mean, 0 mg/L on many days.
SEDIMENT LOAD: Maximum daily, 42 tons, Mar. 26; minimum daily, 0 ton on many days.

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		OCTOBER			NOVEMBER			DECEMBER	
1	.00			.00			e.08	15	.00
2	.00			.00			e.10	15	.00
3	.00			.00			e.13	15	.01
4	.00			.00			e.16	15	.01
5	.00			.00			e.19	15	.01
6	.00			.00			e.20	15	.01
7	.00			.00			e.20	15	.01
8	.00			.00			e.15	15	.01
9	.00			.00			e.10	15	.00
10	.00			.00			e.07	15	.00
11	.00			.00			e.03	15	.00
12	.00			.00			e.04	15	.00
13	.00			.00			e.05	15	.00
14	.00			e.02	15	.00	e.05	15	.00
15	.00			e.05	15	.00	e.03	15	.00
16	.00			e.01	15	.00	e.01	15	.00
17	.00			.00			e.01	15	.00
18	.00			.00			e.01	15	.00
19	.00			.00			e.02	15	.00
20	.00			.00			e.05	15	.00
21	.00			.03	15	.00	e.05	15	.00
22	.00			.09	15	.00	e.05	15	.00
23	.00			.19	15	.01	e.05	15	.00
24	.00			.34	15	.01	e.05	15	.00
25	.00			.16	15	.01	e.04	15	.00
26	.00			.20	15	.01	e.02	15	.00
27	.00			. 12	15	.00	e.01	15	.00
28	.00			e.08	15	.00	.00		
29	.00			e.08	15	.00	.00		
30	.00			e.08	15	.00	.00		
31	.00						.00		
TOTAL	0.00			1.45			1.95		

e Estimated

# 06479928 BATTLE CREEK NEAR NUNDA, SD--Continued

SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
		JANUARY			FEBRUARY			MARCH	
1	.00			.00			.00		
2	.00			.00			.00		
3	.00			.00			.00		
4	.00			.00			.00		
5	.00		255	.00		-	.00		
6	.00			.00			.00	5	
8	.00			.00			e.01 e.03	5	.00
9	.00			.00			e.10	5	.00
10	.00			.00			e1.0	5	.01
11	.00			.00			e30	17	1.4
12	.00			.00			e75	37	7.5
13 14	.00			.00			e70 e50	35 22	6.6 3.0
15	.00			.00			e20	8	.43
16	.00	122	122	.00	1222	442	e10	7	.19
17	.00			.00			e5.0	7	.09
18	.00			.00			e2.0	7	.04
19 20	.00			.00			e1.0 e.90	6	.02
21	.00			.00		222	e.80	6	.01
22	.00			.00			e.70	5	.01
23	.00			.00			e1.0	5	.01
24	.00			.00			e10	9	.24
25	.00			.00			e50	34	4.6
26	.00			.00			e300	52	42
27 28	.00			.00			e150 93	56 35	23 8.8
29	.00			.00			52	25	3.5
30	.00						34	25	2.3
31	.00						24	23	1.5
TOTAL	0.00			0.00		***	980.54		
		APRIL			MAY			JUNE	
1	20	24	1.3	1.5	170	.69	.20	296	.16
2	15	19	.77	1.2	161	.52	.17	273	.13
3	13	19	. 67	1.1	134	.40	. 10	246	.07
4	12	32	1.0	1.1	141	. 42	.05	205	.03
5	9.6	34	.88	1.0	154	.42	.04	169	.02
6	8.3	33	.74	.96	129	.33	.03	139	.01
7	7.2	34	.66	.86	119	.28	.02	113	.01
9	7.0 6.2	36 40	.68 .67	.80 .76	124 178	.27	.00	105	.00
10	5.3	42	.60	.69	178	.33	.00		111
11	4.8	42	. 54	. 57	147	. 23	.00		
12	4.2	42	. 48	.49	160	.21	.00		
13	3.7	41	.41	. 47	188	.24	.00		
14 15	3.3 2.8	41	.37 .31	. 43	173 161	.20 .19	.00		
16	2.6	40	.28	.40	158	.17	.00		
17	2.4	39	.25	.37	150	.15	.02	105	.01
18	2.2	38	. 23	.52	144	.20	.03	105	.01
19	1.6	50	. 22	.65	139	. 24	.00		
20	1.5	91	.37	.70	141	. 27	.00		
21	1.2	84	. 27	. 59	144	.23	.00		
22 23	1.1	84 82	.25	. 54	144	.21	.00		0.222
24	1.1	86	.26	.34	126	.12	.00		
25	2.2	90	. 53	.31	110	.09	.00		
26	2.1	78	. 44	.20	128	.07	. 93	130	.33
27	2.2	80	.48	.19	144	.07	.41	132	.15
28 29	1.9 1.8	74 87	.38	. 17 . 12	152 153	.07 .05	.12 .18	124 121	.04
30	1.7	134	.62	.13	168	.06	.18	130	.06
31			117	.21	244	.14			111
TOTAL	149.1		15.32	18.16		7.38	2.49		

# 06479928 BATTLE CREEK NEAR NUNDA, SD--Continued

# SUSPENDED-SEDIMENT DISCHARGE, IN TONS PER DAY, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

	MEAN				MEAN		MEAN			
DAY	MEAN DISCHARGE (CFS)	CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	
		JULY			AUGUST		SI	EPTEMBER		
1	.10	103	.03	.00			.00			
2	.08	101	.02	.00			.00			
3	.03	99	.02	.00			.00			
4	.00		.01	.00			.00			
5	.00			.00			.00			
3	.00			.00			.00			
6	.00			.00			.00			
7	.00			.00			.00			
8	.00			.00			.00			
9	.00			.00			.00			
10	.00			.00			.00			
11	.00			.00			.00			
12	.00			.00			.00			
13	.00			.00			.00			
14	.00			.00			.00			
15	.00			.00			.00			
16	.00			.00			.00			
17	.00			.00			.00			
18	.07	110	.02	.00			.00			
19	.14	110	.04	.00			.00			
20	.11	110	.03	.00			.00			
21	.03	110	.01	.00			.00			
22	.00	110	.01	.00			.00			
23	.00			.00			.00			
24	.00			.00			.00			
25	.00			.00			.00		·	
26	.00			00			.00			
				.00						
27 28	.00			.00			.00			
	.00			.00			.00			
29 30				.00			.00			
31	.00			.00			.00			
31	.00			.00						
TOTAL	0.56			0.00			0.00			

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. I FINER THAN .062 MM (70331)
DEC					
08	0855	0.17	0.5	14	
MAR					
13	1405	66	0.5	35	
23	0955	0.72	0.0	6	
28	1620	81	3.0	33	90
APR					
03	1015	14	5.0	18	
19	1620	1.8	14.5	58	89
JUN					
01	0755	0.19	13.0	303	88
30	1300	0.20	33.0	110	99

# 06479980 MEDARY CREEK NEAR BROOKINGS, SD

LOCATION.--Lat 44°13'27", long 96°46'06", in NE%NE%NE% sec.25, T.109 N., R.50 W., Brookings County, Hydrologic Unit 10170202, on right bank 400 ft downstream from county highway bridge, 5.2 mi downstream from Deer Creek, 4.1 mi upstream from mouth, and 6.1 mi southeast of Brookings.

DRAINAGE AREA. -- 200 mi 2.

PERIOD OF RECORD, -- October 1980 to current year.

REVISED RECORDS. -- WDR SD-82-1: 1981. WDR SD-84-1: Drainage area.

GAGE. -- Water-stage recorder. Datum of gage is 1,570,20 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for estimated daily discharges, which are poor and May 23-31, which are fair. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 9 years, 60.2 ft3/s, 43,610 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,590 ft<sup>3</sup>/s, June 21, 1984, gage height, 11.27 ft; no flow at times in 1981, 1982.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 13		300	a	Mar. 26	unknown	*600	a*8.03

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 0.04 ft<sup>3</sup>/s, Mar. 3-5.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.0	1.2	e1.4	e1.0	e.50	e.08	53	28	3.8	2.6	5.1	.90
2	. 93	1.1	e1.6	e.50	e.50	e.06	47	25	3.5	2.2	4.0	.83
3	.77	1.2	e1.7	e.70	e.40	e.04	42	22	3.3	1.7	4.0	.82
4	.73	1.2	1.9	e.70	e.20	e.04	36	18	3.2	1.4	3.0	.88
5	.77	1.2	2.1	e.70	e.15	e.04	33	16	3.1	1.4	2.3	.75
6	.79	1.4	2.4	e.70	e.10	e.08	30	15	3.2	1.1	1.9	.77
6	.88	2.4	e2.3	e.70	e.10	e.10	28	14	3.4	1.1	1.8	3.7
8	. 94	2.1	2.1	e.70	e.10	e.10	26	13	3.2	1.0	1.9	2.1
9	.88	. 1.9	1.8	e.50	e.10	e.10	24	13	3.2	. 85	1.8	2.7
10	1.2	1.5	e1.5	e.30	e.10	e.30	23	11	3.4	.77	1.5	3.9
11	. 86	1.6	e1.2	e.30	e.10	e5.0	21	11	3.1	1.5	1.4	5.3
12	. 95	2.7	e1.0	e.30	e.10	e50	20	9.9	4.3	6.0	1.5	4.0
13	. 86	2.9	e1.0	e.30	e.10	e250	20	8.6	6.2	14	1.6	2.6
14	. 88	3.0	e1.0	e.40	e.10	e100	20	8.0	7.1	8.8	2.3	2.1
15	.77	3.1	e.90	e.40	e.10	e60	18	7.6	7.3	4.9	3.7	1.7
16	.77	3.4	e.80	e.50	e.10	e30	18	6.7	8.0	2.5	1.9	1.5
17	. 83	e2.0	e.70	e.50	e.10	e20	16	7.7	9.5	2.9	1.3	1.3
18	. 85	e1.7	e.80	e.50	e.10	e15	15	8.4	12	34	1.1	1.2
19	.91	e1.7	e.90	e.50	e.08	e10	15	9.7	11	50	1.1	1.3
20	. 96	1.7	e1.0	e.50	e.07	e9.0	14	9.2	9.4	46	1.0	2.8
21	.95	1.7	e1.0	e.50	e.07	e8.0	14	7.3	11	38	1.2	6.7
22	. 94	1.8	e1.0	e.50	e.07	e6.0	14	6.6	11	30	1.1	3.5
23	. 94	1.9	e1.0	e.50	e.07	e15	14	e6.3	11	25	1.0	2.0
24	. 94	2.0	e1.0	e.50	e.07	e50	14	e6.0	12	21	.98	3.0
25	1.0	2.1	e1.0	e.40	e.07	e150	13	e5.6	12	16	.88	2.4
26	. 99	2.1	e.90	e.30	e.08	e550	14	e5.2	22	13	1.0	1.7
27	1.1	1.5	e.80	e.30	e.09	e300	16	e4.9	11	11	.97	1.6
28	1.1	1.2	e.70	e.30	e.10	e200	22	e4.5	7.2	11	.86	1.5
29	1.1	e1.2	e.60	e.40		e130	27	e4.2	5.0	8.5	.85	1.5
30	.94	e1.2	e.70	e.50		86	29	e3.9	3.4	6.6	.95	1.4
31	1,1		e1.0	e.50		66		e3.8		6.3	.93	
TOTAL	28.63	55.7	37.80	15.40	3.82	2110.94	696	320.1	216.8	371.12	54.92	66.45
MEAN	. 92	1.86	1,22	.50	.14	68.1	23.2	10.3	7.23	12.0	1.77	2.21
MAX	1.2	3.4	2.4	1.0	.50	550	53	28	22	50	5.1	6.7
MIN	.73	1.1	.60	.30	.07	.04	13	3.8	3.1	.77	.85	.75
AC-FT	57	110	75	31	7.6	4190	1380	635	430	736	109	132
	٠,	110	, ,	01	7.0	4130	1000	000	400	, 00	100	202

CAL YR 1988 TOTAL 7042.12 MEAN 19.2 MAX 221 MIN .25 AC-FT 13970 WTR YR 1989 TOTAL 3977.68 MEAN 10.9 MAX 550 MIN .04 AC-FT 7890

e Estimated

#### 06480000 BIG SIOUX RIVER NEAR BROOKINGS. SD

LOCATION.--Lat 44°10'48", long 96°44'55", in NWkNWk sec.8, T.108 N., R.49 W., Moody County, Hydrologic Unit 10170203, on right bank 3 ft downstream from highway bridge, 2.2 mi downstream from Medary Creek, and 9.5 mi southeast of Brookings.

DRAINAGE AREA. -- 3,898 mi<sup>2</sup>, of which 1,479 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- August 1953 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE. -- Water-stage recorder. Datum of gage is 1,551.91 ft above National Geodetic Vertical Datum of 1929. Prior to May 30, 1959, nonrecording gage at present site and datum.

REMARKS. -- Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--36 years, 216 ft<sup>3</sup>/s, 156,500 acre-ft/yr; median of yearly mean discharges, 130 ft<sup>3</sup>/s 94,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33,900 ft<sup>3</sup>/s, Apr. 9, 1969, gage height, 14.77 ft; no flow at times in 1956, 1959, 1976, 1977, 1982.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	(ft <sup>3</sup> /s)	Gage height (ft)
Mar. 28	2215	*1,900	*9.18	No other pe	eak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989
MFAN VALUES

Minimum daily discharge, 2.8 ft3/s, Feb. 19-24.

DAY OCT AUG NOV DEC TIIN TITT. SEP JAN. FEB MAR APP MAY 1 11 11 e13 e6.0 e5.0 e4.0 e497 157 42 47 31 14 2 10 12 e13 e5.8 e4.0 e3.0 e406 158 41 41 29 14 3 8.3 13 e13 e6.0 e4.0 e3.5 e350 145 40 35 27 13 7.6 13 e13 e6.0 e4.0 e3.6 e301 135 38 32 26 13 5 7.3 e6.5 e4.0 e4.0 272 119 36 29 25 7.5 e13 e6.0 e4.0 252 107 36 27 23 13 e4.0 7.4 15 e5.5 234 99 35 26 21 26 e14 e4.0 e4.0 15 e14 e5.0 e5.0 217 97 34 24 21 54 e4.0 7.0 33 23 19 43 14 e13 e4.8 199 91 e4.0 e8.0 10 6.7 21 e4.8 33 18 35 e13 188 85 e4.0 e40 6.7 11 e12 e100 28 17 35 14 e5.0 84.0 181 80 32 12 6.6 16 e11 e5.0 e4.0 e200 167 79 33 54 19 31 73 13 6.6 17 e12 e5.0 e4.0 e600 161 32 61 19 28 14 7.0 17 e13 e5.5 e4.0 e500 152 67 32 68 19 26 6.9 e19 e12 e6.0 e4.0 e400 142 64 32 64 21 24 e4.0 16 6.8 e17 e10 e6.0 e300 59 31 48 20 21 17 6.8 e16 e10 e6.5 e4.0 e200 128 57 32 40 18 20 18 7.0 78 e13 e11 e6.5 e3.0 e155 119 68 39 18 19 7.6 e13 e6.5 70 37 151 16 e11 e2.8 e135 119 19 20 7.8 31 167 16 21 e14 e12 e6.5 e2.8 e120 121 65 21 8.0 e13 e12 59 29 152 17 22 e7.0 e2.8 e90 116 22 9.2 57 30 121 21 e15 e12 e7.0 e2.8 e69 117 16 23 8.8 e14 e12 e6.5 e2.8 e80 115 58 30 101 15 19 24 8.6 e14 e12 e6.5 e2.8 e220 110 56 29 83 15 18 25 e440 10 e14 e12 e6.5 e3.0 103 52 30 68 14 17 26 10 e6.0 e3.5 e1300 106 59 56 15 15 27 11 e13 e10 e7.0 e3.6 e1550 128 45 81 47 16 15 e9.5 28 e13 e7.0 e4.0 e1830 141 73 41 15 15 29 11 e13 e9.0 e7.0 e1780 156 43 66 41 14 15 30 9.9 e13 e8.5 e7.0 e1370 160 57 37 14 44 10 e8.0 e6.0 43 34 e822 587 TOTAL 257.5 426 362.0 188.4 102.9 5602 2423 1183 1845 652 12340.1 59.5 18.9 21.7 MEAN 8.31 14.2 6.08 78.2 39.4 11.7 3.67 398 187 MAX 5.0 31 54 11 19 14 7.0 1830 497 158 81 167 8.0 MIN 6.6 11 4 8 3.0 103 43 29 21 14 13

1290

1160

CAL YR 1988 TOTAL 32801.6 MEAN 89.6 MAX 942 MIN 2.1 AC-FT 65060 WTR YR 1989 TOTAL 25968.9 MEAN 71.1 MAX 1830 MIN 2.8 AC-FT 51510

374

204

24480

11110

4810

2350

3660

718

511

845

AC-FT

e Estimated

# 06480400 SPRING CREEK NEAR FLANDREAU. SD

LOCATION.--Lat 44°07'18", long 96°35'19", in SE\nE\nE\sec.33, T.108 N., R.47 W., Moody County, Hydrologic Unit 10170203, on left bank at downstream side of bridge on State Highway 13, 5.0 mi north of Flandreau, and 6.6 mi upstream from mouth.

DRAINAGE AREA. -- 63.2 mi<sup>2</sup>.

PERIOD OF RECORD . -- October 1982 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,580 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 7 years, 24.7 ft3/s, 17,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,030 ft<sup>3</sup>/s, June 20, 1984, gage height, 15.72 ft; minimum daily discharge, 0.10 ft<sup>3</sup>/s, Feb. 20-23, Mar. 2-8, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 250 ft 3/s and maximum (\*):

		Discharge (ft 3/s)	Gage height			Discharge	Gage height
Date	Time	(ft <sup>3</sup> /s)	(ft)	Date	Time	(ft <sup>3</sup> /s)	(ft)
Mar. 26	unknown	*200	a b*11.45				

a Backwater from ice.

Minimum daily discharge, 0.10 ft<sup>3</sup>/s, Feb. 20-23, Mar. 2-8.

		DISCHAR	GE, IN CU	BIC FEET		ND, WATER MEAN VALU	YEAR OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.3	2.9	e.90	e.90	e.60	e.15	e11	7.3	2.6	2.6	1.8	1.4
2	2.8	2.9	e1.5	e.80	e.40	e.10	10	6.4	2.4	2.3	1.6	1.3
3	2.4	3.0	e4.0	e.80	e.30	e.10	9.6	5.6	2.2	1.8	1.5	1.2
4	2.4	3.2	e3.5	e.90	e.20	e.10	8.7	5.4	2.1	1.9	1.6	4.4
5	2.4	4.0	e3.3	e1.0	e.20	e.10	7.6	5.2	2.1	1.8	1.7	6.4
6 7	2.4	3.4	e3.2	e1.0	e.20	e.10	7.1	4.7	2.0	1.8	1.5	3.0
7	2.4	3.5		e1.0	e.20	e.10	6.9	4.5	2.0	1.5	1.4	2.9
8	2.5	3.0		e.90	e.20	e.10	8.0	4.4	2.1	1.9	1.3	4.2
9	2.7	3.1	e1.6	e.70	e.20	e.30	7.2	4.3	2.1	2.0	1.3	4.3
10	2.5	3.0	e1.3	e.60	e.20	e2.0	6.3	4.0	2.1	1.5	1.2	3.4
11		2.3	e1.2	e.50	e.20	e50	6.6	3.7	2.0	4.5	1.3	3.2
12	2.3	4.3	e1.3	e.50	e.20	e30	6.3	3.4	2.4	9.2	1.4	3.8
13	2.4	4.5	e1.5	e.50	e.20	e20	6.1	3.3	2.3	28	1.5	3.2
14	2.4	4.1	e1.7	e.55	e.20	e15	6.1	3.2	2.5	13	1.5	2.8
15	2.6	3.8	e1.7	e.55	e.20	e10	5.7	3.1	2.5	5.8	2.4	2.6
16	2.6	3.0	e1.5	e.55	e.20	e7.0	5.8 5.6	2.9	2.2	3.7	1.8	2.3
17	2.6	2.4	e1.5	e.55	e.18	e5.0	5.6	2.8	2.1	3.0	1.5	2.0
18	2.6	e2.2	e1.5	e.55	e.15	e4.0	5.5	3.7	2.8	23	1.2	2.3
19	2.5	e2.0	e1.8	e.55	e.12	e3.0	5.3	4.5	2.6	48	1.6	2.0
20	2.6	e2.0	e2.0	e.60	e.10	e2.5	5.4	3.8	2.0	22	1.4	2.9
21	2.8	e2.0	e2.0	e.60	e.10	e2.5	5.6	3.1	1.8	9.6	1.4	4.9
22	2.7	e2.2	e2.0	e.60	e.10	e4.0	5.5	2.9	1.7	5.2	1.5	4.5
23	2.8	e2.4	e2.0	e.60	e.10	e10	5.8	2.8	2.0	3.9	1.5	3.6
24	2.6	e2.6	e1.9	e.60	e.13	e30	5.9	2.7	2.0	3.1	1.4	3.0
25	2.9	e2.8	e1.8	e.50	e.16	e70	5.9	2.5	2.3	2.7	1.3	2.7
26	2.8	e3.5	e1.7	e.50	e.18	e150	7.6	2.3	7.8	2.4	1.6	2.4
27	3.1	e2.0	e1.6	e.50	e.19	e50	11	2.1	11	2.1	1.6	2.2
28	2.8	e1.0	e1.5	e.50	e.20	e25	9.3	2.0	6.9	1.8	1.5	2.1
29	2.8	e.60	e1.3	e.60		e17	11	2.2	4.4	1.8	1.5	2.0
30	2.5	e.80	e1.0	e.60		e14	8.9	2.4	3.1	1.9	1.3	1.9
31	3.3		e.90	e.60		e11	755	2.6		2.0	1.4	
TOTAL	81.9	82.50	58.70	20.20	5.61	533.15	217.3 1	13.8		215.8	46.5	88.9
MEAN	2.64	2.75	1.89	. 65	.20	17.2		3.67	2.94	6.96	1.50	2.96
MAX	3.3	4.5	4.0	1.0	.60	150	11	7.3	11	48	2.4	6.4
MIN	2.3	.60	.90	. 50	.10	.10	5.3	2.0	1.7	1.5	1.2	1.2
AC-FT	162	164	116	40	11	1060	431	226	175	428	92	176

CAL YR 1988 TOTAL 2308.20 MEAN 6.31 MAX 95 MIN .54 AC-FT 4580 WTR YR 1989 TOTAL 1552.46 MEAN 4.25 MAX 150 MIN .10 AC-FT 3080

b From floodmark.

e Estimated

# 06480650 FLANDREAU CREEK ABOVE FLANDREAU, SD

LOCATION.--Lat 44°03'45", long 96°29'15", in SE%NE%NE% sec.20, T.107 N., R.47 W., Moody County, Hydrologic Unit 10170203, on right bank 500 ft downstream from county highway bridge, 5.9 mi upstream from mouth, and 5.2 mi east of Flandreau.

DRAINAGE AREA. -- 100 mi2.

PERIOD OF RECORD . -- October 1981 to current year.

GAGE. -- Water-stage recorder. Elevation of gage is 1,555 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 8 years, 40.7 ft3/s, 29,490 acre-ft/yr.

EXTREMES FOR FERIOD OF RECORD.--Maximum discharge, 2,650 ft<sup>3</sup>/s, June 20, 1984, gage height, 11.02 ft; no flow at times in 1982, 1988-89.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 150 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Oischarge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 25		*600	a b*9.62	No other	peak greater	than base	discharge.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

- a Backwater from ice.
- b From crest-stage gage.
- No flow Feb. 18 to Mar. 8.

			,			MEAN VALUE	S	0000				
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.9	2.4	.70	e.30	e.06	e.00	18	19	2.5	3.4	1.8	1.0
2	1.6	1.9	.68	e.30	e.04	e.00	17	15	2.2	2.4	1.5	.98
3	1.4	2.0	. 62	e.30	e.02	e.00	16	13	2.2	1.7	1.5	.93
4	1.2	2.5	. 63	e.30	e.02	e.00	14	12	1.9	1.5	1.8	2.2
5	1.2	2.7	. 67	e.30	e.02	e.00	13	10	1.7	1.2	1.4	2.3
6	1.2	1.9	.68	e.30	e.02	e.00	12	10	1.5	1.0	1.1	5.1
7	1.1	2.3	.73	e.25	e.02	e.00	12	9.7	1.3	. 99	1.1	4.4
8	1.2	2.1	. 69	e.20	e.02	e.00	10	8.9	1.1	.84	.96	3.3
9	1.3	2.2	. 67	e.15	e.02	e.01	12	8.2	.98	.69	. 84	3.1
10	1.3	1.9	e.60	e.10	e.02	e2.0	11	7.7	.91	.66	.76	3.9
11	1.2	1.8	e.60	e.10	e.02	e100	10	7.1	.91	8.2	.67	3.7
12	1.1	2.8	e.60	e.10	e.02	e140	11	7.0	. 95	55	.76	3.2
13	1.1	3.0	e.70	e.10	e.02	e140	11	6.0	1.0	33	.83	3.2
14	1.0	3.2	e.69	e.10	e.02	e100	10	5.4	. 97	15	1.0	3.1
15	1.1	3.2	e.70	e.10	e.02	e70	10	5.0	.78	8.0	2.0	2.8
16	1.2	2.0	e.60	e.10	e.02	e50	10	4.6	.96	7.2	2.1	2.5
17	1.2	e2.0	e.60	e.10	e.01	e30	9.1	4.8	1.4	5.7	2.0	2.2
18	1.2	e2.0	e.55	e.10	e.00	e20	8.8	4.7	2.2	12	1.6	2.1
19	1.2	e1.9	e.55	e.10	e.00	e10	8.5	5.4	1.7	29	1.5	1.9
20	1.3	e1.8	e.54	e.10	e.00	e10	8.2	6.5	1.4	22	1.4	2.6
21	1.3	e1.8	e.59	e.10	e.00	e10	8.2	6.0	1.4	12	1.3	3.2
22	1.3	1.8	e.67	e.10	e.00	e20	7.5	4.5	1.0	9.2	1.2	4.3
23	1.3	2.0	e.66	e.10	e.00	e40	8.2	4.0	. 95	7.1	1.2	5.6
24	1.3	2.2	e.60	e.10	e.00	e100	8.6	3.7	. 84	5.4	1.1	3.9
25	1.4	2.3	e.50	e.08	e.00	e450	9.2	3.2	1.2	4.2	1.1	2.9
26	1.4	2.8	e.50	e.07	e.00	e250	13	2.9	6.1	3.4	1.2	2.8
27	1.4	1.0	e.40	e.07	e.00	137	16	2.8	13	2.9	1.2	2.6
28	. 96	.60	e.40	e.08	e.00	88	19	2.4	15	2.5	1.1	2.4
29	1.4	. 56	e.40	e.09		46	21	2.4	7.2	2.1	1.3	2.1
30	1.4	.74	e.30	e.10		29	22	2.5	4.8	1.9	1.3	2.1
31	1.6		e.30	e.10		22		2.5		1.9	1.2	
TOTAL	39.76	61.40	18.12	4.49	0.39	1864.01	364.3	206.9	80.05	262.08	39.82	86.41
MEAN	1.28	2.05	. 58	. 14	.014	60.1	12.1	6.67	2.67	8.45	1.28	2.88
MAX	1.9	3.2	.73	.30	.06	450	22	19	15	55	2.1	5.6
MIN	. 96	.56	.30	.07	.00	.00	7.5	2.4	.78	.66	.67	. 93
AC-FT	79	122	36	8.9	.8	3700	723	410	159	520	79	171

CAL YR 1988 TOTAL 3677.09 MEAN 10.0 MAX 135 MIN .00 AC-FT 7290 WTR YR 1989 TOTAL 3027.73 MEAN 8.30 MAX 450 MIN .00 AC-FT 6010

e Estimated

#### 06481000 BIG SIOUX RIVER NEAR DELL RAPIDS. SD

LOCATION.--Lat 43°47'25", long 96°44'42", in NWkNWk sec.29, T.104 N., R.49 W., Minnehaha County, Hydrologic Unit 10170203, on left bank at downstream side of highway bridge, 0.2 mi downstream from confluence of divided channels, and 3.0 mi southwest of Dell Rapids.

DRAINAGE AREA. --4,483 mi<sup>2</sup>, of which 1,479 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD . -- May 1948 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,455.99 ft above National Geodetic Vertical Datum of 1929.
Prior to Nov. 11, 1949, nonrecording gage and Nov. 11, 1949, to Sept. 30, 1951, water-stage recorder, at present site at datum 0.04 ft lower.

REMARKS.--Records good except those for estimated daily discharges, which are poor. National Weather Service gage-height telemeter at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--41 years, 323 ft<sup>3</sup>/s, 234,000 acre-ft/yr; median of yearly mean discharges, 200 ft<sup>3</sup>/s, 145,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,300 ft<sup>3</sup>/s, Apr. 9, 1969, gage height, 16.47 ft; no flow Aug. 25 to Oct. 17, 1976.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

4-4-		Discharge (ft 3/s)	Gage height	2.5	0.00	Discharge	Gage height
Date	Time	(ft <sup>o</sup> /s)	(ft)	Date	Time	$(ft^3/s)$	(ft)
Mar. 12		1,100	a	Mar. 27	1045	*2,450	*9.11

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 4.0 ft<sup>3</sup>/s, Feb. 19-25.

		DISCHARGE,	IN	COBIC FEET		MEAN VALUE		DER 1900	IO SEFIEM	DEK 1909		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2	16	21	e21	. e8.0	e10	e7.0	1530	e190	58	71	e50	16
2	16	22	e21	e7.0	e7.0	e7.0	938	e200	56	64	e45	17
3	15	21	e22		e6.0	e7.0	654	e190	54	62	43	18
4	14	22	e22		e6.0	e6.0	531	e180	54	58	38	19
5	14	19	e22		e6.0	e7.0	460	e170	52	54	34	21
6	15	23	e23		e6.0	e7.0	408	e160	52	48	31	23
7	15	24	e22	e9.0	e6.0	e7.0	371	e150	50	44	30	23
8	15	24	e21	. e8.0	e6.0	e10	342	e140	45	42	29	21
9	15	25	e20	e8.0	e6.0	e30	305	e130	46	37	27	25
10	14	23	e19		e6.0	e150	285	e125	47	35	26	29
11	14	25	e18	e8.0	e6.0	e400	265	e120	48	38	26	34
12	15	28	e18	e9.0	e6.0	e1000	250	e120	46	53	26	43
13	15	29	e20	e9.0	e6.0	e900	240	e115	44	63	25	43
14	15	30	e20	e10	e6.0	e650	224	e115	44	66	23	42
15	14	27	e15		e6.0	e500	224	e110	45	80	23	40
16	14	23	e15	e10	e6.0	e400	214	e105	45	80	24	37
17	15	25	e15	e10	e6.0	e300	195	e100	46	74	24	35
18	14	26	e16	e10	e6.0	e350	191	95	55	71	24	35
19	14	27	e17		e4.0	e350	185	92	54	71	24	31
20	16	25	e18		e4.0	e300	174	88	50	71	23	35
21	15	24	e18	e10	e4.0	e250	171	88	46	141	23	37
22	16	28	e18	e10	e4.0	e250	174	84	42	e120	23	30
23	. 14	28	e18	e10	e4.0	e300	162	80	43	e100	23	30
24	15	28	e18		e4.0	e600	153	80	42	e90	21	32
25	16	26	e18		e5.0	e1300	151	81	43	e85	19	28
26	19	27	e17	e10	e5.0	e2000	e145	70	47	e80	19	27
27	13	e25	e16	e10	e6.0	2160	e130	69	52	e75	20	30
28	16	e20	e15		e7.0	2070	e160	66	59	e70	19	26
29	20	e25	e14			2190	e160	62	75	e65	18	23
30	23	e22	e13			2100	e190	58	79	e60	20	23
31	22		e12			2000		57		e55	19	
TOTAL	484	742	562	291.0	160.0	20608.0	9582	3490	1519	2123	819	873
MEAN	15.6	24.7	18.1		5.71	665	319	113	50.6	68.5	26.4	29.1
MAX	23	30	23		10	2190	1530	200	79	141	50	43
MIN	13	19	12		4.0	6.0	130	57	42	35	18	16
AC-FT	960	1470	1110		317	40880	19010	6920	3010	4210	1620	1730

CAL YR 1988 TOTAL 49372.4 MEAN 135 MAX 1070 MIN 6.9 AC-FT 97930 WTR YR 1989 TOTAL 41253.0 MEAN 113 MAX 2190 MIN 4.0 AC-FT 81830

e Estimated

# 06481500 SKUNK CREEK AT SIOUX FALLS, SD

LOCATION.--Lat 43°32'01", long 96°47'26", in NWkSWk sec.24, T.101 N., R.50 W., Minnehaha County, Hydrologic Unit 10170203, on left bank 5 ft downstream from bridge on Marion Road, 1.3 mi upstream from mouth, 1.8 mi downstream from small right-bank tributary, and 4.0 mi southwest of Sioux Falls.

DRAINAGE AREA. -- 622 mi<sup>2</sup>, of which 8.51 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD. -- May 1948 to current year. May 1948 to September 1971 (published as "near Sioux Falls").

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,405.10 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). Prior to Oct. 24, 1949, nonrecording gage, and Oct. 24, 1949, to Apr. 28, 1972, water-stage recorder, both at site 1.9 mi upstream at datum 10.19 ft higher, and from Apr. 28, 1972, to May 18, 1987, near right end of bridge at same site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --41 years, 69.2 ft<sup>3</sup>/s, 50,140 acre-ft/yr; median of yearly mean discharges, 32 ft<sup>3</sup>/s, 23,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 29,400 ft<sup>3</sup>/s, June 17, 1957, gage height, 17.78 ft, site and datum then in use, from rating curve extended above 8,100 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow at times in some years.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft 3/s)	Gage height (ft)
Mar 10	unknown	**200	b o*4 60			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

- a Mean daily discharge.
- b Backwater from ice.
- c Maximum observed.

Minimum daily discharge, 0.10 ft3/s, Aug. 7.

		DISCHARG	E, IN	CUBIC FEET	PER SECO	ND, WATER MEAN VALU	YEAR OCTO	BER 1988	TO SEPTEM	BER 1989		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e4.2	e4.5	e5.5	e2.0	e2.0	e.30	51	20	e5.3	2.4	.29	.38
2	e4.0	e4.5	e6.0	e2.0	e1.0	e.30	45	18	e5.0	1.9	.20	.74
3	e4.0	e5.0	e6.0	e1.5	e.50	e.30	41	18	e4.7	1.6	.21	.35
2 3 4	e4.0	e4.5	e6.5	e2.0	e.40	e.25	36	19	e4.3	1.6	.19	7.7
5	e3.5	e4.5	e7.0	e1.5	e.30	e.20	31	17	e4.2	1.2	.14	.71
6	e3.5	e5.0	e7.0	e1.5	e.40	e.15	28	14	e3.8	.94	.11	.44
7	e4.0	e5.5	e7.0	e1.5	e.50	e1.0	29	12	e3.3	.68	.10	16
8	e4.0	e5.0	e5.0	e1.5	e.30	e6.0	29	12	e3.0	. 58	.12	4.1
9	e3.5	e5.5	e4.0		e.30	e35	27	11	e2.7	. 49	.14	2.5
10	e3.5	e5.0	e3.5		e.35	e200	26	9.4	e2.5	. 43	. 14	1.4
11	e4.0	e7.5	e3.5	e.50	e.60	e160	24	7.7	e2.0	.42	.14	.86
12	e3.5	e10	e3.0	e.50	e.50	e130	23	6.7	e1.9	.39	1.0	.70
13	e3.5	e8.0	e3.5	e.70	e.65	e95	23	8.8	1.8	.39	2.0	.61
14	e3.5	e8.0	e5.0		e.60	e60	21	7.7	1.6	.41	.19	.99
15	e3.5	e8.5	e4.0		e.45	e30	20	6.7	1.5	.39	.19	.45
16	e3.5	e8.0	e4.0	e1.5	e.45	e25	19	6.3	1.4	.35	. 18	.77
17	e3.5	e6.5	e3.5	e1.5	e.30	e23	19	5.1	3.9	2.3	.16	.70
18	e3.5	e9.5	e3.0	e1.5	e.30	e23	18	6.3	2.8	1.1	.15	.71
19	e3.5	e8.5	e4.0		e.30	e28	17	6.6	2.6	1.7	6.5	2.1
20	e4.0	e7.0	e4.0	e1.5	e.40	e30	17	3.4	1.8	1.7	1.4	.76
21	e3.5	e5.5	e4.0	e1.5	e.40	e30	16	4.7	1.3	. 82	. 96	.69
22	e3.5	e6.5	e4.5	e1.5	e.40	35	16	5.6	1.3	. 54	. 64	.97
23	e3.0	e5.5	e4.5		e.50	68	16	e6.5	2.0	.88	. 46	1.2
24	e3.0	e5.5	e4.5		e.80	107	16	e5.8	2.1	.41	.38	1.6
25	e3.0	e5.0	e3.5		e.50	148	16	e5.5	2.1	.35	.34	2.3
26	e3.0	e5.0	e4.0	e1.5	e.40	103	16	e5.4	9.3	. 53	1.4	1.5
27	e3.0	e5.5	e3.5	e2.0	e.30	73	15	e5.1	4.7	.37	.50	1.0
28	e2.5	e4.5	e2.5		e.40	67	15	e5.0	3.9	. 24	.45	1.1
29	e2.5	e5.0	e2.0	e2.0		64	19	e5.0	3.1	. 44	.36	1.5
30	e2.5	e5.0	e2.0	e2.5		64	20	e8.0	2.7	. 67	.32	.78
31	e4.5		e2.0	e2.5		56		e6.0		.38	.39	
TOTAL	108.2	183.5	132.0	48.40	14.30	1662.50	709	278.3	92.6	26.60	19.75	55.61
MEAN	3.49	6.12	4.26		.51	53.6	23.6	8.98	3.09	. 86	.64	1.85
MAX	4.5	10	7.0		2.0	200	51	20	9.3	2.4	6.5	16
MIN	2.5	4.5	2.0		.30	.15	15	3.4	1.3	.24	.10	.35
AC-FT	215	364	262		28	3300	1410	552	184	53	39	110
			202	30	20	5556			-		7.5	

CAL YR 1988 TOTAL 10378.63 MEAN 28.4 MAX 226 MIN .37 AC-FT 20590 WTR YR 1989 TOTAL 3330.76 MEAN 9.13 MAX 200 MIN .10 AC-FT 6610

e Estimated

06482020 BIG SIOUX RIVER AT NORTH CLIFF AVENUE, AT SIOUX FALLS, SD

LOCATION.--Lat 43°34'01", long 96°42'39", in SWkNWk sec.10, T.101 N., R.49 W., Minnehaha County, Hydrologic Unit 10170203, on right bank 20 ft downstream from bridge on North Cliff Avenue and 4.1 mi upstream from Slip Up Creek

DRAINAGE AREA. -- 5,216 mi<sup>2</sup>, of which 1,487 mi<sup>2</sup> is probably noncontributing.

PERIOD OF RECORD. -- March 1962 to September 1971 (gage heights and discharge measurements only in files of U.S. Army Corps of Engineers). October 1971 to current year.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,294.18 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Dec. 15, 1971, nonrecording gage 20 ft upstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are fair. National Weather Service gage-height telemeter and U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--18 years, 523 ft<sup>3</sup>/s, 378,900 acre-ft/yr; median of yearly mean discharges, 313 ft<sup>3</sup>/s, 227,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,600 ft<sup>3</sup>/s, June 22, 1984, gage height, 25.40 ft; minimum daily discharge, 0.81 ft<sup>3</sup>/s, Feb. 13, 1982.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 10, 1969, reached a stage of 27.45 ft, discharge, 40,700 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 1,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 13		1,230	a	Mar. 29	0800	*2,050	*11.05

a Backwater from ice. Minimum daily discharge, 7.2 ft<sup>3</sup>/s, Feb. 6, 7.

		DISCHARGE,	IN C	CUBIC FEET	PER SECO	ND, WATER MEAN VALUE	YEAR OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21	17	27	12	14	12	1490	204	51	57	46	16
2	18	15	28	9.9	11	12	982	216	48	53	41	14
2 3	17	14	26	12	9.6	12	684	200	49	49	42	19
4	17	16	23	14	8.5	11	555	183	45	49	33	193
5	16	18	26	14	7.9	9.7	486	173	52	39	30	29
-	10	10	20		7.5	9.7	400	1,0	52	00	- 00	20
6	16	15	27	14	7.2	11	437	161	52	37	25	22
7	16	15	26	e11	7.2	13	405	150	41	32	27	226
8	16	17	20	e10	8.0	17	376	150	33	30	24	55
9	15	18	23	9.7	8.4	73	342	132	31	28	21	26
10	16	17	24	10	9.1	e430	324	127	28	28	18	20
					0.1	0400	024		20	20		
11	18	22	21	9.7	8.6	e960	306	119	24	29	17	19
12	16	64	21	10	7.7	e1170	289	116	26	22	18	18
13	16	36	22	10	9.3	e1120	270	107	25	37	47	19
14	16	26	23	10	11	e850	255	101	25	45	26	52
15	16	29	20	8.5	11	e430	238	102	26	51	22	36
13	10	23	20	0,5	11	8430	230	102	20	31	44	50
16	15	28	17	10	11	e370	235	93	23	56	19	32
17	13	20	17	11	11	e330	224	93	68	102	17	30
18	16	18	15	12	9.4	e330	210	113	65	87	16	26
19	16	18	17	12	8.4	e430	196	105	40	59	72	52
20	15	18	19	12	9.3	e400	196	88	30	58	27	44
		10	10	14	3.5	6400	130	00	50	30	2,	7.7
21	15	18	20	12	11	334	179	86	28	68	23	31
22	15	21	21	13	10	315	168	87	21	108	22	31
23	15	29	22	13	10	371	164	108	18	115	20	28
24	15	29	21	13	12	449	160	80	30	99	19	25
25	16	24	18	13	14	917	162	70	35	80	18	27
											2.2	
26	15	32	19	13	15	1250	158	67	184	77	29	27
27	15	28	19	13	14	1570	132	64	47	76	24	25
28	14	15	15	14	13	1690	174	64	40	61	21	24
29	16	28	14	14		1980	170	66	47	73	21	23
30	15	27	13	14		1800	194	109	59	62	19	21
31	16		14	16		1770		59		62	18	
TOTAL	492	692	638	369.8	286.6	19436.7	10161	3593	1291	1829	822	1210
MEAN	15.9		20.6	11.9	10.2		339	116		59.0	26.5	40.3
MAX						627				115		226
	21	64	28	16	15	1980	1490	216	184		72	
MIN AC-FT	13 976	14 1370	13 1270	8.5 733	7.2 568	9.7	132	59	18	22 3630	16 1630	14 2400
AC-FI	9/0	13/0	12/0	/33	368	38550	20150	7130	2560	3030	1030	2400

CAL YR 1988 TOTAL 57252.2 MEAN 156 MAX 1060 MIN 9.0 AC-FT 113600 WTR YR 1989 TOTAL 40821.1 MEAN 112 MAX 1980 MIN 7.2 AC-FT 80970

# 06482610 SPLIT ROCK CREEK AT CORSON, SD

LOCATION.--Lat 43°36'59", long 96°33'54", in NE½NW½ sec.26, T.102 N., R.48 W., Minnehaha County, Hydrologic Unit 10170203, on left bank 6 ft downstream from highway bridge, 0.3 mi east of Corson, and 3.4 mi upstream from mouth.

DRAINAGE AREA. -- 464 mi 2.

PERIOD OF RECORD. --October 1965 to September 1989 (discontinued). February 1951 to September 1965 (gage heights and discharge measurements only in files of U.S. Army Corps of Engineers).

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,304.22 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Aug. 15, 1964, nonrecording gage at datum 0.15 ft higher and Aug. 15, 1964, to Sept. 3, 1970, nonrecording gage at present site and datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE.--24 years, 100 ft<sup>3</sup>/s, 72,450 acre-ft/yr; median of yearly mean discharges, 54 ft<sup>3</sup>/s, 39,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,800 ft<sup>3</sup>/s, Apr. 8, 1969, gage height, 15.00 ft; no flow at times some years.

EXTREMES OUTSIDE PERIOD OF RECORD. -- Maximum stage since 1951, 15.41 ft, June 17, 1957, discharge, 19,300 ft 3/s.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 9	2045	*1,200	a*7.45	May 24	2115	1.060	5.42

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 4.0 ft<sup>3</sup>/s, Feb. 2.

MEAN VALUES OCT DAY NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP 16 9.9 e8 0 1 e7.0 e6.0 e8.0 e120 43 25 13 17 5.1 2 14 10 e9.0 e8.0 e4.0 e7.0 e110 41 22 15 15 5.6 3 11 10 e10 e8.0 e5.0 e100 38 51 15 13 6.3 e7.0 10 11 e10 e8.0 e5.0 e7.0 36 28 15 11 22 93 5 9.7 12 e10 13 21 e8.0 e5.0 35 6 9.6 12 e10 e6.0 11 e8.0 e6.0 62 9.6 9.6 11 e10 e8.0 e6.0 e8.0 59 33 14 11 8.2 19 8 10 e15 11 e9.0 e6.0 e6.0 53 32 13 10 7.4 17 q 10 11 e8.0 e7.0 e200 45 12 9.9 7.8 13 e7.0 31 10 10 9.4 11 e7.0 e8.0 e7.0 e1000 43 35 11 6.8 11 11 11 e8.0 e10 e7.0 9.0 9.2 e600 41 33 8.8 11 12 9.7 15 e10 e10 e7.0 e350 37 28 11 22 8.0 9.6 13 9.6 16 e12 17 e10 e7.0 e200 37 23 11 9.3 8.9 14 9.7 7.9 15 e12 e10 e7.0 e150 36 20 15 8.5 8.3 15 9.9 16 e8.0 e10 e7.0 e100 34 22 7.4 68 7.8 8.2 16 9.9 15 e10 e10 e7.0 e70 33 20 7.3 127 7.4 7.7 17 10 14 e10 e10 e7.0 e60 31 17 e10 97 6.9 6.9 18 10 13 e10 e10 e6.0 e60 32 20 e9.0 65 6.9 6.7 19 9.8 e13 e10 e10 e6.0 e70 32 25 48 9.4 7.1 e8.0 20 10 e13 e10 e10 32 22 42 9.3 8.4 e6.0 e7.0 e70 21 10 13 e10 e10 8.8 e6 0 e70 31 20 e6 0 43 10 22 10 57 14 e10 e10 e6.0 680 27 17 e5.5 8.9 10 23 10 16 e10 e10 e6.0 e150 28 16 e5.0 44 7.9 10 24 10 14 e10 e10 e7.0 e301 30 85 e6.0 36 7.9 10 25 9.8 13 e9.0 e9.0 e8.0 320 29 502 e6.0 30 7.4 9.0 26 9.8 e8.0 e10 e8.0 e9.0 368 33 229 e30 26 8.7 8.2 27 10 e9.0 e7.0 e9.0 e9.0 411 83 e25 24 9.0 8.0 41 28 9.6 e8.0 e6.0 e10 252 54 e20 21 9.0 e9.0 7.8 29 9.3 e8.0 e6.0 e10 148 50 44 e15 21 8.2 8.0 30 9.7 e8.0 e6.0 e10 49 34 20 6.9 7.9 140 14 31 10 e8.0 e10 e130 28 19 8.6 TOTAL 316.6 362.9 281.0 282.0 184.0 5365.0 1470 1700 429.1 973.5 280.4 308.7 MEAN 9.05 10.2 12.1 9.06 9.10 6.57 173 49 0 54.8 14.3 31.4 10.3 MAX 16 16 12 10 9.0 1000 120 502 51 127 17 22 MTN 9 3 8.0 6.0 6.0 4.0 6.0 27 16 5.0 9 2 6 8 5.1

CAL YR 1988 TOTAL 14873.5 MEAN 40.6 MAX 331 MIN 4.5 AC-FT 29500 WTR YR 1989 TOTAL 11953.2 MEAN 32.7 MAX 1000 MIN 4.0 AC-FT 23710

559

365

10640

2920

3370

851

1930

556

612

557

628

720

AC-FT

e Estimated

#### BIG SIOUX RIVER BASIN

#### 06482848 BEAVER CREEK AT CANTON, SD

LOCATION.--Lat 43°17'12", long 96°35'46", in SW\SW\SE\ sec.23, T.98 N., R.49 W., Lincoln County, Hydrologic Unit 10170203, on left bank about 1,000 ft downstream from county highway bridge, 1.0 mi southwest of Canton, and 2.2 mi upstream from mouth.

DRAINAGE AREA, -- 124 mi 2.

PERIOD OF RECORD. -- October 1982 to September 1989 (discontinued).

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,225 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. -- 7 years, 45.1 ft3/s, 32,670 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,570 ft<sup>3</sup>/s, June 17, 1984, gage height, 13.72 ft; maximum gage height, 14.61 ft, June 20, 1983; no flow July 29, Aug. 1, 2, 1988.

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

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 9	2215	*300	a*5.79	No other	peak grea	ter than base d	lischarge.

a Backwater from ice. Minimum daily discharge, 0.01 ft<sup>3</sup>/s, Aug. 8-12, 17-20.

REVISIONS.--The maximum discharge and maximum gage height (\*) for water year 1988 has been revised to \*50 ft<sup>3</sup>/s, Feb. 29, 1988, gage height, \*5.07 ft, backwater from ice. They supersede figures published in the report for 1988.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

CORRECTIONS .-- Average discharge for 1988, 5 years, 51.7 ft3/s, 37,460 acre-ft/yr.

		DIOGIAL	OL, 11 OO	DIO ILLI		MEAN VALUE	S S	DER 1900	IO BELLE	TELEN 1909		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	1.7	e2.5	e2.0	e4.0	e2.5	5.6	5.3	3.4	3.3	2.9	.48
2	2.3	1.7	e2.5	e2.0	e3.0	e2.5	5.4	4.9	3.2	3.0	1.7	.30
3	2.0	1.9	e2.5	e2.0	e2.5	e2.5	5.9	4.5	3.1	2.7	.91	.07
4	2.0	2.3	e3.0	e2.5	e2.5	e2.0	5.9	4.3	2.5	2.5	.72	.21
5	1.9	3.8	e2.6	e2.5	e2.0	e2.0	5.1	4.4	2.1	2.3	. 54	1.1
6	2.1	3.1	e2.7	e2.5	e2.0	e2.0	4.9	4.7	1.7	1.8	.31	1.1
7	2.0	1.9	e2.8	e2.0	e2.0	e2.5	5.0	4.8	1.4	1.1	.02	43
8	2.0	1.9	e2.5	e1.5	e2.0	e3.0	5.9	4.5	1.7	.42	e.01	77
9	2.1	1.7	e2.5	e1.5	e2.0	e80	5.6	4.0	1.8	36	e.01	22
10	2.0	1.7		e1.5	e2.5	e150	4.8	3.4	1.2	.60	e.01	14
11	1.8	1.8	e2.5	e1.5	e2.5	e100	4.6	2.9	1.0	2.0	e.01	23
12	1.8	5.4	e2.8	e1.5	e2.5	e50	4.7	2.8	.88	5.0	e.01	26
13	2.0	5.7	e2.7	e1.5	e2.0	e30	5.4	2.8	. 52	5.7	.48	20
14	2.1	4.0	e2.3	e2.0	e2.0	e20	4.7	2.6	.74	5.3	.73	12
15	2.1	3.0	e2.0	e2.0	e2.0	e20	4.5	2.6	.55	5.6	.14	8.7
16	2.0	2.6	e2.0	e2.5	e2.0	e15	4.7	2.3	.11	5.0	. 14	6.3
17	2.5	2.5	e2.0	e2.5	e2.0	e15	4.7	2.2	. 25	8.9	e.01	
18	2.5	3.1	e2.0	e3.0	e2.0	e10	4.8	2.9	3.7	33	e.01	4.6
19	2.3	2.9	e2.0	e3.0	e2.0	e7.0	4.8	3.6	3.7	17	e.01	2.8
20	2.4	2.2	e2.2	e3.0	e2.0	e5.0	4.6	3.2	3.3	9.1	e.01	2.4
21	2.4	2.1	e2.3	e3.0	e2.0	e6.0	4.6	2.8	2.6	3.9	.08	2.7
22	2.3	2.5	e2.4	e3.5	e2.0	e8.0	4.5	2.7	2.2	3.4	.51	1.3
23	2.2	2.4	e3.0	e3.5	e2.0	e10	4.5	2.5	2.4	3.6	.15	. 83
24	2.0	2.5	e2.5	e3.5	e2.5	17	4.7	2.1	2.9	4.6	.09	. 59
25	2.4	2.4	e2.5	e3.0	e3.0	14	7.9	1.9	4.3	3.0	.11	. 56
26	2.4	e2.5	e2.0	e3.0	e2.5	12	7.4	1.9	8.3	2.3	23	.36
27	2.1	e2.5	e2.0	e3.5	e2.5	12	6.7	1.9	7.1	2.0	12	. 83
28	2.0	e2.5	e2.0	e4.0	e2.5	10	9.5	1.9	6.2	1.6	7.9	.32
29	2.3	e2.5	e2.0	e5.0		8.5	7.1	2.2	4.7	7.4	3.1	.19
30	2.4	e2.5	e2.0	e5.0		7.3	6.1	2.3	3.7	15	1.6	.45
31	1.9		e2.0	e5.0		6.1		3.1		8.5	.94	
TOTAL	67.5	79.3	73.3	84.5	64.5	631.9	164.6	98.0	81.25	169.98	58.16	278.89
MEAN	2.18	2.64	2.36	2.73	2.30	20.4	5.49	3.16	2.71	5.48	1.88	9.30
MAX	3.2	5.7	3.0	5.0	4.0	150	9.5	5.3	8.3	33	23	77
MIN	1.8	1.7	2.0	1.5	2.0	2.0	4.5	1.9	.11	.36	.01	.07
AC-FT	134	157	145	168	128	1250	326	194	161	337	115	553
IIC II	104	137	143	100	120	1230	320	194	101	337	113	333

CAL YR 1988 TOTAL 1747.93 MEAN 4.78 MAX 50 MIN .00 AC-FT 3470 WTR YR 1989 TOTAL 1851.88 MEAN 5.07 MAX 150 MIN .01 AC-FT 3670

e Estimated

#### 06483500 ROCK RIVER NEAR ROCK VALLEY. IA

LOCATION.--Lat 43°12'52", long 96°17'39", in SW\SW\sec.16, T.97 N., R.46 W., Sioux County, Hydrologic Unit 10170204, on left bank 3 ft upstream from bridge on county highway K30, 0.3 mi north of Rock Valley and at mile 19.1.

DRAINAGE AREA. -- 1,592 mi2.

PERIOD OF RECORD . -- June 1948 to current year.

REVISED RECORDS. -- WSP 1439: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,222.54 ft above National Geodetic Vertical Datum of 1929.
Prior to Aug. 13, 1952, nonrecording gage with supplementary water-stage recorder operating above 6.2 ft gage height. June 4, 1949, to Aug. 12, 1952, and Aug. 13, 1952, to May 4, 1976, water-stage recorder, at site 3.2 mi downstream at datum 10.73 ft lower.

REMARKS.--Estimated daily discharges: Nov. 10, 16-22, Nov. 27 to Mar. 10, and Mar. 15-23. Records good except those for estimated daily discharges, which are poor. Periodic observations of water temperature and specific conductance are published in this report as miscellaneous water-quality data. U.S. Army Corps of Engineers rain-gage and satellite data-collection platform at station.

AVERAGE DISCHARGE.--41 years, 412 ft<sup>3</sup>/s, 3.51 in/yr, 298,500 acre-ft/yr; median of yearly mean discharges, 300 ft<sup>3</sup>/s, 2.6 in/yr, 217,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 40,400 ft<sup>3</sup>/s, Apr. 7, 1969, gage height, 17.32 ft, site and datum then in use; no flow for many days during winter period in 1959 and 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1897 reached a stage of 17.0 ft, former site and datum, discharge not determined, from information by State Highway Commission.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 3,000 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	0015	*3,340	*11.39	No other p	eak greate	r than base	discharge.

Minimum daily discharge, 5.4 ft<sup>3</sup>/s, Feb. 3.

		DISCHARGE,	CUBIC	FEET PER	SECOND	, WATER YEAR MEAN VALUES	OCTOBER	1988 TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	70	34	30	22	19	12	345	296	159	209	47	29
2	64	35	80	17	9.0	10	310	263	141	168	43	26
3	55	36	88	19	5.4	9.4	288	234	125	142	40	25
4	50	41	58	21	6.0	8.0	265	213	112	156	36	30
5	45	50	74	32	7.0	7.0	245	193	102	139	33	29
6	43	52	84	25	8.0	7.2	231	173	93	122	30	29
7	41	54	62	18	9.9	8.5	218	161	83	107	29	46
8	40	53	30	14	8.0	40	215	152	75	94	27	69 67
9	39	54	19	15	9.0	125	201	140	69	81	24	67
10	35	46	15	15	14	350	192	129	64	72	22	68
11	34	48	12	16	17	2670	186	121	59	66	21	57
12	32	54	30	17	18	2910	178	111	54	99	21	49
13	33	59	50	19	18	1610	174	104	50	159	21	44
14	34	60	24	23	17	972	164	99	49	209	21	40
15	32	62	15	22	15	540	159	94	49	223	20	36
16	30	40	20	22	14	310	153	89	47	169	18	30
17	32	28	25	23	14	180	148	82	46	145	17	28
18	33	50	37	32	12	160	143	83	51	186	16	25
19	31	46	33	40	10	340	139	87	47	174	16	24
20	32	33	30	27	11	250	135	83	42	147	20	25
21	30	36	28	33	9.4	265	133	78	41	127	27	28
22	30	50	33	54	7.3	285	128	76	41	113	27	27
23	30	72	31	42	6.5	340	124	91	42	101	58	25
24	31	78	29	40	11	1000	124	80	46	91	49	24
25	30	81	26	30	29	1570	130	731	54	82	30	24
26	32	88	27	19	27	1140	126	763	80	72	59	23
27	30	200	25	22	22	835	137	414	110	61	123	21
28	29	27	23	31	16	683	263	277	370	52	65	20
29	30	75	21	45		557	298	210	382	64	49	20
30	31	50	23	66		461	311	173	276	70	40	22
31	34		30	58		391		164		60	33	
TOTAL	1142	1692 1	112	879	369.5	18046.1	5863	5964	2959	3760	1082	1010
MEAN	36.8		5.9	28.4	13.2	582	195	192	98.6	121	34.9	33.7
MAX	70	200	88	66	29	2910	345	763	382	223	123	69
MIN	29	27	12	14	5.4	7.0	124	76	41	52	16	20
AC-FT	2270		210	1740	733	35790	11630	11830	5870.	7460	2150	2000

CAL YR 1988 TOTAL 85096 MEAN 233 MAX 1750 MIN 11 AC-FT 168800 CFSM .15 IN. 1.99 WTR YR 1989 TOTAL 43878.6 MEAN 120 MAX 2910 MIN 5.4 AC-FT 87030 CFSM .08 IN. 1.03

## 06485500 BIG SIOUX RIVER AT AKRON, IA (National stream-quality accounting network station)

LOCATION.--Lat 42°50'14", long 96°33'41", in SW\sE\sSW\sec.30, T.93 N., R.48 W., Plymouth County, on left bank 15 ft downstream from Iowa Highway 403 bridge, 0.5 mi northwest of Akron, and 2.9 mi upstream from Union Creek.

DRAINAGE AREA. -- 8,424 mi<sup>2</sup>, of which 1,487 mi<sup>2</sup> is probably noncontributing.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD . -- October 1928 to current year.

REVISED RECORDS.--WSP 1309: 1929(M), 1931-33(M), 1936(M), 1938(M), 1940(M). WSP 1389: Drainage area. WDR SD-84-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,118.90 ft above National Geodetic Vertical Datum of 1929. Prior to Dec. 3, 1934, nonrecording gage at bridge 0.5 mi downstream at same datum. From Dec. 3, 1934, to Oct. 31, 1985, water-stage recorder at site 0.6 mi downstream at same datum.

REMARKS.--Records good except those for estimated daily discharges, which are poor. U.S. Army Corps of Engineers satellite data-collection platform at station. Several observations of water temperature and specific conductance were made during the year.

AVERAGE DISCHARGE. --61 years, 1,030 ft<sup>3</sup>/s, 746,200 acre-ft/yr; median of yearly mean discharges, 750 ft<sup>3</sup>/s, 543,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 80,800 ft<sup>3</sup>/s, Apr. 9, 1969, gage height, 22.99 ft; minimum daily, 4.0 ft<sup>3</sup>/s, Jan. 17, 1977.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 3,500 ft3/s and maximum (\*):

Date	Time	Discharge (ft 3/s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 12	1900	a*4.100	*15.36	No other	peak grea	ter than base d	lischarge.

a Backwater from ice. Minimum daily discharge, 106 ft<sup>3</sup>/s, Aug. 20.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MEAN VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL. AUG SEP e160 e140 e180 e120 e160 e140 e180 e120 e170 e140 e180 e120 e180 e180 e140 e120 e200 e140 e170 e120 e200 e140 e170 e120 e190 e120 e140 e170 e190 e140 e170 e120 e190 e160 e200 e180 e120 e160 e1000 e180 e120 e160 e2000 e180 e120 e160 e4000 e180 e120 e3500 e150 e170 e120 e150 e3000 e170 e130 e150 e2500 e170 e130 e150 e2000 e170 e130 e140 e1400 e160 e130 e140 e1450 e160 e150 e1500 e140 e160 e150 e1500 e140 e155 e150 e130 e1300 e155 e160 e130 e155 e160 e130 e150 e170 e130 e140 e170 e120 e140 e170 e120 e140 e170 e120 e140 e180 e120 e140 e190 e140 e190 e140 e200 TOTAL MEAN MAX MIN AC-FT 

CAL YR 1988 TOTAL 221655 MEAN 606 MAX 3010 MIN 98 AC-FT 439700 WTR YR 1989 TOTAL 147415 MEAN 404 MAX 4000 MIN 106 AC-FT 292400

e Estimated

#### BIG SIOUX RIVER BASIN

#### 06485500 BIG SIOUX RIVER AT AKRON, IA--Continued (National stream-quality accounting network station)

#### WATER-QUALITY RECORDS

PERIOD OF RECORD, -- October 1966 to current year.

PERIOD OF DAILY RECORD. --SPECIFIC CONDUCTANCE: October 1974 to September 1981. WATER TEMPERATURE: October 1974 to September 1981.

EXTREMES FOR PERIOD OF DAILY RECORD . --

SPECIFIC CONDUCTANCE: Maximum daily, 2,310 microsiemens, Jan. 20, 1977; minimum daily, 260 microsiemens,

Mar. 20, 23, 1978.
WATER TEMPERATURE: Maximum daily, 31.0°C, Feb. 19, 1975, July 23, 1976, July 11, 1981; minimum daily, 0.0°C on many days during winter periods.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		******	w. doimiti	, 112	IIIII	OULODIN 1	10 51				
DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
OCT											
06 DEC	0855	236	895	8.80	214	5.5	12.5	22	743	16.0	154
21 MAR	1300	160	1390	8.25	305	1.5	0.0	4.3	734	13.5	96
28 JUN	1010	2610	400			6.0	8.0	110	739	11.0	96
29 SEP	1330	430	900	9.07	124	30.0	28.0	44	735	10.5	140
21	1155	145	840	8.96	111	24.0	22.0	21	730	13.6	163
	COLI-	STREP-									
	FORM, FECAL, 0.7 UM-MF	TOCOCCI FECAL, KF AGAR (COLS.	HARD- NESS TOTAL (MG/L	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED	200000	SODIUM AD- SORP- TION	POTAS- SIUM, DIS- SOLVED	ALKA- LINITY LAB (MG/L	SULFATE DIS- SOLVED
DATE	(COLS./ 100 ML) (31625)	PER 100 ML) (31673)	AS CACO3) (00900)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)	SODIUM PERCENT (00932)	(00931)	(MG/L AS K) (00935)	AS CACO3) (90410)	(MG/L AS SO4) (00945)
OCT 06	K1500	60	450	110	43	42	17	0.9	5.5	226	190
DEC 21	48	K13	600	150		00	24	2		308	280
MAR					55	86			6.3		
28 JUN	K22	3500	170	43	14	12	13	0.4	8.2	111	63
29 SEP	1100		310	61	38	63	30	2	8.5	157	220
21	750	70	300	54	39	66	32	2	7.8	130	210
	CHLO-	FLUO-	SILICA,	SOLIDS, RESIDUE	SOLIDS, SUM OF	SOLIDS.	SOLIDS,	NITRO- GEN,	NITRO- GEN,	NITRO- GEN,	
	RIDE, DIS- SOLVED	RIDE, DIS- SOLVED	DIS- SOLVED (MG/L	AT 180 DEG. C DIS-	CONSTI- TUENTS, DIS-	DIS- SOLVED (TONS	DIS- SOLVED (TONS	NITRITE DIS- SOLVED	NITRATE DIS- SOLVED	NO2+NO3 DIS- SOLVED	
DATE	(MG/L AS CL) (00940)	(MG/L AS F) (00950)	AS SIO2) (00955)	SOLVED (MG/L) (70300)	SOLVED (MG/L) (70301)	PER AC-FT) (70303)	PER DAY) (70302)	(MG/L AS N) (00613)	(MG/L AS N) (00618)	(MG/L AS N) (00631)	
OCT											
06	51	0.30	10	605	633	0.82	386	0.040	3.96	4.00	
21 MAR	110	2.0	14	949	921	1.29	410	0.030	6.97	7.00	
28 JUN	15	0.20	10	258	243	0.35	1820	0.080	1.92	2.00	
29 SEP	85	0.40	0.20	566	573	0.77	657	<0.010	- 5 51	<0.100	
21	83	0.30	0.07	521	531	0.71	204	0.050	0.550	0.600	

BIG SIOUX RIVER BASIN 281 06485500 BIG SIOUX RIVER AT AKRON, IA--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

	72
ост	
06 0.030 0.040 0.05 2.4 0.490 0.160 0.130 10 3 DEC	
21 0.070 0.060 0.08 0.90 0.600 0.490 0.430 <10 2	86
28 0.870 0.940 1.2 2.0 0.850 0.340 0.280 50 3	56
JUN 29 0.030 0.020 0.03 1.3 0.340 0.050 0.030 30 2	84
SEP 21 0.060 0.050 0.06 4.4 0.380 <0.010 <0.010 10 1	66
22 0.000 0.000 0.00 4.4 0.000 0.010 10 12	
DIS-	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT	
06 <0.5 <1 <1 <3 2 9 <5 36 12	<0.1
DEC 21 <0.5 <1 2 <3 3 6 <5 52 110	<0.1
MAR 28 <0.5 1 2 <3 6 73 <5 11 17	0.1
JUN 29 <0.5 <1 <1 <3 2 9 <1 34 3	<0.1
SEP	
21 <0.5 <1 2 <3 3 26 <1 36 3	<0.1
DATE (UG/L (UG/L (UG/L (UG/L (UG/L (UG/L (UG/L PENDED PENDED AS MO) AS NI) AS SE) AS AG) AS SR) AS V) AS ZN) (MG/L) (T/DAY)	SED. SUSP. SIEVE DIAM. 7 FINER THAN .062 MM (70331)
OCT	
06 <10 1 4 <1.0 430 <6 4 120 76 DEC	99
21 <10 1 6 <1.0 580 <6 18 25 11	64
MAR 28 <10 8 1 <1.0 150 <6 7 638 4500	97
JUN 29 <10 4 2 <1.0 340 <6 6 312 362	100
SEP 21 <10 4 2 <1.0 340 <6 53 155 61	99

#### 06485696 BRULE CREEK NEAR ELK POINT. SD

LOCATION.--Lat 42°48'32", long 96°41'11", in SWkSWk sec.6, T.92 N., R.49 W., Union County, Hydrologic Unit 10170203, on right bank 10 ft upstream from county highway bridge, 8.8 mi upstream from mouth, and 8.5 mi north of Elk Point.

DRAINAGE AREA. -- 204 mi 2.

REVISED RECORDS. -- WDR SD-84-1: Drainage area.

PERIOD OF RECORD . -- October 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,150 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Several observations of specific conductance and water temperature were made during the year.

AVERAGE DISCHARGE. -- 7 years, 77.3 ft3/s, 56,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 6,290 ft<sup>3</sup>/s, June 28, 1983, gage height, 22.39 ft; minimum daily discharge, 1.1 ft<sup>3</sup>/s, Sept. 24, 26, 1989.

EXTREMES FOR CURRENT YEAR. -- Peak discharges greater than base discharge of 500 ft3/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar. 11	1230	a	*9.86	July 29	1215	*454	8.38

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

a Backwater from ice. Minimum daily discharge, 1.1 ft<sup>3</sup>/s, Sept. 24, 26.

						MEAN VALUE	S					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.7	6.9	e10	e10	e10	e6.0	18	19	4.3	4.2	9.8	2.1
2	7.4	7.0	e10	e10	e8.0	e5.0	17	17	4.1	4.0	4.9	1.6
2	6.2	7.5	e10	e10	e6.0	e5.0	16	16	3.6	3.7	3.5	1.7
4	5.5	7.4	e10	e10	e5.0	e5.0	11	13	3.3	3.3	2.7	3.1
5	5.6	7.7	e10	e10	e4.0	e5.0	10	12	3.2	2.9	2.8	2.2
6	5.3	7.2	e10	e10	e4.0	e4.0	10	11	3.1	2.5	4.0	1.5
7	5.6	6.8	e10	e10	e4.0	e4.0	10	10	e2.8	2.2	2.3	22
8	7.1	6.6	e10	e9.0	e5.0	e5.0	10	10	e2.5	2.1	1.9	19
9	6.4	6.7	e10	e8.0	e5.0	e50	10	9.4	e2.5	2.1	1.7	5.5
10	5.9	9,8	e10	e8.0	e5.0	e100	10	9.8	e2.0	1.8	1.6	10
11	5.4	9.6	e9.0	e8.0	e6.0	e150	10	8.8	e2.0	1.7	1.4	5.1
12	5.1	11	e8.0	e8.0	e6.0	e100	9.6	8.7	e2.0	19	1.4	3.2
13	5.1	11	e9.0	e8.0	e6.0	e50	8.5	7.7	e2.0	26	2.2	2.4
14	5.1	12	e9.0	e8.0	e6.0	e40	8.0	7.7	e2.0	4.3	2.0	2.3
15	5.1	10	e9.0	e8.0	e6.0	e50	10	6.9	e2.0	6.1	1.6	2.3
16	5.0	9.2	e9.0	e10	e6.0	e75	15	6.7	e2.0	4.2	1.5	2.0
17	5.5	8.2	e9.0	e10	e6.0	e50	14	5.8	e2.0	4.4	1.4	2.0
18	5.9	e9.0	e9.0	e10	e6.0	e40	14	6.1	e2.0	47	1.3	1.9
19	6.2	e9.0	e10	e10	e5.0	e50	15	6.8	e2.0	6.2	1.3	1.5 1.5
20	5.7	e9.0	e12	e10	e5.0	e50	16	6.5	e2.0	17	1.3	1.5
21	5.8	e10	e15	e10	e5.0	e50	15	6.0	e2.0	6.0	39	1.3
22	6.0	e10	e15	e10	e4.0	e70	14	5.5	e2.0	3.7	2.5	1.2
23	5.7	e10	e15	e10	e3.0	e60	13	5.2	e2.0	2.8	1.6	1.2
24	5.6	e9.0	e15	e10	e3.0	e50	13	5.0	e2.0	2.4	15	1.1
25	5.2	e9.0	e15	e10	e3.0	e40	16	4.5	e5.0	2.1	8.2	1.2
26	5.5	e8.0	e10	e10	e4.0	31	17	4.3	e10	1.9	9.3	1.1
27	5.5	e8.0	e10	e10	e5.0	29	19	3.7	e9.0	1.7	7.4	1.2
28	5.8	e8.0	e10	e10	e6.0	23	22	3.8	e8.0	1.6	21	1.2
29	6.1	e8.5	e9.0	e10		21	35	4.7	e7.0	153	14	1.3
30	5.6	e9.0	e8.0	e10		20	28	4.1	e6.4	45	5.9	1.2
31	6.4		e10	e10		19		4.1		12	3.8	
TOTAL	182.0	261.1	325.0	295.0	147.0	1257.0	434.1	249.8	104.8	396.9	178.3	104.9
MEAN	5.87	8.70	10.5	9.52	5.25	40.5	14.5	8.06	3.49	12.8	5.75	3.50
MAX	9.7	12	15	10	10	150	35	19	10	153	39	22
MIN	5.0	6.6	8.0	8.0	3.0	4.0	8.0	3.7	2.0	1.6	1.3	1.1
AC-FT	361	518	645	585	292	2490	861	495	208	787	354	208

CAL YR 1988 TOTAL 9967.5 MEAN 27.2 MAX 400 MIN 2.3 AC-FT 19770 WTR YR 1989 TOTAL 3935.9 MEAN 10.8 MAX 153 MIN 1.1 AC-FT 7810

e Estimated

#### MISSOURI RIVER MAIN STEM

#### 06486000 MISSOURI RIVER AT SIOUX CITY. IA

LOCATION.--Lat 42°29'09", long 96°24'49", in NW\sEk sec.16, T.29 N., R.9 E., sixth principal meridian, Dakota County, Nebraska, Hydrologic Unit 10230001, on right bank on upstream side of bridge on U.S. Highway 20 and 77 at South Sioux City, Nebraska, 1.9 mi downstream from Big Sioux River, and at mile 732.2.

DRAINAGE. -- 314,600 mi<sup>2</sup>, approximately. The 3,959 mi<sup>2</sup> in Great Divide basin are not included.

#### WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1897 to current year in reports of the U.S. Geological Survey. Prior to October 1928 and October 1931 to September 1938, monthly discharges only, published in WSP 1310. January 1879 to December 1890, monthly discharges only, in House Document 238, 73rd Congress, 2d session, Missouri River. Gage-height records collected in this vicinity September 1878 to December 1899 are contained in reports of Missouri River Commission and since July 1889 are contained in reports of U.S. Weather Bureau.

REVISED RECORDS. -- WSP 716: 1929-30. WSP 876: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,056.98 ft above National Geodetic Vertical Datum of 1929. Sept. 2, 1878, to Dec. 31, 1905, nonrecording gages at various locations within 1.7 mi of present site and at various datums. Jan. 1, 1906, to Feb. 14, 1935, nonrecording gage, and Feb. 15, 1935, to Sept. 30, 1969, water-stage recorder at site 227 ft downstream at datum 19.98 ft higher, and Oct. 1, 1969, to Sept. 30, 1970, at datum 20.00 ft higher. Oct. 1, 1970, to Jan. 30, 1981, water-stage recorder at site 227 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Jan. 6, 7, and Feb. 5-28. Records good except those for estimated daily discharges, which are poor. Flow regulated by upstream main-stem reservoirs. U.S. Army Corps of Engineers rain-gage and satellite data-collection platform at station.

AVERAGE DISCHARGE. -- 92 years, 31,970 ft3/s, 23,160,000 acre-ft/yr.

CAL YR 1988 TOTAL 9912300 MEAN 27080 MAX 38400 MIN 11100 AC-FT 19660000 WTR YR 1989 TOTAL 9081960 MEAN 24880 MAX 35200 MIN 5060 AC-FT 18010000

EXTREMES FOR PERIOD OF RECORD. --Maximum discharge, 441,000 ft<sup>3</sup>/s, Apr. 14, 1952, gage height, 24.28 ft, datum then in use; minimum, 2,500 ft<sup>3</sup>/s, Dec. 29, 1941; minimum gage height, 7.83 ft, Jan. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35,500 ft<sup>3</sup>/s, Nov. 3; maximum gage height, 19.20 ft, July 18; minimum daily discharge, 5,060 ft<sup>3</sup>/s, Jan. 9; minimum gage height, 7.83 ft, Jan. 9, result of freeze up.

		DISCH	ARGE, CUB	C FEET PE	R SECOND	, WATER Y MEAN VALU	YEAR OCTOBE JES	R 1988 TO	SEPTEMBE	R 1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	31100	34700	13300	14300	13500	13800	29200	31300	31300	31800	31400	29100
2	31000	34800	13500	12700	10800	13700	29300	31000	31700	31500	31400	29700
3	30700	35200	13700	13300	10300	11200	29700	31300	31400	30100	31700	29700
4	30600	34900	13500	14100	12200	9800	29500	31700	31800	29600	31800	31600
5	31300	35000	13600	14000	15900	12000	29000	31700	31700	30700	32000	30000
6	32200	35100	13700	14800	18100	14300	28600	31600	31500	29100	32000	28500
7	32500	34700	13700	14000	18000	15600	28900	31300	32000	27800	32000	29400
8	32700	34800	13400	8700	18000	14400	29800	31500	32100	30300	32000	29600
9	32800	33000	13100	5060	17800	15200	29500	31600	31900	29800	31800	27600
10	32800	30700	13200	11700	18000	18100	29900	32300	31900	28500	31600	25100
11	32900	29200	12500	15300	18700	16800	30400	32300	32000	30200	31300	24400
12	33300	26700	12400	15300	18800	16000	31300	32700	32700	30600	31400	25300
13	33300	23500	14300	14900	18300	16300	31100	32500	32100	30700	31800	26700
14	33800	20000	13600	14100	18000	16200	30700	32600	31200	31500	31800	27000
15	34100	17200	12600	14000	17900	13800	30600	32400	31600	32900	31600	27100
16	34000	15100	11900	13800	17900	12500	30500	32500	31800	32100	31600	27400
17	33700	13700	11800	14000	17800	11800	30600	33100	31800	32400	32000	27600
18	33500	13700	12700	14100	17600	10500	30900	33500	32400	33300	32400	28000
19	33500	13800	13300	14200	16300	11300	31300	33400	31600	31200	32400	28000
20	33900	13700	12900	14400	14800	11500	31400	32800	31400	30000	32300	28200
21	33800	13700	12400	13700	16200	12200	32100	32600	31500	28600	33200	28300
22	33700	13600	12700	14200	16600	12300	32100	32600	31500	30500	33200	28500
23	33900	13500	12900	14800	14900	12400	32100	32500	31400	29500	32300	28500
24	33800	13000	12300	14400	14700	12900	32000	32200	31400	28600	31800	29000
25	34300	13600	11800	13900	16200	15100	32100	31400	32300	30400	31600	29000
26	34000	13500	11700	13600	15500	18600	32100	31200	31000	30000	31700	29100
27	34100	13600	12600	13700	13700	21900	32000	31100	28900	29200	31200	29400
28	33800	12900	11400	13900	13100	24800	32300	30700	30300	30500	30100	29400
29	33800	13600	11800	13800		27800	31900	31400	29300	32300	29700	29400
30	33800	13400	12700	13900		29200	31400	30200	29000	32400	28800	29400
31	34300		14400	14000		29100		30500		31500	28500	
TOTAL	1027000	663900	399400	420660	449600	491100	922300	989500	942500	947600	978400	850000
MEAN	33130	22130	12880	13570	16060	15840	30740	31920	31420	30570	31560	28330
MAX	34300	35200	14400	15300	18800	29200	32300	33500	32700	33300	33200	31600
MIN	30600	12900	11400	5060	10300	9800	28600	30200	28900	27800	28500	24400
	2037000	1317000	792200	834400	891800	974100				1880000	1941000	1686000

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. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or floodflow analyses, depending on the type of data collected.

#### Crest-stage partial-record stations

The following table contains annual maximum discharges for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

		discharge at crest-stage partial-recor				Annual Maximum		
Station No.	Station Name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Gage height (ft)	Dis- charge (ft /s	
		SPRING CREEK BASIN						
06354860	Spring Creek near Herreid, SD	Lat 45°58'52", long 100°06'28", in SWk sec.13, T.127 N., R.77 W., Campbell County, Hydrologic Unit 10130102, on left bank 0.5 mi upstream from county highway bridge, 2.4 mi southwest of Herreid, and 13.2 mi upstream from highwater line of Lake Oahe.	440, of which 220 is probably noncon- tributing	1962-86 <del>‡</del> , 1989	3-26-89	9.75	701	
		BAD RIVER BASIN						
06440850	Medicine Creek near Philip, SD	Lat 44°03'17", long 101°29'12", in SE's sec. 8, T.1 N., R.22 E., Haakon County, Hydrologic Unit 10140102, at bridge on county highway, 1.3 mi upstream from mouth, and 9.0 mi east of Philip.	undeter- mined	1989	1989		(a)	
06441100	Plum Creek near Hayes, SD	Lat 44°20'41", long 101°07'40", in SWk sec.32, T.5 N., R.25 E., Stanley County, Hydrologic Unit 10140102, at bridge on U.S. Highway 14 and State Highway 63, 7.0 mi southwest of Hayes.	undeter- mined	1989	1989	adam -	(a)	
		MISSOURI RIVER BASIN	1					
06452330	Campbell Creek near Geddes, SD	Lat 43°11'08", long 98°48'19", in SEk sec.30, T.97 N., R.67 W., Charles Mix County, Hydrologic Unit 10140101, at bridge on county highway, 1.1 mi upstream from mouth, and 7.5 mi southwest of Geddes.	undeter- mined	1989	7-15-89	7.30	<sup>b</sup> 200	
		JAMES RIVER BASIN						
06477150	Rock Creek near Fulton, SD	Lat 43°45'39", long 97°54'25", in NWkNWk sec.3, T.103 N., R.59 W., Hanson County, Hydrologic Unit 10160011, attached to right downstream wingwall of highway bridge, 4.9 mi northwest of Fulton, and 9.5 mi upstream from mouth. Prior to 1989 at same site and different datum.		1966-72 <del>†</del> , 1972-79, 1989	3-27-89	<sup>d</sup> 6.43	<10	
06478052	Enemy Creek near Mitchell, SD	Lat 43°38'33", long 97°59'09", in NWkNWk sec.13, T.102 N., R.60 W., Davison County, Hydrologic Unit 10160011, attached to right downstream wingwall of highway bridge, 7.3 mi upstream from mouth, and 4.5 mi southeast of Mitchell.	163	1975-87 <b>‡</b> , 1989	3-27-89	<sup>d</sup> 5.29	<2	

					Ann	ual Maxi	num
Station No.	Station Name	Location	Drainage area (mi <sup>2</sup> )	Period of record	Date	Gage height (ft)	Dis- charge (ft /s)
		JAMES RIVER BASINCont	inued				
06478300	Dry Creek near Parkston, SD	Lat 43°22'18", long 97°49'23", in SEk sec.21, T.99 N., R.59 W., Hutchinson County, Hydrologic Unit 10160011, attached to left upstream wingwall on county highway bridge and 8.5 mi southeast of Parkston. Prior to 1989 at same site and different datum.	76.8	1955-80, 1989	3-10-89	<sup>c e</sup> 1.81	<2
06478390	Wolf Creek near Clayton, SD	Lat 43°22'18", long 97°36'12, in NW\LE sec.29, T.99 N., R.57 W., Hutchinson County, Hydrologic Unit 10160011, attached to left downstream pier on highway bridge 4.1 mi upstream from mouth, and 5.6 mi southeast of Clayton.	396	1975-88 <b>+</b> , 1989	3-10-89	<sup>c</sup> 8.39	100
		VERMILLION RIVER BAS	IN				
06479000	Vermillion River near Wakonda, SD	Lat 42°59'27", long 96°57'49", in SWkNWk sec.2, T.94 N., R.52 W., Clay County, Hydrologic Unit 10170102, attached to right downstream wingwall of State Highway 19, 4.3 mi downstream from Frog Creek, 7.4 mi southeast of Wakonda, and 29.6 mi upstream from mouth.	2,170	1945-83‡, 1989	3-13-89	<sup>c e</sup> 7.60	400

<sup>†</sup> Operated as a continuous-record gaging station.
a No evidence of any flow during the water year.
b Estimated.
c Backwater.
d Observed.
e From floodmark.

The following daily precipitation stations are listed in downstream order.

#### CHEYENNE RIVER BASIN

434002103214500 PRECIP AT CUSTER STATE PARK AT RACETRACK BUTTE, NEAR FAIRBURN, SD (Formerly published as Custer State Park)

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°40'02", long 103°21'45", in SW\sE\sE\sec.26, T.4 S., R.6 E., Custer County, Hydrologic Unit 10120109, 100 ft east of Wildlife Loop Road CSP #1, 0.8 mi southeast of Racetrack Butte, and 7.0 mi west of Fairburn.

PERIOD OF RECORD. --October 1983 to current year. Prior to October 1987, published as Custer State Park.

INSTRUMENTATION. -- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 3,970 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records poor for water years 1988 and 1989.

		ACCUMULATED	PRECI	PITATION,		WATER TION V		1987	TO SEPTEMBER	1988		
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.05	.00	.00	.00	.00	.00	1.20	.00	e.00	e.00	e.00
2	.00	.44	.00	.00	.00	.00	.00	.00	.00	e.00	e.08	e.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	e1.01	.00
4	.00	.00	.00	.00	.08	.03	.00	.00	e.00	e.00	e.52	.00
5	.00	.00	.00	.00	.04	.00	.00	.00	e.00	e.03	e.00	.00
6	.00	.00	.00	.00	.01	.00	.00	.05	e.00	e.00	e.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.33	e.00	e.00	e.00	.00
8	.00	.10	.00	.00	.00	.00	.00	.00	e.00	e.00	e.00	.00
9	.23	.00	.00	.00	.01	.00	.00	.00	e.00	e.00	e.00	.00
10	.00	.00	.00	.00	.02	.07	.00	.00	e.00	e.34	e.00	.00
11	.00	.02	.00	.05	.00	.05	.00	.00	e.00	e.08	e.00	.16
12	.00	.00	.00	.00	.00	.00	.00	.00	e.12	e.00	e.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	e.11	e.00	e.12	.00
14	.05	.00	.00	.00	.00	.00	.00	.00	e.52	e.00	e.00	.00
15	.00	.00	.00	.00	.03	.00	.00	.00	e.00	e.00	e.00	.00
16	.00	.00	.00	.00	.00	.05	.00	.04	e.00	e.10	e.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00		e.02	e.00	.00
18	.03	.00	.00	.00	.00	.00	.00	.09	e.00	e.15	e.00	.02
19	.00	.00	.00	.00	.00	.00	.00	.60	e.00	e.37	e.00	.25
20	.00	.00	.00	.00	.00	.00	.00	. 25	e.00	e.00	e.16	.00
21	.00	.00	.10	.00	.00	.00	.07	.00	e.00	e.00	e.00	.00
22	.00	.00	.00	.00	.00	.00	e.25	.00		e.00	e.06	.00
23	.04	.00	.00	.05	.00	.00	e.00	.00	e.85	e.00	e.00	.00
24	.00	.00	.00	.00	.00	.00	e.09	.00	e.00	e.00	e.00	.00
25	.00	.00	.00	.00	.00	.00	e.43	.00	e.04	e.00	e.00	.00
26	.00	.00	.00	.00	.00	.00	.02	.20	e.00	e.00	e.00	.00
27	.00	.00	. 15	.00	.00	.00	.00	.00		e.00	e.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00		e.00	e.00	.04
29	.00	.00	.00	.00	.00	.00	.00	.00		e.00	e.00	.00
30	.00	.00	.15	.00		.00	.00	. 12		e.00	e.00	.00
31	.00		.00	.00		.00		.12		e.00	e.00	
TOTAL	0.35	0.61	0.40	0.10	0.19	0.20	0.86	3.00	2.30	1.09	1.95	0.47

e Estimated

# 434002103214500 PRECIP AT CUSTER STATE PARK AT RACETRACK BUTTE, NEAR FAIRBURN, SD--Continued ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

SUMMATION VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP .00 .00 .00 .00 .00 .00 .00 e.00 .07 .03 e.00 .00 2 e.00 .00 .00 .00 .00 e.00 .02 .07 .00 .08 .00 .00 3 .00 .00 .00 e.00 .00 e.00 .10 .28 .00 .00 . 23 10 .00 .00 .00 .00 .00 .00 e.00 .00 .00 e.00 .05 .00 .00 5 .00 .00 .00 e.00 .00 .00 e.01 .12 .00 .00 .00 6 .00 .00 .00 e.00 .00 .00 e.03 .00 .04 .00 .16 .00 .00 .00 .09 e.00 .00 .00 e.05 .00 .10 .00 .00 .07 8 .00 .00 .00 e.00 .00 .00 e.16 .04 .00 .00 .00 1.15 9 .00 .09 .00 e.00 .00 .00 e.00 .00 .00 .00 .00 .23 10 .00 .00 .00 e.01 .00 .00 e.00 .00 .00 .00 .00 .59 11 .00 .00 e.00 .00 .03 e.00 .00 .00 .00 .00 .00 12 .00 .00 .00 e.00 .00 .00 e.00 .20 .00 .12 .00 .00 13 .00 .19 .00 e.00 .08 .07 e.00 .19 .00 .70 .04 .00 14 .00 .06 .00 e.00 .04 .08 e.00 .00 .00 . 56 . 58 .00 15 .05 .00 .00 e.00 .00 .79 .00 .08 .00 .00 .00 e.00 16 .02 .00 .00 e.00 .00 .00 .01 .03 .02 .09 .41 e.16 17 .04 .00 e.00 .00 .40 .00 .00 .00 .15 .11 .39 e.06 .00 .06 .00 .03 18 .00 e.00 .00 .00 e.00 00 .00 .04 .00 19 00 .00 e.00 .00 .00 e.00 .00 00 .00 .20 .00 20 .00 .00 e.00 e.00 .00 .00 e.00 .00 .00 .00 .00 1.18 21 .00 .00 e.00 e.00 .00 .00 .00 .00 .03 .00 .00 .36 22 .00 .00 e.00 e.00 .00 .00 .00 .00 .07 .00 .00 .00 23 .00 .00 e.00 e.00 .00 .00 .00 .00 .00 .00 .00 .00 24 .00 .03 e.00 e.00 .00 e.00 .00 .00 .43 .00 .54 .00 25 .00 .00 e.10 e.00 .00 e.00 .02 .00 .04 .00 .00 .00 26 .00 .00 e.19 e.00 .08 e.00 .09 .00 .00 .00 .00 .00 e.00 27 .00 .00 e.00 .01 .02 .00 .05 .00 .00 e.02 . 43 28 .00 .07 e.00 .07 e.00 e.00 .00 .00 .00 .00 .02 .00 29 .00 .00 e.00 .02 .00 .00 e.00 ---.04 .00 .00 e.08 30 .00 e.00 .00 .03 e.00 ---.00 .00 .00 e.00 .08 .16 31 ---.00 e.00 e.02 e.00 ---.14 ---.00 .00 TOTAL 0.47 1.01 3.66 0.38 0.03 0.37 0.65 1.13 1.96 1.09 2.23 1.93

e Estimated

#### 434732103300000 PRECIP AT BISMARK LAKE NEAR CUSTER, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°47'32", long 103°30'55", in NW\nE\sW\nW\ sec.15, T.3 S., R.5 E., Custer County, Hydrologic Unit 10120109, 300 ft northeast of U.S. Forest Service Road 345, 1.0 mi north of Bismark Lake, and 3.7 mi east of Custer.

PERIOD OF RECORD. -- May to September 1989.

INSTRUMENTATION. --Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 5,280 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except that for estimated period, which is poor. Gage read daily by observer.

		ACCUMULATED	PRECIE	PITATION,	IN		WATER			1988	TO	SEPTEMBER	1989		
DAY	OCT	NOA	DEC	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1												.00	.14	.00	
2												.07	.00	.34	
3												.21	.00	.00	
4												.00	.00	.00	
5										.00		.00	.00	.00	
6										.00		.07	.00	.00	
7										.00		.23	.00	.00	
8										.00		.08	.00	.00	
9										.20		.00	.00	.05	
10										.00		.00	.45	.51	
11										.00		.00	.00	.12	
12										.65		.00	.14	.00	
13										.25		.00	.35	.00	
14										e.00		.00	.65	. 58	
15										.09		.00	.02	.00	
16										. 19		. 54	. 13	2.00	
17										.02		.00	.02	.00	
18										.00		.00	.00	.00	
19										.00		.00	.00	.06	
20										.00		.13	.00	.00	
21										.00		.00	.00	.00	
22										.00		.08	.00	.00	
23								100		.00		.70	.00	.00	
24										.00		.02	.00	. 17	
25										.00		.37	.00	.00	
26										.00		.00	.01	.00	
27										.09		.00	.00	.00	
28										.00		.00	.07	.00	
29										.00		.00	.29	.00	
30										. 47		.00	.00	.00	
31										.15			.00	.04	
TOTAL												2.50	2.27	3.87	

e Estimated

#### 434444103282000 CUSTER STATE PARK NEAR MT. COOLIDGE. SD

#### PRECIPITATION RECORDS

LOCATION. -- Lat 43°44'44", long 103°28'20", in NWkNEkSWk sec.36, T.3 S., R.5 E., Custer County, Hydrologic Unit 10120109, on State Highway 87, 0.25 mi south and 0.25 mi east of the entrance to Mt. Coolidge lookout tower, and 2.0 mi north of Blue Belle.

PERIOD OF RECORD .-- October 1983 to current year.

INSTRUMENTATION.--Non-shielded, weighing-type precipitation recorder. Elevation of gage is 5,400 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

REMARKS. -- Records poor for water years 1988 and 1989.

				,	SUM	MATION VA	LUES					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	e.00	e.00	e.00	e.00	e.06	.00	.00	.00	.00
2	.00	.38	.00	e.00	e.00	e.08	e.00	e.76	.00	.00	1.14	e.00
3	.00	.00	.00	e.00	e.00	e.00	e.00	e.00	.00	.00	. 93	e.00
4	.00	.00	.00	e.00	e.00	e.02	e.00	e.00	.00	.00	.30	e.00
5	.00	.00	.00	e.00	e.00	e.00	e.02	e.00	.00	.00	.00	e.00
6	.00	.00	.00	e.00	e.07	e.01	e.00	e.00	.00	.00	.00	e.00
7	.00	.04	.00	e.00	e.00	e.00	e.00	e.40	.00	.00	.00	e.00
8	.00	.00	.07	e.06	e.00	e.00	e.00	e.00	.00	.76	.00	e.00
9	.46	.00	.00	e.00	e.00	e.02	e.00	e.00	.00	.00	.00	e.00
10	.00	.06	.00	e.00	e.00	e.54	e.00	e.00	.00	.00	.00	e.00
11	.00	.00	.08	e.00	e.00	e.00	e.00	e.00	.00	.14	.00	e.06
12	.00	.00	.00	e.00	e.00	e.00	e.00	e.00	. 24	.00	.00	e.08
13	.00	.00	.07	e.00	e.00	e.00	e.00	e.00	. 26	.00	.00	e.00
14	. 25	.00	.00	e.00	e.00	e.00	e.00	e.00	.00	.00	.00	e.00
15	.00	.00	.00	e.00	e.07	e.00	e.00	e.00	.00	.00	.00	e.02
16	.00	.00	e.00	e.00	e.00	e.17	e.00	e.00	.00	.00	.00	e.08
17	.00	.00	e.00	e.00	e.00	e.00	e.00	e.00	.00	e.00	.00	e.00
18	.08	.00	e.00	e.01	e.00	e.00	e.00	e.13	.00	e.65	.00	e.00
19	.00	.00	e.00	e.00	e.12	e.00	e.00	e.41	.00	.05	.00	e.15
20	.00	.00	e.00	e.00	e.00	e.00	e.00	e.49	.00	.00	.00	e.00
21	.00	.00	e.00	e.00	e.00	e.00	e.03	e.00	.00	.00	.00	e.00
22	.00	.00	e.08	e.00	e.00	e.00	e.09	e.00	. 33	.00	.00	e.00
23	.00	.00	e.06	e.07	e.00	e.00	e.03	e.00	. 34	.00	.00	e.00
24	.00	.00	e.00	e.00	e.00	e.00	e.00	e.00	.02	.00	.00	e.00
25	.00	.00	e.00	e.00	e.00	e.00	e.36	e.00	.00	.00	.00	e.00
26	.00	.00	e.00	e.00	e.00	e.00	e.48	e.00	.00	.00	.00	e.00
27	.00	.00	e.17	e.00	e.00	e.00	e.00	e.00	.00	.00	.00	e.00
28	.00	.00	e.00	e.00	e.00	e.00	e.00	e.00	.03	.00	.00	e.25
29	.00	.00	e.00	e.00	e.00	e.00	e.00	e.00	.18	.00	.00	e.00
30	.00	.00	e.00	e.00		e.03	e.00	e.00	.00	.00	.00	e.00
31	.00		e.00	e.09		e.00		e.54		.00	.33	
TOTAL	0.79	0.48	0.53	0.23	0.26	0.87	1.01	2.79	1.40	1.60	2.70	0.64

CAL YR 1987 TOTAL 14.65 WTR YR 1988 TOTAL 13.30

e Estimated

290

#### CHEYENNE RIVER BASIN

#### 434444103282000 CUSTER STATE PARK NEAR MT. COOLIDGE, SD--Continued

## ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.15	.07	.00	.02	.00	.11	.00	.00
2	.00	.00	.00	.00	.06	.08	.02	.02	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.15	.01	.29	.24	.00	.00	.00
4	.00	.00	.00	.00	.04	.00	.02	.04	.00	.00	.00	.00
5	.00	.02	.00	.00	.01	.00	.01	.06	.00	.00	.00	.00
6	.00	.00	.06	.00	.00	.00	.02	.00	.14	.00	.25	.02
7	.00	.00	.00	.00	.00	.00	.01	.00	.13	.00	.00	1.65
8	.00	.00	.00	.00	.00	.00	.11	.06	.00	.00	.00	1.17
	.00	.28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.38
10	.00	.02	.00	.00	.00	.00	.00	.00	.00	.32	.30	e1.00
11	.00	.32	.00	.00	.00	.08	.00	.07	.00	.00	.08	e.00
12	.00	.11	.00	.00	.05	.00	.00	.35	.00	.35	.00	e.00
13	.00	. 17	.00	.00	.07	.00	.00	.22	.00	.47	.01	e.00
14	.00	.07	.00	.00	. 23	.12	.00	.02	.00	.88	.92	.00
15	.06	.00	.04	.00	.00	.00	.00	.12	.00	.05	.00	.00
16	.02	.00	.02	.00	.00	.01	.15	.00	. 52	.12	.84	.00
17	.33	.05	.00	.00	.00	.20	.07	.00	.02	.07	.00	.00
18	.00	.08	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.02	.00	.04	.00	.00	.00	.00	.00	.00	.14	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	. 87
21	.00	.00	.00	.00	.00	.00	.00	.01	.06	.00	.00	.76
22	.00	.00	.00	.00	.00	.00	.00	.01	.05	.00	.00	.00
23	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.01	.00	.00	.01	.00	.00	. 53	.00	.21	.00
25	.00	.00	.10	.00	.00	.00	.02	.00	.19	.00	.00	.00
26	.00	.00	.08	.00	. 14	.00	.16	.00	.00	.00	.00	.00
27	.00	.00	.01	.00	.02	.04	.49	.02	.00	.06	.00	.00
28	.00	.07	.00	.00	.11	.00	.02	.00	.00	.00	.00	.11
29	.00	.00	.00	.00		.05	.01	. 13	.01	.15	.00	.00
30	.00	.00	.00	.00		.05	.06	. 13	.00	.00	.00	.00
31	.00		.00	.00		.00		.15		.00	.00	
TOTAL	0.41	1.21	0.32	0.07	0.88	0.86	1.18	1.72	1.89	2.58	2.81	5.96

CAL YR 1988 TOTAL 13.44 WTR YR 1989 TOTAL 19.89

e Estimated

#### 434638103253500 PRECIP AT ROAD CAMP AT CUSTER STATE PARK, NEAR CUSTER, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°46'38", long 103°25'35", in NE½NW½SW½NE½, sec.20, T.3 S., R.6 E., Custer County, Hydrologic Unit 10120109, 0.1 mi north of U.S. Highway 16A at Road Camp, 2.2 mi northwest of Custer State Park Headquarters, and 8.0 mi east of Custer.

PERIOD OF RECORD. -- May to September 1989 (seasonal record).

INSTRUMENTATION.--Shielded, 8.0-in. diameter plastic gage, 48 in. tall. Elevation of gage is 4,660 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS .-- Records fair except those for estimated period, which are poor. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,	IN		WATER TION VA		OCTOBER	1988	TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1												.00	.30	.00	.00
2												.35	.00	.00	.00
3												.00	.00	.00	.00
4												.20	.00	.00	.00
5												.00	.00	.00	.00
6								- 4				.00	.00	.35	.00
7												.10	.00	.00	1.65
8												.80	.00	.00	.00
9												.00	.00	.00	1.40
10												.00	.00	.00	.60
11								- 3				.00	.10	.30	.00
12												.00	.00	.00	.00
13										.00		e.00	.20	.00	.00
14										.00		e.00	.40	.00	.00
15								-		.00		e.00	.60	.30	.00
16										.10		e.57	.00	.60	.00
17										.00		e.00	.05	.00	.00
18										.40		e.00	.15	.00	.00
19										.00		e.00	.00	.00	.00
20								- 0		.00		e.02	.00	.10	. 55
21										.00		e.13	.00	.00	1.70
22										.00		e.20	.00	.00	.00
23										.00		e.01	.00	.00	.00
24										.00		e.58	.00	.00	.00
25										.00		e.31	.00	.25	.00
26								١.		.00		e.00	.00	.00	.00
27										.00		.00	.00	.00	.00
28										.10		.00	.05	.00	.40
29										.00		.00	.05	.00	.00
30										.05		.00	.05	.00	.00
31										.00			.00	.00	
TOTAL												3.27	1.95	1.90	6.30

e Estimated

### 434645103240700 PRECIP AT WATER TREATMENT PLANT AT CUSTER STATE PARK, NEAR CUSTER, SD

#### PRECIPITATION RECORDS

PERIOD OF RECORD. -- May to September 1989 (seasonal record).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,400 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1									.00	.13	.00	.00
2									.00	.00	.00	.00
3									.36	.00	.00	.00
4									.00	.00	.00	.00
5									.00	.00	.29	.00
6									.04	.00	.00	.00
7									.00	.00	.00	1.90
8									.08	.00	.00	1.41
9									.00	.00	.00	.00
10									.00	.00	.10	.60
11									.00	.06	.08	.33
12								.30	.00	.24	.00	.00
13								.15	.00	.45	.00	.00
14								.20	.00	.66	.22	.00
15								. 13	.00	.20	.00	.00
16								.08	.00	.15	.00	.00
17								.30	.67	.22	.55	.00
18								.00	.00	.00	.00	.00
19								.00	.00	.00	.00	.00
20								.00	.00	.00	.08	.51
21								.00	00	.00	.21	1.72
22									.09			
23								.00	.08	.00	.00	.00
								.00	.00	.00	.00	.00
24								.00	. 53	.00	.00	.00
25								.00	.30	.00	. 28	.00
26								.00	.00	.00	.00	.00
27								.07	.00	.00	.00	.00
28								.00	.00	.02	.00	.06
29								.00	.00	.12	.00	.00
30								.20	.00	.00	.00	.00
31								.18		.00	.00	
TOTAL									2.15	2.25	1.81	6.53

## 434807103235400 PRECIP AT BEAR GULCH AT CENTER LAKE, NEAR HAYWARD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°48'07", long 103°23'54", in SWkNWkNWkSWk, sec.10, T.3 S., R.6 E., Custer County, Hydrologic Unit 10120109, 100 ft downstream from mouth of South Fork Bear Gulch, 0.8 mi east of Center Lake, and approximately 5 mi southwest of Hayward.

PERIOD OF RECORD. -- June to September 1989 (seasonal record).

INSTRUMENTATION. -- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 4,635 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records good .

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1										.06	.03	.00
2										.00	.00	.00
3										.00	.00	.00
4										.00	.00	.00
5										.00	.00	.00
6		444								.00	.27	.00
7										.00	.00	1.86
8										.00	.00	1.47
9										.00	.00	.41
10										.01	.06	.62
11										.00	.11	.00
12										.05	.00	.00
13										.32	.00	.00
14										.88	. 53	.00
15										.15	.00	.00
16								222		.14	. 43	.00
17										.34	.02	.00
18										.00	.00	.00
19										.00	.02	.00
20										.00	.15	1.82
21										.00	.00	.70
22										.00	.00	.00
23										.00	.00	.00
24										.00	.23	.00
25										.12	.00	.00
26										.00	.00	.00
27										.00	.00	.00
28										.00	.00	.00
29										.00	.00	.00
30									.00	.00	.00	.00
31	422									.00	.04	
TOTAL										2.07	1.89	6.88

## CHEYENNE RIVER BASIN 434928103214800 PRECIP AT NORTH FARM AT CUSTER STATE PARK, NEAR HAYWARD, SD

## PRECIPITATION RECORDS

# LOCATION.--Lat 43°49'28", long 103°21'48", in NWkNWkNEkNEk sec.2, T.3 S., R.6 E., Custer County, Hydrologic Unit 10120109, 3.5 mi southwest of Hayward on Spokane Creek, 0.1 mi east of U.S. Highway 16A, and 0.1 mi south of north boundary of Custer State Park.

PERIOD OF RECORD. -- May to September 1989 (seasonal record).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,220 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except those for estimated period, which are poor. Gage read daily by observer.

		ACCUMULATED	PRECIE	PITATION,		S, WATER		R 1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								.00	.00	.08	.00	.00
2								.00	.07	.00	.00	.00
3								.16	.21	.00	.00	.00
4								.08	.00	.00	.00	.00
. 5								.12	.00	.00	.00	.00
6								.00	.00	.00	.32	.00
7								.00	. 07	.00	.00	1.70
8								.00	.00	.00	.00	1.30
9								.00	.00	.00	.02	.42
10								.00	.00	.00	.00	.76
11								.00	.00	.03	.00	.00
12								. 44	.00	.09	.00	.00
13								.26	.01	.32	.00	.00
14								.03	.00	.69	.30	.00
15								. 13	.00	.33	e.08	.00
16								.05	.00	.07	e.23	.00
17								.15	.73	. 56	e.00	.00
18								.00	.00	.00	e.00	.00
19								.00	.00	.00	e.24	.00
20								.00	.00	.00	e.03	. 98
21								.00	.00	.00	.00	1.25
22								.00	.14	.00	.00	.00
23								.00	.00	.00	.00	.00
24								.00	1.10	.00	.00	.00
25								.00	.30	.00	. 33	.00
26								.00	.00	.00	.00	.02
27								.03	.00	.00	.00	.00
28								.00	.00	.00	.00	.00
29								.01	.00	.13	.00	.00
30								. 19	.00	.00	.00	.00
31								.23		.00	.00	
TOTAL								1.88	2.63	2.30	1.55	6.43

e Estimated

CHEYENNE RIVER BASIN 295
434939103272800 PRECIP AT CAMP REMINGTON NEAR HAYWARD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°49'39", long 103°27'28", in NW\(\)N\(\)\(\)SW\(\) sec.31, T.2 S. R.6 E., Custer County, Hydrologic Unit 10120201, 100 ft east of U.S. Forest Service Road 345 within Camp Remington, 0.2 mi north of Custer State Park, and 7.0 mi southwest of Hayward.

PERIOD OF RECORD . -- April to September 1989 (seasonal record).

INSTRUMENTATION. --Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 5,010 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records good .

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								.00	.00	.03	.00	.00
2								.00	. 29	.00	.03	.00
3								.30	.21	.00	.00	.01
4								.16	.00	.00	.00	.00
5								. 14	.00	.00	.00	.00
6	444						.03	.00	.00	.00	.33	.00
7							.05	.00	. 22	.00	.00	. 43
8							. 13	.00	.02	.00	.00	1.64
9							.00	.00	.00	.00	.01	.35
10							.00	.00	.00	.14	. 26	. 63
11							.00	.08	.00	.00	.18	.03
12							.00	.38	.00	.05	.00	.00
13							.00	. 27	.00	.22	.00	.00
14							.00	.00	.00	.54	. 59	.00
15							.00	. 10	.00	.11	.00	.00
16							.26	.02	.66	.12	.59	.00
17							.05	.09	.00	.08	.00	.00
18							.00	.00	.00	.00	.00	.00
19							.00	.00	.00	.00	.05	.05
20							.00	.00	.03	.00	.00	1.37
21							.00	.00	.16	.00	.05	1.08
22							.00	.00	.24	.00	.00	.00
23							.00	.00	.03	.00	.00	.00
24							.00	.00	.70	.00	.20	.00
25							.05	.00	.36	.02	.00	.00
26							.20	.00	.00	.00	.00	.00
27							.73	.06	.00	.08	.01	.00
28							.03	.00	.00	.00	.00	.06
29							.05	.14	.00	.28	.00	.01
30							.03	.31	.00	.00	.00	.01
31								. 18		.00	.07	
TOTAL								2.23	2.92	1.67	2.37	5.67

#### 435355103432800 PRECIP AT MEDICINE MOUNTAIN NEAR CUSTER. SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 43°53'55", long 103°43'28", in SW\SW\SE\sec.2, T.2 S., R.3 E., Pennington County, Hydrologic Unit 10120109, along Spring Creek, 1.0 mile southwest of Medicine Mountain, and 11 mi northwest of Custer.

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION. -- Shielded, 8.0-in. diameter plastic gage, 48 in. tall. Elevation of gage is 6,070 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except those for estimated periods, which are poor. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,		S, WATER MATION VA		R 1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	e.00	.10	.00	.00	.05	.00	.00	.00	.00	.00	.00
2	.00	e.00	.00	.00	.00	.30	.20	.10	.00	.00	.00	.00
3	.00	e.00	.00	.05	.00	.00	.00	.00	.30	.00	.00	.00
4	.00	e.00	.00	.00	.00	.00	.10	.30	.00	.05	.00	.00
5	.00	e.00	.10	.00	.00	.05	.00	.40	.05	.00	.00	.00
6	.00	e.00	.00	.00	.00	.00	.30	.05	.00	.00	.10	.00
7	.00	e.00	.00	.05	.00	.00	.00	.00	.00	.00	. 20	.10
8	.00	e.00	.00	.00	.05	.00	.00	.00	.00	.00	.00	.80
9	.00	e.00	.00	.00	.00	.00	.10	.05	.00	.00	.00	.70
10	.00	e.00	.00	.10	.00	.00	.10	.00	.00	.00	.00	.40
11	.00	e.00	.10	.00	.10	.00	.05	.05	.00	.05	.00	.20
12	.00	e.00	.00	.00	.00	.00	.00	.05	.10	.00	.10	.00
13	.00	e.00	.00	.00	.00	.20	.05	. 55	.00	.00	.10	.00
14	.00	.00	.00	.05	.00	.00	.00	.35	.15	.00	.20	.00
15	.00	.00	.00	.00	.10	.00	.00	.20	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.20	.00
17	.00	.00	.00	.00	.00	.20	.05	.15	.70	.60	.60	.00
18	.00	.00	.00	.00	.20	.00	.10	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	e.00	.10	.00	.00	.00	.00	e.23
20	.00	.00	.00	.00	.00	e.15	.00	.00	.00	.00	.00	e1.08
21	.00	.00	.00	.00	.05	e.00	.00	.00	.00	.00	.00	e.44
22	.00	.00	.00	.00	.00	e.00	.00	.00	.10	.00	.40	e.00
23	.00	.00	.10	.10	.05	e.00	.00	.00	.10	.00	.00	e.00
24	.00	.00	.00	.00	.00	e.15	.00	.00	.10	.00	.10	e.00
25	.00	.00	.00	.00	.00	e.00	.10	.00	.00	.10	.00	e.00
26	.00	.00	.10	.00	.10	.00	.10	.00	.00	.00	.00	e.00
27	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	e.00
28	.00	.00	.00	.00	.00	.00	.55	.00	.00	.00	.00	e.11
29	e.00	.00	.00	.00		.00	.05	.00	.00	.00	.00	e.00
30	e.00	.00	.00	.00		.00	.10	.10	.00	.20	.00	e.04
31	e.00		.05	.05		.00		.10		.00	.00	
TOTAL	0.00	0.00	0.55	0.40	0.65	1.10	2.20	2.50	1.60	1.00	2.00	4.10

e Estimated

## 440001103300200 FRECIP NEAR SHERIDAN LAKE NEAR HILL CITY, SD FRECIPITATION RECORDS

LOCATION.--Lat 44°00'01", long 103°30'02", in NE\SE\NW\SE\x sec.34, T.1 N., R.5 E., Pennington County, Hydrologic Unit 10120109, along Horse Creek, 0.2 mi west of U.S. Highway 385, 2.0 mi northwest of Sheridan Lake, and 5.0 mi northeast of Hill City.

PERIOD OF RECORD. -- October 1988 to September 1989 (seasonal record).

INSTRUMENTATION. --Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,790 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS .-- Records fair. Gage read daily by observer.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00						.00	.00	.00	.00	.00
2	.00	.00						.00	.00	.00	.00	.00
3	.00	.03						.00	.00	.00	.05	.05
4	.00	.00						.00	.21	.00	.00	.00
5	.00	.00						. 43	.00	.00	.00	.00
6	.00	.12			1.2			.00	.00	.00	. 18	.00
7	.00							.00	.00	.00	.00	.00
8	.00							.00	.12	.00	.00	, 62
9	.00							.05	.02	.00	.04	.51
10	.00							.00	.00	.00	.16	.26
11	.00							.00	.00	.09	.00	.21
12	.00							.00	.00	.00	.00	.00
13	.00							.32	.04	.74	.00	.00
14	.00							.29	.00	. 17	.13	.00
15	.07							.04	.00	1.00	05	.00
16	.00							.12	.00	.04	1.75	.00
17	. 51							.02	. 49	.08	.00	.00
18	.00							.00	.00	.06	.00	.05
19	.03							.00	.00	.00	. 53	.00
20	.00							.00	.00	.00	.09	.00
21	.00							.00	.01	.00	.00	2.65
22	.00							.00	.00	.00	.00	.06
23	.00							.00	.24	.00	.00	.00
24	.00							.00	.29	.00	.00	.00
25	.00							.00	. 26	.02	.05	.00
26	.00							.00	. 59	.00	.00	.00
27	.00							.00	.00	.00	. 27	.00
28	.00							.00	.00	.00	.00	.06
29	.00							.00	.00	.00	.00	.00
30	.00							.18	.00	.05	.00	.00
31	.00							. 16		.00	.00	
TOTAL	0.61							1.61	2.27	2.25	3.30	4.47

#### 440756103450300 PRECIP AT TELEGRAPH GULCH ABOVE ROCHFORD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°07'56", long 103°45'03", in SWkNWkNEkSWk sec.15, T.2 N., R.3 E., Pennington County, Hydrologic Unit 10120110, 1.0 mi east of Telegraph Gulch and 1.5 mi west of Rochford.

PERIOD OF RECORD. -- April 1987 to September 1989.

INSTRUMENTATION. -- Non-shielded, metal can with 8.0-in. diameter orifice and 24-in capacity. Elevation of gage is 5,500 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records for period April to September 1988, water year 1989, and those for estimated periods poor.

		ACCUMULATED	PRECIE	PITATION,	IN		WATER TION V		OCTOBE	R 1987	TO :	SEPTEMBER	1988		
DAY	OCT	NOV	DEC	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1									.00	.00		.00	.00	.01	.00
2									.00	.46		.00	.00	. 23	.00
3									.00	.00		.00	.00	.60	.00
4									.00	.00		.00	.07	.15	.00
5									.00	.00		.00	.10	.00	.00
6									.00	.07		.00	.00	.00	.00
7									.00	. 56		.00	.00	.00	.00
8									.00	1.12		.00	.33	.08	.00
9									.00	.00		.00	. 63	.00	.00
10									.00	.00		.00	.04	.00	.00
11									.00	.00		.00	.05	.00	.00
12									.00	.00		.19	.00	.00	.00
13									.00	.00		.25	.00	.00	.00
14									.00	.00		.09	.00	.00	.00
15									.00	.00		.00	.00	.00	e.26
16									.00	.00		.00	.00	.00	.00
17									.00	.00		.00	.00	.00	.00
18									.00	.20		.00	.40	.00	.00
19									.00	.51		.00	.30	. 12	e.06
20									.00	.07		.00	.00	.00	.00
21									.00	.00		.00	.00	.00	.00
22									. 19	.00		.00	.00	.30	.00
23									.00	.00		.07	.00	.00	.00
24									.00	.00		.00	.00	.00	.00
25									.00	.00		.00	.11	.00	.00
26									.37	.00		.00	.00	.00	.00
27									.00	.00		.00	.00	.00	.00
28									.00	.00		. 34	.00	.00	e.33
29									.00	.00		. 63	.00	.00	e.13
30									.00	.00		.02	.00	.00	.00
31										.37			.00	.00	
TOTAL								0	. 56	3.36		1.59	2.03	1.49	0.78

e Estimated

### 440756103450300 PRECIP AT TELEGRAPH GULCH ABOVE ROCHFORD, SD--Continued

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00								.00	.00	e.00
2	.00	.00								.00	.00	e.00
3	.00	.00								.00	.00	e.00
4	.00	.00								.00	.00	e.00
5	.00	.00								.00	.00	e.00
6	.00	.00								.00	. 13	e.00
7	.00	.19								.00	.00	e.08
8	.00	.00								.00	.00	e.40
9	.00	.05								.00	.00	e.25
10	.00	.00								.00	.00	e.10
11	.00	.18			1					. 15	.00	e.00
12	.00	.00							.11	.00	.00	e.00
13	.00	.00			1				.01	.23	.00	e.00
14	.05	.27			111				.08	.29	.00	e.00
15	.00	.00							.00	.03	.00	e.00
15	.00	.00		777	- 5152				.00	.03	.00	e.00
16	.00	.00							.00	.00	.00	e.00
17	. 58	.00							.60	. 25	.00	e.00
18	.04	.19							.00	.03	.00	e.00
19	.00	.00							.00	.00	.00	e.00
20	.00	.00							.00	.00	.00	e.77
21	.00	.00							.10	.00	.00	e.35
22	.00	.00							.29	.00	.00	e.00
23	.00	.00							.18	.00	.00	.00
24	.00	.04							.63	.00	.00	.00
25	.00	.00							.13	.05	.00	.00
23	.00	.00							.10	.05	.00	.00
26	.00	.00							.00	.00	.00	.00
27	.00	.00							.00	.00	.00	.00
28	.00	.05							.00	.02	.00	.00
29	.00	.05							.00	.03	.00	.00
30	.00	.05							.00	.00	.00	.00
31	.00									.00	.00	
TOTAL	0.67	1.07								1.08	0.13	1.95

e Estimated

#### 440242103520600 PRECIP AT REYNOLDS PRAIRIE NEAR HILL CITY. SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°02'42", long 103°52'06", in NWkNEkSWk, sec.15, T.1 N., R.2 E., Pennington County, Hydrologic Unit 10120110, 0.1 mi northeast of U.S. Forest Service Road 110, 2.0 mi west of Reynolds Prairie, 3.5 mi northwest of Deerfield Lake, and 16 mi northwest of Hill City.

PERIOD OF RECORD .-- October 1988 to September 1989.

INSTRUMENTATION. -- Shielded, 8.0-in. diameter plastic gage, 72 in. tall. Elevation of gage is 6,100 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except those for estimated period, which are poor. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,		HES, WATER	YEAR OCTOBE	R 1988	TO SEPT	EMBER 1	989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	J	UL .	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	301	00	.00	.00
2	.00	.00	.00	.00	.10		.00	.00	.00	40.0	00	.00	.00
3	.00	.00	.00	.00	.10		.00	.00	.00			.00	.00
4	.00	.30	.00	.00	.00		.20	.00	.00			.00	.00
5	.00	.00	.00	.00	.00		.00	.10	.00			.50	.00
6	.00	.00	.00	.00	.00	.00	.30	.20	.00		00	.00	.00
7	.00	.20	.00	.00	.00	.00	.00	.20	.10		00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.20	.00		00	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.10	.00		00	.00	.40
10	.00	.00	.10	.00	.00	.00	.00	.00	.00		40	.00	.00
11	.00	.30	.10	.00	.00	.00	.00	.20	.00		00	.20	.40
12	.00	.00	.00	.10	.00	.00	.00	.00	.00		00	.00	.00
13	.00	.00	.10	.00	. 10	.30	.00	.10	.10		00	.00	.00
14	.00	.00	.10	.00	.10		.00	.20	.00			.00	.00
15	.00	.00	.10	.00	.00	e.00	.00	.00	.00		00	.10	.00
16	.10	.40	.00	.10	.00	.20	.00	.00	.00		05	.00	.00
17	.30	.00	.00	.00	.10	.00	.00	.00	.30		05	. 50	.00
18	.00	.00	.00	.00	.10	.00	.00	.00	.10		00	.10	.00
19	.00	.00	.00	.00	.00	.00	.00	. 50	.00		00	.00	.00
20	.00	.00	.00	.00	. 10	.00	. 50	.00	.00		00	.40	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00		00	.00	1.00
22	.00	.00	. 10	.00	.00	.00	.00	.00	.00		00	.00	.30
23	.00	.00	.00	.00	.00	.00	.00	.00	. 40		00	.00	.00
24	.00	.00	.00	.00	.10	.00	.00	.10	. 20		00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.30		20	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00		00	.00	.00
27	.00	.00	.10	.00	.00	.00	1.10	.00	.00		00	.60	.00
28	.00	.00	.00	.00	.00	.00	.40	.00	.00		00	.00	.20
29	.00	.00	.10	.00		.20	.20	.00	.00		00	.00	.00
30	.00	.30	.10	.00		.00	.20	.00	.00		00	.00	.00
31	.00		.10	.00		.10		.00			30	.00	
TOTAL	0.40	1.50	1.00	0.20	0.80	1.00	2.90	1.90	1.50	1.	00 2	.40	2.30

e Estimated

440501103262300 PRECIP AT JOHNSON SIDING NEAR RAPID CITY, SD

301

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°05'01", long 103°26'23", in NW\sE\sW\sE\sw\sE\s sec.31, T.2 N., R.6 E., Pennington County, Hydrologic Unit 10120110, 0.1 mi west of U.S. Forest Service Road 166, 0.1 mi east of Rapid Creek, and 100 ft north of State Highway 44 at Johnson Siding, approximately 7.5 mi west of Canyon Lake in Rapid City.

PERIOD OF RECORD . -- October 1988 to September 1989.

INSTRUMENTATION.--Non-shielded, metal can with 8.0-in. diameter orifice and 24-in. capacity. Elevation of gage is 4,290 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.10	.10	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.12	.06	.03	.00	.15	.00	.05	.00
3	.00	.01	.00	.00	.00	.45	.05	.08	.00	.20	.00	.00
4	.00	.00	.00	.00	.00	.00	.07	.09	.00	.00	.00	.00
5	.00	.01	.00	.00	.00	.00	.00	.23	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.18	.00	.00	.00	.07	.00
7	.00	.02	. 10	.00	.00	.00	.00	.00	.00	.00	.00	.43
8	.00	.00	.00	.00	.00	.00	.03	.01	.00	.00	.00	. 82
9	.00	.08	.00	.00	.00	.00	.00	.00	.00	.00	.08	.11
10	.00	.00	.01	.00	.00	.00	.02	.00	.00	.00	.00	.39
11	.00	.19	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00
12	.00	.16	.00	.00	.00	.00	.00	.42	.00	.15	.00	.00
13	.00	.16	.00	.00	.00	.00	.00	.61	.00	.09	.00	.00
14	.00	.14	.00	.00	.03	.34	.00	.15	.02	.30	.00	.00
15	.05	.10	.00	.00	.00	.00	.00	. 13	.00	.22	.27	.00
16	.00	.00	.00	.00	.00	.02	.04	.05	.00	.05	2.01	.00
17	.76	.00	.00	.00	.04	.18	.10	.15	.44	.19	.00	.00
18	.00	. 13	.00	.00	.00	.00	.02	.00	.00	.03	.00	.00
19	.04	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02
20	.00	.00	.00	.00	.00	.02	.00	.00	.01	.00	. 53	. 47
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	1.65
22	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00	.02
23	.00	.00	.00	.01	.00	.00	.00	.00	. 17	.00	.00	.00
24	.00	.00	.00	.06	.00	.00	.00	.00	. 53	.03	.00	.00
25	.00	.00	.02	.00	.00	.00	.04	.00	.00	.00	.11	.00
26	.00	.01	.17	.00	.04	.00	.14	.00	.06	.00	.01	.00
27	.00	.00	.00	.00	.00	.00	.90	.00	.00	.00	.10	.00
28	.00	.08	.00	.00	.00	.09	.10	.00	.00	.78	.11	.00
29	.00	.01	.00	.00	100	.00	.02	.02	.00	.07	.00	.00
30	.00	.00	.00	.00		.00	.00	.24	.00	.00	.00	.00
31	.00		.00	.00		.00		.10		.00	.22	
TOTAL	0.85	1.10	0.30	0.07	0.33	1.26	1.74	2.28	1.48	2.21	3.57	3.91

### 440424103254000 RIMROCK HEIGHTS NEAR RAPID CITY, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°04'24", long 103°25'40", in NE\NW\SW\ sec.5, T.1 N., R.6 E., Pennington County, Hydrologic Unit 10120110, in Rimrock Heights subdivision, 3.0 mi east of Pactola Dam, or 5.9 mi west of city limits of Rapid City.

PERIOD OF RECORD. -- April 1987 to current year.

INSTRUMENTATION. -- Non-shielded precipitation recorder. Elevation of gage is 4,300 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

REMARKS. -- Records fair.

	SUMMÁTION VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP													
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		
2	.00	.00	.00	.00	.00	.02	.01	.00	.16	.00	.02	.00		
3	.00	.00	.00	.00	.00	.12	.02	.06	.00	. 13	.00	.01		
4	.00	.00	.00	.00	.00	.06	.02	.09	.00	.00	.00	.00		
5	.00	.00	.00	.00	.02	.00	.07	.10	.00	.00	.00	.00		
6	.00	.01	.04	.00	.00	.00	.03	.00	.00	.00	.06	.00		
7	.00	.00	.01	.00	.00	.00	.03	.00	.00	.00	.00	.15		
8	.00	.00	.00	.00	.00	.00	.00	.03	.00	.00	.00	.76		
9	.00	.04	.00	.00	.00	.00	.00	e.00	.00	.00	.08	.05		
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.03	.01	.26		
11	.00	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		
12	.00	.00	.00	.00	.00	.00	.00	.71	.00	.14	.00	.00		
13	.00	.09	.00	.00	.00	.14	.00	.19	.00	.31	.00	.00		
14	.00	.05	.00	.00	.00	.04	.00	.12	.00	.33	.00	.00		
15	.01	.00	.00	.00	.00	.00	.00	.09	.00	.08	.05	.00		
16	.08	.00	.00	.00	.00	.00	.09	.05	. 50	.14	1.81	.00		
17	.05	.01	.00	.00	.00	.05	.00	.05	.04	.03	.00	.00		
18	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.61	.01		
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.81		
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.20		
22	.00	.00	.00	.00	.00	.00	.00	.00	.04	.00	.00	.00		
23	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00		
24	.00	.00	.00	.00	.00	.00	.00	.00	.48	.01	.09	.00		
25	.00	.00	.03	.00	.00	.00	.06	.00	. 03	.00	.04	.00		
26	.00	.00	.02	.00	.00	.00	.10	.00	.02	.00	.00	.00		
27	.00	.00	.00	.00	.00	.06	. 45	.00	.00	.00	.11	.00		
28	.00	.06	.00	.00	.00	.00	.00	.00	.00	.38	.00	.00		
29	.00	.00	.00	.00		.00	.00	.06	.00	.06	.00	.00		
30	.00	.00	.00	.00		.00	.00	.11	.00	.00	.00	.00		
31	.00		.00	.00		.00		.07		.00	.16			
TOTAL	0.14	0.47	0.10	0.00	0.02	0.49	0.88	1.73	1.37	1.64	3.04	3.25		

e Estimated

303

### 440022103195200 PRECIP AT SHERIDAN LAKE ROAD NEAR RAPID CITY, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°00'22", long 103°19'52", in SW\sW\sW\sW\sW\sws.NW\sW\sec.31, T.1 N., R.7 E., Pennington County, Hydrologic Unit 10120110, 0.2 mi south of Sheridan Lake Road, 6.5 mi northeast of Sheridan Lake, and 4.0 mi southwest of Canyon Lake in Rapid City.

PERIOD OF RECORD. -- March to September 1989 (seasonal record).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,265 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except that for estimated period, which is poor. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,	IN		, WATER		OCTOBER	1988	TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1							.00		.00	.30			.00	.00	.00
2							.00		.02	.00			.00	.00	.00
3							.00		.00	.00			.00	.00	.00
4							.00		.00	.00			.00	.00	.00
5							.00		10	.00			.00	.00	.00
6							.00		. 18	.00			.00	.00	.00
7							.00		.00	.00			.00	.00	.29
8							.00		.00	.00			.00	.00	.45
9							.00		.00	.00			.00	.00	.70
10							.00		.00	.00			.00	.00	.29
11							.00		.00	.00			. 17	.00	.22
12							.00		.00	.06			.00	.12	.00
13							.35		.00	.50			.21	.00	.00
14							.00		.00	.39			.21	.00	.00
15							.00		.00	.00			.00	.00	.00
16							e.00		.40	.25			. 50	.00	.00
17							. 25		.00	.05			.00	2.81	.00
18							.00		.05	.00			.00	.00	.00
19							.05		.00	.00			.00	.00	.00
20							.00		.00	.00			.00	.72	1.03
21							.00		.00	.00			.00	.12	1.31
22							.00		.00	.00			.00	.00	.00
23							.00		.00	.00			.00	.00	.00
24							.00		.00	.00			.00	.00	.00
25							.00		.00	.00			.00	1.00	.00
26							.00		.13	.00			.00	.05	.00
27							.00		.50	.00			.00	.00	.00
28							.00		53	.00			.00	.31	.00
29							.00		10	.00			.72	.00	.00
30							.00		.07	.30			.05	.00	.00
31							.00			.02			.00	.00	
TOTAL							0.65	2	.08	1.87			1.86	5.13	4.29

e Estimated

#### 440444103215900 PRECIP AT WILD IRISHMAN GULCH NEAR RAPID CITY, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°04'44", long 103°21'59", in SWkSWkNEkNWk sec.2, T.1 N., R.6 E., Pennington County, Hydrologic Unit 10120110, 0.2 mi south of the intersection of U.S. Forest Service Road 199 and Wild Irishman Gulch and 4.0 mi northwest of Canyon Lake in Rapid City.

PERIOD OF RECORD. -- October 1988 to September 1989 (seasonal records).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,180 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00				.00	.00	.09	.00	.00	.00
2	.00	.00	.00				.00	.00	.00	.00	.00	.00
3	.00	.00	.00				.04	.00	.19	.00	.03	.00
4	.00	.01	.00				.05	.05	.03	.15	.00	.02
5	.00	.00	.00				.10	.29	.00	.00	.00	.00
6	.00	.02	.00				.25	.00	.00	.00	.09	.00
7	.00	.00	.13				.01	.00	.00	.00	.00	.14
8	.00	.00	.00				.09	.02	.00	.00	.00	. 50
9	.00	.00	.00				.07	.00	.00	.00	.00	.46
10	.00	.08	.03				.03	.00	.00	.00	.11	.10
11	.00	.00	.00				.00	.00	.00	.08	.00	.21
12	.00	. 45	.00				.00	.00	.00	.00	.00	.00
13	.00	.00					.00	.89		.73	.00	.00
14	.00	.16					.00	.22		.16	.00	.00
15	.00	.07					.00	.01		. 62	.00	.00
16	.03	.00					.00	.25	.02	.12	.04	.00
17	.74	.00					. 20	.02	.40	.09	1.92	.00
18	.02	.08					.03	.07	.00	.04	.00	.00
19	.00	.04					.00	.00	.00	.00	.00	.02
20	.00	.00					.00	.00	.00		. 47	.03
21	.00	.00					.00	.00			.00	1.82
22	.00	.00					.00	.00			.00	.06
23	.00	.00					.00	.00			.00	.00
24	.00	.00					.00	.00			.00	.00
25	.00	.00					.00	.00			. 44	.00
26	.00	.00				.00	. 16	.00	. 98		.15	.00
27	.00	.00				.00	.39	.00	.00		.25	.00
28	.00	.00				.40	. 51	.00	.00		.00	.00
29	.00	. 12				.00	.04	.03	.00		.00	.00
30	.00	.00				.00	.07	.23	.00	. 13	.00	.00
31	.00					.00		.02		.00	.10	
TOTAL	0.79	1.03					2.04	2.10			3.60	3.36

#### 441037103292701 OX BOW RANCH NEAR NEMO, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°10'37", long 103°29'27", in SWkNWkSWk, sec.35, T.3 N., R.5 E., Lawrence County, Hydrologic Unit 10120111, 0.2 mi northeast of Nemo Road on gravel road and 1.7 mi southeast of Nemo.

PERIOD OF RECORD. -- April 1982 to September 1989 (discontinued).

INSTRUMENTATION. -- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 4,540 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records for water years 1988 and 1989 fair except those for estimated periods, which are poor.

		ACCUMULATED	PRECI	PITATION,	IN		WATER TION V		OCTOBER	1987	TO	SEPTEMBER	1988		
DAY	OCT	NOV	DEC	JAN		FEB	MAR		APR	MAY		JUN	JUL	AUG	SEP
1	.00	.00	.00	.00		.00	.00		.00	. 63		.00	.00	.46	.00
2	.00	.16	.00	.00		.00	.00		.00	.13		.00	.00	.14	.00
3	.00	.08	.00	.00		.00	.00		.00	.00		.00	.00	.54	.00
4	.00	.00	.00	.00		.00	.00		.10	.00		.00	.00	.36	.00
5	.00	.00	.00	.00		.00	.00		.00	.00		.00	.00	.00	.00
6	.00	.00	.00	.00		.00	.00		.00	e.17		.00	.00	.00	.00
7	.00	.00	.00	.00		9.02	.03		.00	.20		.00	.00	.00	.00
8	.00	.00	.00	e.04		.00	.00		.00	.60		.00	.00	.00	.00
9	.20	.00	.00	.00		.00	.02		.00	.00		.00	.00	.00	.00
10	.00	.06	.00	.00		.00	.42		.00	.00		.00	.00	.00	.00
11	.00	.00	.06	.00		.04	.21		.00	.00		.00	.00	.00	.00
12	.00	.00	.00	e.02		.08	.00		.00	.00		.22	.00	.10	.00
13	.00	.00	.00	.00		.00	.00		.00	.00		.42	.00	.00	.00
14	.00	.04	.00	.00		.00	.00		.00	.00		.00	.00	.00	.00
15	.04	.00	.00	.00		.00	.00		.00	.00		.00	.00	.00	.00
16	.00	.00	.00	.00		.00	.00		.00	.00		.30	.00	.00	.00
17	.00	.00	00	.00		.00	.00		.00	.00		.00	.00	.00	.00
18	.28	.00	.00	.00		.00	.00		.00	e.05		.00	.30	.00	.00
19	.00	.00	.00	.00		.05	.00		.00	e.44		.00	.00	.00	.00
20	.00	.00	.00	.00		. 12	.00		.00	e.10		.00	.00	.00	.00
21	.00	.00	.00	.00		.00	.00		.00	.00		.00	.00	.00	.00
22	.00	.00	.00	.00		.00	.00		.02	.00		.06	.00	.16	.00
23	.00	.00	.06	e.15		.00	.00		.00	.00		.03	.00	.00	.00
24	.00	.00	.05	e.04		.00	.00		.02	.00		.00	.00	.00	.00
25	.00	.00	.00	e.04		.00	.00		.34	.00		.00	.00	.00	.00
26	.00	.00	.00	.00		.00	.00		.04	.12		.00	.00	.00	.00
27	.00	.00	.08	.00		.00	.00		.00	.30		.00	.00	.00	.14
28	.00	.00	.00	.00		.00	.00		.00	.00		.00	.00	.00	.22
29	.00	.00	.00	.00		.00	.00		.00	e.10		. 54	.00	.00	.00
30	.00	.00	.02	e.05			.00		.00	.40		.14	.00	.00	.00
31	.00		.00	.00			.00			.10			.00	.00	
TOTAL	0.52	0.34	0.27	0.34	(	0.31	0.68	0	. 52	3.34		1.71	0.30	1.76	0.36

CAL YR 1987 TOTAL 10.33 WTR YR 1988 TOTAL 10.45

e Estimated

306

#### CHEYENNE RIVER BASIN

#### 441037103292701 OX BOW RANCH NEAR NEMO, SD--Continued

## ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.04	.20	.00	.03	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.08	.11	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.35	.13	.08	.00	.16	.00	.00
4	.00	.00	.00	.00	.00	.00	.09	.11	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.18	.21	.00	.00	.00	.00
6	.00	.06	.02	.00	.00	.00	.11	.00	.00	.00	.00	.00
7	.00	.02	.02	.00	.00	.00	.04	.00	.00	.00	.00	. 14
8	.00	.00	.00	.00	.00	.00	.09	.04	.00	.00	.00	. 44
9	.00	.08	.00	.00	.00	.00	.02	.00	.00	.00	.00	.06
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.06	.00	.00
11	.00	.34	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.90	.00	.26	.00	.00
13	.00	.12	.00	.00	.00	.12	.00	.22	.08	.80	.00	.00
14	.00	.10	.00	.00	.00	.14	.00	.00	.00	.62	.00	.00
15	.02	.00	.00	.00	.00	.00	.00	.10	.00	.02	.00	.00
16	.24	.00	.00	.00	.00	.00	.07	.22	. 54	.02	.60	.00
17	.46	.00	.00	.00	.00	.09	.02	.04	.00	.00	.00	.00
18	.00	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00										
20			.04	.00	.00	.00	.00	.04	.00	.00	.30	.00
20	.00	.00	.02	.00	e.00	.00	.00	.00	.00	.00	.00	.80
21	.00	.00	.04	.00.	e.00	.00	.00	.00	.00	.00	.00	.66
22	.00	.00	.00	.00	e.00	.00	.00	.00	. 36	.00	.00	.00
23	.00	.00	.00	.00	e.00	.00	.00	.00	.18	.00	.00	.00
24	.00	.00	.00	.00	e.00	.00	.00	.00	. 44	.00	.00	.00
25	.00	.00	.02	.00	.00	.00	.08	.00	.08	.00	.00	.00
26	.00	.00	.08	.00	.00	.00	. 62	.00	.00	.00	.00	.00
27	.00	.04	.00	.00	.00	. 13	. 64	.00	.00	.00	.30	.00
28	.00	.06	.02	.00	.00	.00	. 12	.00	.00	.00	.00	.00
29	.00	.00	.02	.00		.00	.10	.08	.00	.26	.00	.00
30	.00	.00	.00	.00		.00	.04	.14	.00	.00	.00	.00
31	.00		.00	.06		.00		.06		.00	.12	
TOTAL	0.72	0.92	0.28	0.10	0.20	0.91	2.49	2.24	1.68	2.20	1.32	2.10

CAL YR 1988 TOTAL 11.24 WTR YR 1989 TOTAL 15.16

e Estimated

307

## 441716103300800 PRECIP AT BETHLEHEM CAVE NEAR TILFORD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°17'16", long 103°30'08", in SWkNWkSWkSEk, sec.22, T.4 N., R.5 E., Meade County, Hydrologic Unit 10120111, at Bethlehem Cave, 0.1 mi north of U.S. Forest Service Road 168, and 3.5 mi west of Tilford.

PERIOD OF RECORD .-- October 1987 to current year (seasonal record).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 4,560 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer. Records for water year 1988 also published.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1					122			.43	.00	.00	. 55	.00
2					4			.59	.00	.00	.21	.00
3								.00	.00	.00	.63	.00
4								.00	.00	.10	.08	.00
5								.00	.00	.00	.00	.00
6								.00	.00	.00	.00	.00
7								1.03	.00	.00	.01	.00
8								1.10	.00	.00	.00	.00
9								.00	.00	.00	.00	.00
10								.00	.00	. 13	.00	.05
11								.00	.00	.00	.00	.08
12								.00	.00	.00	.28	.01
13								.00	. 86	.00	.00	.00
14								.00	.00	.00	.00	.00
15								.00	.00	.00	.00	.00
16								.00	.08	.00	.00	.00
17								.00	.00	.00	.00	.00
18								.21	.00	.41	.00	. 12
19								. 45	.00	.00	.00	.00
20								.00	.00	.00	.00	.00
21								.00	.00	.00	.18	.00
22								.00	.39	.00	.00	.00
23								.00	.00	.00	.00	.00
24								.00	.00	.00	.00	.00
25								.00	.00	.00	.00	.00
26								.09	.00	.00	.00	.00
27								.00	.04	.00	.00	. 17
28								.00	.00	.00	.00	. 98
29								.00	1.13	.00	.00	.00
30								.68	. 22	.00	.00	.00
31								.00		.00	.00	
TOTAL			722	122				4.58	2.72	0.64	1.94	1.41

## 441716103300800 PRECIP AT BETHLEHEM CAVE NEAR TILFORD, SD--Continued

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1								.00	.00	.00	.01	.00
2								.00	. 10	.00	.04	.00
3								.15	.03	.00	.00	.00
4								. 50	.00	.00	.00	.00
5								.00	.00	.00	.00	.00
6								.00	.00	.00	.00	.11
7								.00	.00	.00	.00	.25
8								.07	.01	.00	.00	.02
9								.00	.00	.00	.02	.30
10								.00	.02	.35	.00	.02
11								.00	.04	.00	.00	.00
12								1.28	.12	.00	.00	.00
13								.18	.16	.12	.01	.00
14								.03	.00	1.02	.00	.00
15								.12	.00	.06	.00	.00
13			7.7					. 12	.00	.00	.00	.00
16								.16	.39	.04	.33	.00
17								. 23	.00	.00	.00	.00
18								.00	.00	.00	.00	.00
19								.00	.00	.00	.66	.00
20								.00	.05	.00	.00	1.81
21								.00	.03	.00	.00	.02
22								.00	.03	.00	.00	.00
23								.00	. 84	.00	.00	.00
24								.00	.08	.00	.00	.00
25								.01	.18	.00	.00	.00
26								.00	.00	.00	.00	.00
27								.00	.00	.00	.12	.00
28								.00	.00	. 56	.00	.00
29								.40	.00	.00	.00	.00
30								.06	.00	.00	.00	.11
31								.06		.00	.45	
TOTAL								3.25	2.08	2.15	1.64	2.64

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°21'04", long 103°41'44", in NWkNEkNWkSEk sec.36, T.5 N., R.3 E., Lawrence County, Hydrologic Unit 10120202, 0.1 mi west of U.S. Forest Service Road 540 and 2.0 mi southeast of Deadwood.

442104103414400 PRECIP AT TWO BIT GULCH NEAR DEADWOOD, SD

PERIOD OF RECORD. -- October 1988 to September 1989 (seasonal record).

INSTRUMENTATION. -- Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 5,140 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS .-- Records fair. Gage read daily by observer.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00							.00	.00	.00	.00	.00
2	.00							.00	.00	.00	.00	.00
3	.00							.00	.00	.00	.00	.00
4	.00							.37	.35	.00	.00	.00
5	.00							.40	.00	.00	.00	.00
6	.00							.00	.00	.00	.00	.00
7	.00							.00	.00	.00	.00	.04
8	.00							.00	.00	.00	.00	. 17
9	.00							.20	.00	.00	.00	.00
10	.00							.00	.00	.00	.15	.28
11	.00							.00	.05	. 13	.00	.21
12	.00							.00	.19	.00	.00	.00
13	.00							. 56	.14	.00	.00	.00
14	.00							.20	.40	. 23	.03	.00
15	.07							.04	.00	. 85	.00	.00
16	.00							.04	.00	.00	.00	.00
17	1.00				+			.05	.33	. 20	. 40	.00
18	.00							.38	.00	.04	.00	.00
19	.00							.00	.00	.00	.00	.00
20	.00							.00	.00	.00	.00	.00
21	.00							.00	.12	.00	.00	1.72
22								.00	.15	.00	.00	.00
23								.00	.04	.00	.00	.00
24								.00	1.00	.00	.00	.00
25					+			.00	.17	.00	.00	.00
26		424						.00	.12	.00	.00	.00
27								.00	.00	.00	.00	.00
28								.00	.00	.00	.25	.00
29					4			.02	.00	.00	.00	.00
30								.41	.00	.00	.00	.00
31								.10		. 48	.05	
TOTAL								2.77	3.06	1.93	0.88	2.42

#### 442343103363900 PRECIP AT BOULDER PARK NEAR STURGIS, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°23'43", long 103°36'39", in SE\SE\NE\x sec.15 T.5 N., R.4 E., Lawrence County, Hydrologic Unit 10120202, 0.1 mi north of U.S. Highway 14A, 0.5 mi west of Boulder Park School, and 5.0 mi west of Sturgis.

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION. -- Shielded, 8.0-in. diameter plastic gage, 48 in. tall. Elevation of gage is 4,075 ft above National Geodetic Vertical Datum of 1929, from topographic map.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

REMARKS. -- Records fair except those for estimated periods, which are poor. Gage read daily by observer.

	SUMMATION VALUES  DAY OCT NOV DEC JAN FEB MAR AFR MAY JUN JUL AUG SEP													
DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP		
1	.00	.00	.00	e.00	e.25	.00	.00	.00	.00	.00	.00	.00		
2	.00	.00	.00	e.04	e.08	.00	.20	.00	.00	.00	.00	.00		
3	.00	.00	.00	e.00	e.00	.20	.00	.00	.20	.00	.00	.00		
4	.00	.00	.00	e.00	e.00	.00	.30	. 50	.10	.00	.00	.00		
5	.00	.00	.00	e.00	e.05	.00	.10	.20	.00	.00	.00	.00		
6	.00	.20	.20	e.02	e.04	.00	.40	.00	.00	.00	.00	.00		
7	.00	.00	.00	e.00	e.04	.00	.20	.20	.00	.00	.00	.00		
8	.00	.00	.00	e.00	e.00	.00	.00	.00	. 10	.00	.00	.00		
9	.00	.00	.10	e.02	e.00	.00	.00	.20	.00	.00	.00	.00		
10	.00	.00	.00	e.00	e.00	.00	.10	.00	.00	.00	.00	.00		
11	.00	.30	.00	e.00	e.00	.00	.00	.00	.00	.20	.00	.20		
12	.00	.00	.00	e.00	e.00	.00	.00	.00	.00	.00	.00	.00		
13	.00	.00	.00	e.00	e.03	.00	.00	.00	.10	.00	.00	.00		
14	.00	.20	.00	e.00	e.03	1.10	.00	.00	.10	.20	.00	.00		
15	1.10	.00	.00	e.00	e.00	.00	.00	.80	.00	.60	.00	.00		
16	.00	.00	.00	e.00	e.00	.00	.00	.20	.00	.20	.00	.00		
17	.00	.00	.00	e.00	e.01	.20	.00	.40	. 40	.30	.50	.00		
18	.00	.10	.00	e.00	e.00	.00	1.00	.00	.00	.00	.00	.00		
19	.00	.00	.00	e.04	e.00	.00	.00	.00	.00	.00	.00	.00		
20	.00	.00	.00	e.00	e.03	.00	.00	.00	.00	.00	. 50	.00		
21	.00	.00	.00	e.00	e.06	.00	.00	.00	.00	.00	.00	1.60		
22	.00	.00	.00	e.00	e.01	.00	.00	.00	.10	.00	.00	.20		
23	.00	.00	.00	e.03	e.00	.00	.00	.00	.00	.00	.00	.00		
24	.00	.00	.00	e.03	e.00	.00	.00	.00	.60	.00	.00	.00		
25	.00	.00	.10	e.00	e.03	.00	.00	.00	.00	.00	.00	.00		
26	.00	.40	.00	e.00	e.07	.00	.00	e.00	.60	.00	.00	.00		
27	.20	.00	.00	e.00	e.01	.40	.70	e.00	.00	.00	.00	.00		
28	.00	.00	.00	e.00	e.06	.00	.70	e.00	.00	.00	. 50	.00		
29	.00	.00	.00	e.00		.00	1.00	e.07	.00	.00	.00	.00		
30	.00	.20	.00	e.00		.00	.30	e.08	.00	.30	.00	.00		
31	.00		.00	e.02		.30		e.05		.00	.00			
TOTAL	1.30	1.40	0.40	0.20	0.80	2.20	5.00	2.70	2.30	1.80	1.50	2.00		

e Estimated

### 441859103385600 ADAMS RANCH NEAR LEAD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°18'59", long 103°38'56", in NW\SE\SW\ sec.9, T.4 N., R.4 E., Lawrence County, Hydrologic Unit 10120202, at Adams Ranch 0.25 mi west of U.S.Forest Service Road 534, 1.5 mi southwest of Galena, and 5.5 mi southeast of Lead.

PERIOD OF RECORD . -- November 1983 to current year.

INSTRUMENTATION. -- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Prior to October 1988, gage was not shielded. Elevation of gage is 5,020 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair except those for estimated periods, which are poor. Records for water year 1988 also published.

ACCUMULATED PRECIPITATION. IN INCHES. WATER YEAR OCTOBER 1987 TO SEPTEMBER 1988

		ACCOMOLAT	ED FRECI	PITATION, I		MATION VA		DER 1907	IO SEFIEME	EK 1900		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.07	.00	.39	.00	.00	e.36	.00
2	.00	.25	.00	.00	.00	.00	.00	. 56	.00	.00	e.10	.00
3	.00	.03	.00	.00	.02	.00	.00	.00	.00	.00	e.35	.00
4	.00	.00	.00	.00	.01	.12	.11	.00	.00	.04	e.45	.00
5	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.05	.00	.01	.00	.02	.00	.00
7	.00	.00	.00	.00	.02	.18	.00	.98	.00	.00	.00	.00
8	.00	.00	.08	.00	.00	.00	.03	1.53	.00	.05	.00	.00
9	. 27	.00	.00	.00	.03	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.22	.00	.00	1.23	.00	.00	.00	.16	.00	.00
11	.00	.00	.02	.12	. 17	. 43	.00	.00	.00	.03	.00	.08
12	.00	.00	.04	.04	.00	.05	.00	.00	.08	.00	e.30	.00
13	.00	.00	.10	.00	. 16	.00	.00	.00	1.70	.00	e.60	.00
14	.00	.37	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.07	.05	.00	.05	.05	.00	.00	.00	.00	.00	.00	.00
16	.04	.00	.00	.00	.05	.00	.00	.00	.16	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.33	.00	.00	.00	.00	.00	.00	e.09	.00	. 55	.00	.00
19	.05	.00	.00	.00	.22	.00	.00	e.46	.00	.00	.00	.00
20	.00	.00	.00	.00	.37	.00	.04	e.01	.00	.00	.00	.00
21	.00	.00	.00	.07	. 13	.00	.00	e.12	.00	.00	.00	.00
22	.00	.00	.08	.00	.04	.00	.05	e.11	. 26	.00	e.15	.00
23	.00	.00	. 12	.25	.00	.06	.00	e.10	.00	.00	.00	.00
24	.00	.00	.00	.04	.00	.02	.05	e.00	.00	.00	.00	.00
25	.00	.00	.00	.06	.00	.08	.45	e.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.09	e.09	.00	.00	.00	.00
27	.00	.00	.05	.00	.00	.00	.00	e.24	.15	.00	.00	. 13
28	.00	.00	.00	.00	.00	.00	.00	e.11	.00	.00	.00	1.51
29	.00	.00	.00	.00	.00	.10	.00	e.20	.74	.00	.00	.11
30	.00	.05	.03	. 12		.00	.00	.00	.05	.00	.00	.00
31	.00		.00	.00		.00		.00		.00	.00	
TOTAL	0.76	0.75	0.74	0.75	1.28	2.39	0.82	5.00	3.14	0.85	2.31	1.83

e Estimated

312

### CHEYENNE RIVER BASIN

### 441859103385600 ADAMS RANCH NEAR LEAD, SD--Continued

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.00	.00	.20	.04	.08	e.01	.00	.00	.00	.00
2	.00	.00	e.00	.09	.00	.30	.13	e.00	.11	.00	.02	.00
3	.00	.03	e.00	.00	.00	.00	.39	e.31	.00	.05	.00	.00
4	.00	.00	e.00	.00	.00	.00	.20	e.50	.00	.00	.00	.00
5	.00	.00	e.00	.00	.07	.00	.31	e.23	.00	.00	.00	.00
6	.00	.33	.10	.04	.04	.00	.21	e.00	.00	.00	.02	.00
7	.00	.00	.03	.00	.06	.00	. 13	.12	.00	.00	.00	.03
8	.00	.00	.00	.00	.00	.00	.13	.00	.00	.00	.00	.25
9	.00	.10	.11	.00	.00	.00	.12	.00	.22	.00	.00	.07
10	.00	.00	.03	.00	.00	.00	.00	.00	.00	.25	.00	. 17
11	.00	.21	.08	.00	.00	.00	.00	.00	.02	.00	.00	.00
12	.00	.00	.10	.00	.00	.00	.00	.62	.24	.00	.00	.00
13	.00	.06	.03	.00	.04	.10	.00	.20	.30	.40	.00	.00
14	.00	.13	.20	.00	.04	. 54	.00	.03	.03	.95	.00	.00
15	.21	.03	.00	.00	.00	.00	.00	.03	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.07	.18	.06	. 17	.18	.76	.00
17	1.13	.04	.00	.00	.00	.32	. 17	.30	.06	.00	.00	.00
18	.00	e.11	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00
19	.00	e.00	.01	.10	.00	.05	.00	.00	.00	.00	.72	.00
20	.00	e.00	.05	.00	.04	.00	.00	.00	.00	.00	.00	1.13
21	.00	e.00	.06	.00	.09	.00	.00	.02	.11	.00	.00	. 52
22	.00	e.00	.03	.00	.00	.00	.00	.00	.18	.00	.00	.00
23	.00	e.00	.00	.04	.00	.00	.00	.00	.35	.00	.00	.02
24	.00	e.00	.00	.00	.00	.00	.03	.00	. 67	.17	.03	.00
25	.00	e.00	.07	.00	.04	.00	.08	.02	.00	.00	.03	.00
26	.00	e.00	.07	.00	.07	.00	. 59	.00	. 13	.00	.00	.00
27	.12	e.23	.07	.00	.02	e.12	.89	.00	.00	.00	.09	.00
28	.00	e.00	.00	.00	.08	e.00	. 62	.00	.00	.04	.00	.00
29	.00	e.05	.00	.00		e.00	. 42	. 22	.00	.39	.00	.00
30	.00	e.07	.00	.00		e.00	.16	. 13	.00	.00	.00	.00
31	.00		.00	.04		.00		.12		.00	.08	
TOTAL	1.46	1.39	1.04	0.31	0.79	1.54	4.85	2.92	2.59	2.43	1.75	2.19

e Estimated

# 441632103482400 PRECIP NEAR ENGLEWOOD NEAR LEAD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°16'32", long 103°48'24", in SW\sE\nE\sW\sec.30, T.4 N., R.3 E., Lawrence County, Hydrologic Unit 10120202, 0.1 mi west of U.S. Forest Service Road 205, 0.5 mi south of the Englewood Cemetery, and 5.0 mi south of Lead.

PERIOD OF RECORD. -- October 1988 to September 1989 (seasonal record).

INSTRUMENTATION.--Non-shielded, 4.0-in. diameter plastic gage with 11-in. capacity. Elevation of gage is 5,840 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

					5012	ALL LOW VILL	.020					
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00							.00	.00	.00	.00	.00
2	.00							.00	.00	.00	.00	.00
3	.00							.75	.00	.00	.00	.00
4	.00							.00	.00	.00	.00	.00
5	.00							.00	.00	.00	.00	.00
6	.00							.00	.00	.00	.00	.00
7	.00							.07	.00	.00	.00	.00
8	.00							.10	.08	.00	.00	. 48
9	.00							.00	.03	.00	.10	.09
10	.00							.00	.33	.11	.00	.10
11	.00							.00	.00	.00	.00	.00
12	.00							.80	. 17	.03	.00	.00
13	.00							.23	.00	.33	.00	.00
14	.00							.16	.00	. 55	.00	.00
15	.14							.19	.00	.00	.00	.00
16	1.25							.03	. 58	.04	.43	.00
17	.00							. 14	.00	.08	.02	.00
18	.00							.00	.00	.00	.00	.00
19	.07							.00	.00	.00	1.89	.00
20	.00							.00	.18	.00	.00	1.27
21	.00							.00	. 13	.00	.00	.00
22								.00	.06	.00	.02	.00
23								00	.76	.00	.00	.00
24								.00	. 12	.00	.06	.00
25								.00	.38	.00	.00	.00
26					1,222	222	444	.00	.00	.00	.00	.00
27								.00	.00	.00	.38	.00
28								.00	.00	. 80	.00	.00
29								. 22	.00	.35	.00	.00
30								.00	.00	.00	.10	.00
31								. 17		.00	.00	
TOTAL					4			2.86	2.82	2.29	3.00	1.94

#### 442745103434500 PRECIP AT ELKHORN PEAK NEAR WHITEWOOD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°27'45", long 103°43'45", in NE\SE\SE\sec.22, T.6 N., R.3 E., Lawrence County, Hydrologic Unit 10120203, along Polo Creek, 0.2 mi west of U.S. Highway 85, 2.0 mi southwest of Elkhorn Peak, and 4.5 mi west of Whitewood.

PERIOD OF RECORD .-- October 1988 to September 1989.

INSTRUMENTATION.--Shielded, 8.0-in. diameter plastic gage, 48 in. tall. Elevation of gage is 3,835 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,		WATER	YEAR OCTOBER	1988	TO SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.50	.30	.00	.30	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.20	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.80	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00	.00
7	.00	.40	.00	.00	.00	.00	.10	.00	.40	.00	.00	.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	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	.00	.50	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	. 50	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	. 50	.00	.20	. 10	.00	.00	.00
15	. 50	.10	.10	.00	.00	.00	.00	.00	.00	.70	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.10	.00
17	.60	.00	.00	.00	.00	.00	.20	.00	.50	.00	.00	.00
18	.10	.00	.00	.00	.00	.30	.30	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.20	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	1.80
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	.20	.00	.00	.00	.00	. 10	.00	. 50	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.70	.00
26	.00	.30	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	1.20	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.20	.60	.00	.00	.00	.00	.00
29	.00	.00	.00	.00		.00	. 90	.10	.00	.00	.00	.00
30	.00	.00	.00	.00		.00	.20	.00	.70	.20	.00	.00
31	.00		.00	.00		.00		.20		.10	.20	
TOTAL	1.20	1.10	0.30	0.00	0.20	2.00	4.70	1.80	2.50	1.00	1.00	1.80

# PRECIPITATION RECORDS

LOCATION.--Lat 44°18'32", long 103°52'32", in NE\SE\SE\SE\NE\struct\stru

441832103523200 PRECIP AT CHEYENNE CROSSING NEAR LEAD, SD

PERIOD OF RECORD . -- October 1988 to September 1989.

INSTRUMENTATION. -- Non-shielded precipitation recorder with 8.0-in. orifice. Elevation of gage is 5,280 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS . -- Records good .

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES DAY OCT SEP NOV DEC JAN FEB MAR APR MAY JUN JUL AUG .00 .00 .00 .00 .00 .00 .06 .00 .00 .00 .00 .00 .00 .00 .00 .04 .00 .03 .00 .08 .00 .00 .00 .11 3 .00 .10 .00 .00 .26 .00 .00 .00 .00 .00 .14 .40 .00 .00 .00 .00 .07 .37 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .03 .03 .04 .22 .00 .00 .00 .00 6 .00 .00 .01 .00 .33 .06 .00 .01 .19 .00 .00 .00 .00 .00 .00 .00 00 00 00 .00 .00 .00 .00 .05 8 .00 .00 .00 .00 .00 .00 .12 .00 .00 .00 .24 .03 9 .00 .11 .01 .00 00 07 .02 .00 .00 .30 00 .14 10 .00 .00 .22 .01 .02 .00 .00 .00 .00 .03 .06 .02 11 .00 . 12 .07 .00 .00 .00 .00 .00 .00 .00 .00 .01 12 .00 .03 .08 .00 .00 .00 .00 .62 .28 .09 .00 .00 13 .00 .04 .00 .00 .00 .02 .00 .10 .15 .32 .00 .00 .00 .19 .00 . 50 .05 .03 .32 .00 .00 .00 .00 15 .08 .01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .06 .16 .36 .00 .00 .00 .00 .08 .33 .00 .20 .00 .00 .14 17 .90 .01 .00 .00 .00 .01 .09 .03 .01 .00 . 13 .17 18 .00 .01 .00 .00 .00 .00 .00 .01 .00 01 .00 .00 19 .02 .00 .00 .01 00 .00 .00 .00 .00 . 56 .00 .01 20 .00 .00 .00 .00 .00 .00 .00 .03 .00 68 .01 .00 .00 .23 .00 21 .00 00 .00 .00 .38 02 .00 .00 .00 22 23 .00 .00 .03 .00 .01 .00 .00 .00 .16 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .42 .00 .00 .00 24 .00 .05 .00 .00 .00 .00 .00 .00 .45 .00 .09 .00 25 .00 .00 .00 .00 .00 .00 .00 .00 .01 .00 .00 .00 26 .04 .19 .02 .00 .01 .00 .63 .00 .00 .00 .00 .00 27 .15 .00 .03 .00 .02 .05 .88 .00 .00 .00 .34 .00 28 .00 .08 .00 .00 .01 .00 .58 .00 .00 .03 .00 .00 29 .00 .07 .00 .00 .04 .25 .03 .15 .36 .00 .00 30 .00 .00 .00 .00 .00 .00 .00 .00 .00 .11 .11 31 .00 .00 .00 .00 .00 .03 .09 TOTAL 1.59 1.55 1 32 0.50 0.09 0.97 3.87 2.26 2.58 1.22 1.27 0.11

316

#### CHEYENNE RIVER BASIN

#### 441852103594800 PRECIP AT HEADWATERS LITTLE SPEARFISH CREEK NEAR LEAD, SD

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°18'52", long 103°59'48", in NE\nE\nE\sec.16, T.4 N., R.1 E., Lawrence County, Hydrologic Unit 10120103, 0.1 mi west of U.S. Forest Service Road 134, 1.1 mi south of Timon Campground, and 11 mi southwest of Lead.

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION.--Shielded, 8.0-in. diameter plastic gage, 72 in. tall. Elevation of gage is 5,710 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS. -- Records fair. Gage read daily by observer.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.10	.00	.05	.00	.00	.00	.00	.00
2	.00	.00	.00	.05	.00	.10	.02	.00	.10	.00	.00	.00
3	.00	.20	.00	.20	.00	.20	.00	.00	.10	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.13	.50	.05	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.10	. 80	.00	.00	.00	.00
6	.00	.30	.00	.00	.10	.00	.20	.00	.00	.00	.00	.00
7	.00	.00	.10	.00	.05	.00	.10	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.20
9	.00	.20	.10	.05	.00	.00	.20	.00	.00	.00	.00	.22
10	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.13
11	.00	.10	.10	.10	.00	.00	.00	.00	.00	.10	.00	.05
12	.00	.00	.10	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.05	.00	.00	.30	.10	.00	.00	.00
14	.00	.05	.10	.00	.00	.25	.00	.20	.10	.25	.00	.00
15	.05	.05	.00	.00	.00	.00	.00	.10	.00	.35	.00	.00
16	.00	.00	.00	.00	.00	.00	.30	.00	.00	.00	.00	.00
17	1.00	.00	.00	.00	.05	.20	.10	.30	.60	.00	.30	.00
18	.00	.00	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.05	.05	.05	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.10	.00	.00	.00	.00	.00	.15	1.45
22	.00	.00	.10	.10	.00	.00	.00	.00	.20	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.50	.00	.00	.00
24	.05	.00	.00	.00	.00	.00	.10	.00	.20	.00	.10	.00
25	.00	.00	.05	.00	.00	.00	.10	.00	.00	.00	.00	.00
26	.00	.15	.10	.00	.02	.00	.20	.10	.00	.00	.00	.00
27	.10	.00	.00	.00	.00	.10	1.30	.00	.70	.00	.10	.00
28	.00	.05	.00	.00	.08	.00	. 40	.00	.30	.00	.00	.00
29	.00	.10	.00	.00		.05	.40	.05	.00	.20	.00	.00
30	.00	.00	.00	.00		.15	.20	.05	.00	.00	.00	.00
31	.00		.00	.00		.00		.20		.00	.00	
TOTAL	1.20	1.20	0.75	0.55	0.60	1.10	4.00	2.70	3.00	0.90	0.65	2.05

# CHEYENNE RIVER BASIN 441207104012700 PRECIP AT O'NEIL PASS NEAR LEAD, SD

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#### PRECIPITATION RECORDS

LOCATION.--Lat 44°12'07", long 104°01'27", in NW\sW\sE\sec.20, T.3 N., R.1 E., Lawrence County, Hydrologic Unit 10120203, 1.0 mi west of O'Neil Pass and 16 mi southwest of Lead on the north side of U.S. Highway 85, approximately 1.5 mi east of the South Dakota-Wyoming State line.

PERIOD OF RECORD. -- October 1988 to September 1989.

INSTRUMENTATION. -- Shielded precipitation recorder with 8.0-in. orifice and 12-in. capacity. Elevation of gage is 6,520 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to May 5, 1989, a non-shielded, 8.0-in. diameter plastic gage, 72 in. tall.

REMARKS. -- Records fair. Gage read daily by observer.

		ACCUMULATED	PRECI	PITATION,	IN		WATER		OCTOBER	1988	TO	SEPTEMBER	1989		
DAY	OCT	NOV	DEC	JAN		FEB	MAR	1	APR	MAY		JUN	JUL	AUG	SEP
1	.00	.00	.00	.00		.40	.00		.00	.00		.01	.00	.00	.00
2	.00	.00	.00	. 20		.00	.00		00	.00		.06	.00	.00	.00
3	.00	.00	.00	.00		.00	.10		00	.40		.00	.00	.00	.00
4	.00	.00	.00	.00		.00	.00		20	.00		.02	.00	.00	.00
5	.00	.00	.00	.00		.20	.00		.00	.00		.00	.00	.08	.00
6	.00	.60	.00	.10		.00	.00		.00	.00		.00	.00	.00	.03
7	.00	.00	.00	.00		.00	.00		00	.00		.00	.00	.00	. 55
8	.00	.00	.00	.00		.00	.00		20	.02		.00	.00	.00	. 23
9	.00	.00	.00	.00		.00	.00		00	.14		.00	.00	.03	.12
10	.00	.00	.00	.10		.00	.00		.00	.00		.00	.00	.02	.00
11	.00	.00	.00	.00		.00	.00		.00	.11		. 18	.17	.02	.00
12	.00	.00	.00	.00		.00	.00		00	.03		. 13	.02	.00	.00
13	.00	.30	.00	.00		.00	.40		00	.63		.15	. 86	.00	.00
14	.00	.10	.40	.10		.20	.10		00	.18		.00	.24	.00	.00
15	.20	.00	.00	.00	•	.00	.00		00	.23		.00	.00	.60	.00
16	.00	.00	.00	.00		.00	.00		.00	.24		.10	.00	.91	.00
17	.70	.00	.00	.00		.00	.40		00	.00		. 44	.08	.00	.00
18	.00	.00	.00	.00		.00	.00		.00	.00		.10	.00	.00	.03
19	.00	.00	.00	.00		.00	.10		00	.00		. 12	.00	.12	.85
20	.00	.00	.00	.00		.00	.00		00	.00		.74	.00	.01	.70
21	.00	.00	.00	.00		. 60	.00		00	.00		.00	.00	.00	.00
22	.00	.00	.30	.00		.00	.00		00	.00		.00	.00	.00	.00
23	.00	.00	.00	.00		.00	.00		00	.00		.00	.00	.00	.00
24	.00	.10	.00	.10		.00	.00		00	.02		.00	.00	.11	.00
25	.00	.00	.30	.00		.00	.00		00	.01		.00	.16	.00	.00
26	.00	.00	.20	.00		.20	.00		50	.00		.00	.00	.00	.00
27	.00	.00	.00	.00		. 40	.00		00	.00		.00	.00	.48	.00
28	.00	.20	.00	.00		.00	.00		90	.00		.00	.00	.00	.00
29	.00	.00	.00	.00			.00		50	.12		.00	.09	.00	.00
30	.00	.00	.00	.00			.00		30	.11		.00	.00	.00	.00
31	.00		.00	.00			.00		.221	.22			.00	.00	
TOTAL	0.90	1.30	1.20	0.60		2.00	1.10	2.	60	2.46		2.05	1.62	2.38	2.51

# 441810104062300 PRECIP AT WAGON CANYON NEAR SUNDANCE, WY

#### PRECIPITATION RECORDS

LOCATION.--Lat 44°18'10", long 104°06'23", in SWkNEkSWk sec.19, T.50 N., R.60 W., Crook County, Hydrologic Unit 10120101, in Wagon Canyon 15 mi southeast of Sundance, 17 mi south of Beulah, and 2.5 mi west of the South Dakota-Wyoming State line.

PERIOD OF RECORD. -- October 1988 to September 1989 (seasonal record).

INSTRUMENTATION.--Shielded, 8.0-in. diameter plastic gage, 72 in. tall. Elevation of gage is 5,650 ft above National Geodetic Vertical Datum of 1929, from topographic map.

Remarks. -- Records fair. Gage read daily by observer.

# ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00										.00	.00
2	.00										.00	.00
3	.00										.00	.00
4	.00										.00	.00
5	.00										.00	.00
6	.00										.00	.00
7	.00										.00	.00
8	.00										.00	.00
9	.00										.00	.10
10	.00										.00	.00
11	.00					111	122				.00	.30
12	.00										.00	.00
13	.00										.00	.00
14	.00										.00	
15	.00										.00	
16	.00										.00	
17	. 90										.00	
18	.00										.00	.30
19	.30										.00	.00
20	.00										.00	.00
21	.00										.00	1.50
22	.00										.00	.00
23	.00										.00	.00
24	.00										.00	.00
25	.00										.20	.00
26	.00			444							.00	.00
27	.10										.00	.00
28	.00										.20	.00
29	.00										.00	.00
30	.00										.00	.10
31	.00										.00	
TOTAL	1.30										0.40	

# 00430061 HURON WELL FIELD (National Trends Network Acid Precipitation Station)

LOCATION.--Lat 44°21'18", long 98°17'38", 3.0 mi west of the City of Huron at the City of Huron Municipal Well Field.

#### PRECIPITATION RECORDS

PERIOD OF RECORD. -- December 1983 to current year.

INSTRUMENTATION. -- The sample collector is a straight-sided polyethylene bucket that is triggered into opening and closing by a precipitation switch, and a shielded weighing-type precipitation recorder. Installation and equipment conforms to guidelines set by National Atmospheric Deposition Program.

REMARKS.--Records for period December 1983 to September 1989 good. Field measurements are taken as part of the National Atmospheric Deposition Program (NADP) and National Trends Network.

ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1983 TO SEPTEMBER 1984 SUMMATION VALUES DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP .00 .00 .00 .00 .00 .78 .00 .00 .02 .03 2 ------.00 .00 .00 .00 .32 .00 .00 .00 .03 .15 3 ---.00 .06 .00 .00 .00 .00 .10 .00 .00 . 55 ---.00 .00 .00 . 51 .00 .15 . 40 .00 .06 .00 5 .07 .00 .00 . 10 .00 . 10 1.2 .05 .00 .00 6 .00 .00 .00 00 00 25 .00 .00 .00 .01 7 .00 .00 .00 .00 .00 1.1 .00 .22 .06 .30 8 .04 .00 .00 .05 00 .00 .00 00 .00 .08 9 .00 .03 .00 .00 .00 .00 .00 80 .30 00 10 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 11 00 00 ------.10 .03 .00 .55 .00 .35 .00 .02 12 ------.00 .00 .10 .00 .02 .00 .00 .00 .00 1.4 13 ------.00 .00 .30 .00 .00 .00 .00 .02 .00 .00 ---.07 .00 .00 .00 .00 .00 .40 .10 .23 15 ---------.00 .00 .21 .00 .00 .00 .10 .00 .02 16 .00 .00 .10 .00 .47 .06 .00 .02 1.8 17 .00 .02 .00 .00 00 12 .00 .00 . 68 18 ---.02 .00 .00 00 .00 .00 .00 .00 1.7 19 .00 .00 .00 95 .00 00 .00 .00 .00 20 .25 .00 .00 .00 .00 .00 . 50 .00 .06 .00 21 .00 .00 .00 .00 .00 1.2 1.1 .00 .00 .05 22 .00 ------.00 .00 .00 .00 .00 .00 .00 .00 .05 23 ------.00 .00 .00 .00 .00 .00 .00 .00 .00 .36 24 ------.01 .00 .00 .00 .00 .00 .00 .00 .02 .05 25 ------.00 .00 .00 .00 .00 .00 .00 .92 .00 .00 26 .00 .00 .00 .00 .20 .00 .00 .00 .00 .00 27 ------.00 .00 .31 .20 1.6 .00 .00 .00 .02 28 ------.00 .00 .00 .02 .00 .00 .00 .00 .00 .00 29 ---.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 30 .00 .00 .00 .00 .00 .15 .00 .00 .00 .00 31 ---.00 .00 .00 .00 ---.00 .01 TOTAL 2.70 0.87 0.83 1.13 3.16 4.05 9.60 2.00

JAN

DEC

NOV

OCT

DAY

# 00430061 HURON WELL FIELD--Continued

# ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1984 TO SEPTEMBER 1985 SUMMATION VALUES

MAR

APR

MAY

JUN

JUL

AUG

SEP

FEB

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2 3 4 5	.00 .00 .00 .00	.00 .00 .00 .00	.21 .01 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .27  .00	.00 .00 .00 .00	.00 .00 .00 .00		.00 .00 .01 .00	.00 .00 .00 .00	.00 1.0 .00 .40
6 7 8 9 10	.46 .07 .00 .03	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .03 .00	.00 .00 .00 .03	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00		.00 .00 .00 .00	.00 .13 .00 .12 .00	.00 .00 .47 .00
11 12 13 14 15	.59 .00 .00 .14 .65	.00 .00 .00 .00	.00 .00 .00 .01 .07	.00 .00 .00 .00	.00 .00 .00 .00	.09 .05 .00 .00	.00 .00 .01 .00	.00 .00 .00 .10 .90	.00 .00 .00 .00	.00 .01 .00 .50	.38 .45 .00 .00	.00 .95 .00 .00
16 17 18 19 20	.00 .00 1.7 .01	.00 .00 .00 .00	.01 .01 .00 .00	.11 .05 .01 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .52 .28	.00 .00 .00 .00	.00 .00 .00 .00	.08 1.9 .00 .00	.16 .00 .00 .00	.00 .00 .00 .00
21 22 23 24 25	.00 .01 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .03 .00	.00 .00 .00 .00	.00 .10 .00 .00	.00 .11 .25 .00	.00 .37 .00 .00	.00 .00 .00 .00	.06 .00 .30 .55	.00 .61 .00 .00	.40 .00 .00 .00
26 27 28 29 30 31	.00 .01 .00 .00	.04 .01 .00 .00	.00 .00 .00 .00	.00 .00 .01 .01 .00	.00 .00 .00	.00 .00 .12 .00 .00	.03 .00 .00 .00	.00 .00 .00	.56 .10 .00 .00	.00 .00 .00 .00 .43	.00 .10 .02 .01 .00	.00 .00 .02 .00
TOTAL	3.67	0.23	0.32	0.34	0.04		1.41			3.84	2.24	3.25
		ACCUMULAT	TED PRECI	PITATION,	IN INCHES	S, WATER		BER 1985	TO SEPTEM	BER 1986		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2 3 4 5	.00 .00 .24 .20	.00 .00 .00 .00	===	.00 .12 .05 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .48 .02 1.1	.00 .00 .00 .00	.00 .00 .00 .30	.00 .00 .00 .00	.05 .00 .00 .00	.12 .92 .00 .00
6 7 8 9 10	.00 .00 .00 .00	.00 .16 .27 .00	===	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .03	.00 .00 .00 .00	.00 .44 1.9 .04	.60 .00 .00 .20	.00 .00 .09 .00	.01 .00 .00 .45	.00 .00 .00 .00
11 12 13 14 15	.57 .00 .00 .00	.00 .00 	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .06 .20 .02	.00 1.1 1.0 .00	.02 .01 .00 .01	.00 .04 .05 .00	.00 .02 .00 .43	.00 .94 .02 .00	.00 .00 .04 .31
16 17 18 19 20	.00 .00 .00 .00	==	.12 .01 .00 .07 .00	.00 .00 .00 .00	.00 .00 .06 .18	.10 .30 .00 .00	.00 .31 .15 .02	.00 .00 .00 .00	.02 .00 .00 .00	.00 .00 .12 .00	1.8 .00 .00 .00	1.4 .00 .10 .91
21 22 23 24 25	.00 .01 .00 .00	===	.00 .00 .00 .00	.09 .00 .03 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .15 .14	.00 .06 .15 .65	.07 .00 .00 .00	.00 .00 .00 .04 2.3	.00 .02 .00 .00	.01 .00 .00 .08
26 27 28 29 30	.00 .00 .00 .00 .00	=======================================	.00 .00 .00 .00	.00 .00 .00 .00 .04	.00	.00 .00 .00 .00 .00	.04 .57 .00 .02	.03 .00 .00 .00	.00 .00 .01 .13 .00	.07 .00 .00 .16 .06	.00 .00 .00 .00	.00 .00 .00
TOTAL	1.03			0.34	0.33	0.83	5.69	3.71	2.64	3.36	3.75	4.00

00430061 HURON WELL FIELD--Continued

		ACCUMULATE	D PRECI	PITATION,		, WATER S	YEAR OCTOBE	ER 1986	TO SEPTEM	BER 1987		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2 3 4 5	.10 .14 .08 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .04 .00 .00	.00 .00 .00 .03	.00 .00 .00 .00	.01 .00 .00 .00	.00 .12 .07 .00	.00 .00 .00 .00	.00 .00 .00 .00	.01 .01 .25 .03 .80	.00 .00 .00 .10
6 7 8 9 10	.00 .00 .11 .00	.00 .06 .00 .00	.00 .00 .00 .00	.14 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .15	.64 .00 .05 .20	.00 .56 .48 .00	.00 .02 .00 .00
11 12 13 14 15	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .06 .00 .00	.00 .03 .27 .00	.00 .00 .17 .00	.00 .00 .00 .00	.57 .01 .00 .00	.00 .03 .00 .00	.49 .00 .00 .00
16 17 18 19 20	.00 .00 .00 .00	.00 .23 .00 .02	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.22 2.0 .22 .03 .08	.00 .00 .00 .10	.00 .08 .00 .15	.00 .00 .00 .00	.00 .00 .02 .00	.18 .21 .00 .02 .00	.25 .00 .24 .00
21 22 23 24 25	.02 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.01 .00 .00 .04	.00 .18 .24 .18	.00 .00 .00 .00	.05 .00 .00 .06 .20	.04 .00 .00 .15	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00
26 27 28 29 30 31	.00 .00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.17 .31 .15	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .78 .00	.00 .00 .77 .00	.00 .00 .00 .00	.00 .04 .01 .00 .00	.00 .00 .03 .00
TOTAL	0.47	0.31	0.00	0.18	1.00	4.21	0.41	1.77	1.70	2.49	2.66	1.44
		ACCUMULATE	D PRECI	PITATION,		S, WATER Y		ER 1987	TO SEPTEM	BER 1988		
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1 2 3 4 5	.00 .00 .00 .00	.00 .00 .05 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .66 .01 .00	.00 .00 .02 .00	.06 .00 .00 .00	.38 .00 .00 .00	.00 .47 .67 .00	.00 .00 .00 .00
6 7 8 9 10	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .12	.00 .05 .15 .00	.00 .00 .00 .00	.07 .01 .00 .00	.00 .00 .00 .00	.22 .01 .00 .21	.00 .00 .00 .00	.00 .00 .00 .00
11 12 13 14 15	.00 .00 .00 .33 .01	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 .00 .00	.05 .00 .00 .01	.49 .11 .00 .00	.00 .00 .00 .00	.01 .00 .00 .03	.00 .06 .13 .02	.00 .00 .00 .00	.00 .00 .79 .00	.00 .00 .00 .11
16 17 18 19 20	.08 .00 .00 .02 .00	.40 .00 .00 .00	.00 .00 .00 .03	.00 .00 .07 .17	.00 .00 .00 .02 .00	.00 .00 .00 .00	.00 .00 .00 .00	.00 .00 1.0 .15 1.8	.09 .00 .00 .00	.00 .00 .00 .01	.00 .00 .01 .00	.10 .00 .78 1.9
21 22 23 24 25	.00 .00 .00 .00	.00 .00 .00 .00	.02 .01 .14 .10	.00 .00 .06 .03	.00 .00 .00 .00	.00 .00 .00 .05	.41 .14 .00 .00	2.0 .15 .00 .00	.00 .00 .01 .00	.00 .00 .47 .00	.13 .00 .00 .00	.00 .00 .00 .00
26 27 28 29 30 31	.00 .00 .00 .00	.00 .00 .01 .00	.00 .88 .05 .00 .03	.00 .00 .00 .00	.00	.00 .00 .02 .00 .00	.29 .00 .00 .00	.15 .00 .00 .00 .30	.00 .00 .03 .16 .20	.00 .00 .40 .00	.04 .00 .00 .00 .00	.00 .06 .27 .02 .00
TOTAL	0.44	0.80	1.26	0.48	0.20	0.87	1.72	5.70	0.76	1.70	2.11	3.95

TOTAL

0.13

# MISCELLANEOUS WATER QUALITY DATA

#### 00430061 HURON WELL FIELD--Continued

#### ACCUMULATED PRECIPITATION, IN INCHES, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 SUMMATION VALUES SEP DAY OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG .00 .00 .00 .00 .10 .00 .03 .00 .00 .00 .00 .00 2 .00 .00 .00 .00 .04 .07 .00 .00 .00 .00 .42 .00 3 .00 .00 .00 .02 .02 .00 .00 .60 .00 .00 .06 .08 .00 1.6 5 .00 .06 .00 .00 .00 .00 .20 .00 .00 .00 .00 .00 .04 .00 .00 .00 .00 .00 .00 .00 .08 .00 .00 .00 .00 6 .00 .00 .00 .00 .00 .00 ---.01 .00 .00 .00 .11 .00 .00 .00 .00 .12 .11 8 .00 .00 .00 .00 .00 .00 ---.00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 10 .00 .00 .00 .00 .00 .00 .00 .00 .00 .14 .14 . 52 11 .00 . 52 .00 .00 .00 .00 .00 .00 .58 .00 .00 .02 12 .00 .10 .00 .00 .00 .09 .00 .00 .03 .00 .05 .00 13 .00 .00 .00 .00 .02 .09 .00 .00 .03 .45 .05 .00 .00 .00 .02 .00 .05 .20 .00 .00 .00 .05 .00 .00 15 .01 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 16 .00 .00 .00 .02 .05 .00 .01 .00 .00 .00 .00 17 .00 .00 .00 .08 .27 .00 .25 .75 .00 .00 .42 18 .00 .00 .00 .07 .00 .00 .02 .00 .00 .05 .00 19 .00 .00 .02 .00 .01 .00 .05 .00 .00 .00 .00 20 .02 .00 .00 ---.00 .00 .00 .00 .00 .03 .00 21 22 23 .00 .00 .00 .03 .00 .03 .00 ---.00 .00 .00 ------.00 .00 .00 .00 .00 .00 .00 .07 .00 .00 ---.00 ---.00 .00 .00 .12 .00 .00 .00 .00 .00 24 25 .00 ---.00 .00 .00 .00 .00 .28 .00 .00 .00 .00 ------.00 .00 .00 .00 .00 1.5 .00 .00 .00 26 27 .10 ------.00 .00 .00 .43 .00 .00 .00 .33 .00 .00 ---\_\_\_ .00 .00 .00 .00 .00 .00 .00 .00 .16 .00 ---.00 .00 .00 .00 .00 .00 .35 .00 .00 .00 29 .00 .00 .07 .00 .00 .05 .01 .00 .21 .20 30 .01 .00 .00 .00 .00 ---.08 .00 .00 .00 .01 .00 31 .00 .00 .00 .00 .00 .00 .00

0.96

1.31

0.95

2.70

1.68

1.24

2.93

0.44

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# 00430061 HURON WELL FIELD--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD. -- December 1983 to current year (weekly composite).

REMARKS.--Field measurements are taken and samples collected on a weekly basis as part of the National Atmospheric Deposition Program (NADP) and National Trends Network.

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

		TOTAL	COL-				NI-	NI-		
DATE	TIME	PRECIP- ITATION FOR DEFINED PERIOD (IN) (00193)	LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	CHLO- RIDE ATM DEP WET DIS (MG/L) (82944)	MAG- NESIUM ATM DEP WET DIS (MG/L) (83002)	TROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	TROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	PH CK.SOL. ATM DEP WET T (UNITS) (83105)	PH FIELD ATM DEP WET T (UNITS) (83106)
OCT	1420	0.0	122	-0 010	0.04	0.004	-0.000	0.04		102
04-11 OCT	1430	0.0		<0.010	0.04	0.004	<0.020	0.04		7.7
11-18 OCT 18-	1430	0.01	13	11111						
NOV 01	1430	0.12	90	0.800	0.15	0.128	0.360	1.81	4.31	5.82
01-08	1515	0.10	50	0.560	0.21	0.111	1.91	4.04	4.29	5.63
NOV 08-15 NOV	1645	0.62	96	0.160	<0.03	0.010	0.300	1.34	4.29	4.90
15-22	1345	0.14	76	2.71	0.21	0.180	0.830	7.07	4.31	6.38
NOV 22-29 NOV 29-	1545		44							
DEC 06	1530	0.01	55	3					122	
DEC 06-13	1545	0.0		0.050	0.05	0.008	<0.020	<0.03		
DEC 13-20	1720	0.02	18	<0.150	<0.51	<0.051	<0.340	0.86		
DEC										
20-27 DEC 27 1988-	1559			0.530	0,20	0.142	<0.080	0.41	- 55	
JAN 03 1989 JAN	1555	0.0								
03-10 JAN	1500		7.7							
10-17	1500	0.0		1						
JAN 17-24	1500	0.0								
JAN 24-31	1500	0.0								
JAN 31- FEB 07	1500	0.14		0.050	0.06	0.014	<0.020	0.04		
FEB 07-14	1530	0.03	7.4							
FEB							10111			
14-21 FEB	1530	0.27	29	0.140	0.14	0.034	0.470	2.39	4.28	4.64
21-28 FEB 28-	1630	0.0								
MAR 07 MAR	1630	0.09	2.2	144						
07-15	1600	0.38	59	0.550	0.23	0.083	2.12	4.61	4.22	5.36
MAR 15-21	1600	0.32	9.7	0.260	0.19	0.053	<0.020	0.99		
MAR 21-28	1630	0.12	126	0.080	0.09	0.017	0.470	1.12	4.34	5.16
MAR 28-										
APR 04 APR	1530	0.14	104	0.490	0.13	0.079	1.48	1.94	4.30	6,16
04-11 APR	1545	0.20	89	0.100	0.08	0.021	0.830	0.89	4.31	6.14
11-18 APR	1230	0.05	78	0.870	0.14	0.192	1.10	1.66		
18-25 APR 25-	1600	0.0		0.040	0.03	0.006	<0.020	<0.03		
MAY 02 MAY	1430	1.02	100	1.27	0.21	0.200	2.93	4.69	4.30	6.34
02-09	1400	0.33	97	0.250	0.08	0.045	1.20	1.66	4.33	5.61
MAY 09-16 MAY	1455									
16-23	1445	0.53	101	0.310	0.12	0.046	1.17	1.98	4.33	5.82
MAY 23-30	1445	0.05	69	0.760	0.53	0.131	2.63	4.47		
MAY 30- JUN 06	1505	0.04	116	0.760	0.35	0.117	2.40	3.82	4.30	6.29
JUN 06-13	1545	0.61	102	0.210	0.09	0.043	0.960	1.43	4.32	5.20
00 10	12.75	0.01	102	0.210	0.09	0.043	0.300	1.43	4.02	3.20

# 00430061 HURON WELL FIELD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	PH LAB ATM DEP WET T (UNITS)	PHOS- PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L)	POTAS- SIUM ATM DEP WET DIS (MG/L)	SODIUM ATM DEP WET DIS (MG/L)	SPEC. CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM)	TANCE FIELD ATM DEP WET TOT (US/CM)	SPEC. CONDUCTANCE LAB ATM DEP WET TOT (US/CM)	SULFATE ATM DEP WET DIS AS SO4 (MG/L)	VOLUME ATM DEP WET (L)
	(83107)	(83111)	(83120)	(83138)	(83152)	(83154)	(83156)	(83160)	(83177)
OCT 04-11	5.93	0.080	0.003	0.049			1.7	<0.03	0.00
OCT		0.000	0.003	0.045			1.7	-0.03	
11-18 OCT 18-									0.002
NOV 01	6.40	0.080	0.113	0.228	21.8	10.6	10.5	1.28	0.187
01-08	6.34	0.080	0.052	0.282	21.7	20.7	23.1	3.26	0.087
NOV 08-15	5.01	<0.020	0.006	0.029	21.8	8.8	7.8	0.61	1.029
NOV 15-22	6.65	0.040	0.224	0.241	21.5	23.0	26.3	1.57	0.183
NOV 22-29									
NOV 29-									0.001
DEC 06 DEC	7.28						38.2		0.009
06-13 DEC	6.34	<0.020	0.003	0.023			2.7	0.05	0.00
13-20	7.08	<0.340	<0.051	0.291			27.8	<0.51	0.006
DEC 20-27	6.67	<0.080	0.049	0.244			20.0	1.79	0.024
DEC 27 1988- JAN 03 1989									0.001
JAN 03-10									0.006
JAN							NA		
10-17 JAN	-	4.5							0.002
17-24 JAN				7-				4.	0.002
24-31 JAN 31-									0.00
FEB 07	6.00	<0.020	<0.003	0.022			1.8	<0.03	0.00
FEB 07-14									0.004
FEB 14-21	6.22	<0.020	0.008	0.354	22.0	12.6	10.2	0.79	0.136
FEB 21-28									0.001
FEB 28-									
MAR 07 MAR				-					0.003
07-15 MAR	6.40	<0.020	0.035	0.289	21.7	23.8	24.1	3.27	0.388
15-21 MAR	6.56	<0.020	0.024	0.305			8.7	0.53	0.00
21-28	6,09	<0.020	0.014	0.035	21.2	6.8	6.4	0.46	0.260
MAR 28- APR 04	6.68	<0.020	0.044	0.236	21.6	15.6	16.8	1.68	0.252
APR 04-11	6.42	<0.020	0.004	0.115	20.4	8.2	8.8	0.91	0.306
APR 11-18	6.97	<0.020	0.082	0.619			19.7	1.86	
APR									
18-25 APR 25-	5.21	<0.020	<0.003	0.016			3.8	0.04	0.00
MAY 02 MAY	6.93	<0.020	0.113	0.153	21.4	34.8	33.2	4.04	1.767
02-09 MAY	6.53	<0.020	0.025	0.087	21.1	12.6	12.4	1.17	0.554
09-16	6.87						80.7		0.008
MAY 16-23	6.40	<0.020	0.046	0.100	20.6	11.7	12.9	1.60	0.001
MAY 23-30	7.06	0.030	0.141	0.751		10.2	36.3	3.26	0.059
MAY 30-									
JUN 06 JUN	6.72	0.060		0.661	21.3	25.9	28.0	3.24	0.080
06-13	6.36	<0.020	0.022	0.022	21.1	13.1	10.3	1.25	1.072

# 00430061 HURON WELL FIELD--Continued

WATER QUALITY DATA, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DATE	TIME	TOTAL PRECIP- ITATION FOR DEFINED PERIOD (IN) (00193)	COL- LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	CALCIUM ATM DEP WET DIS (MG/L) (82932)	CHLO- RIDE ATM DEP WET DIS (MG/L) (82944)	MAG- NESIUM ATM DEP WET DIS (MG/L) (83002)	NI- TROGEN AMMON. ATM DEP WET DIS AS NH4 (MG/L) (83047)	NI- TROGEN NITRATE ATM DEP WET DIS AS NO3 (MG/L) (83071)	PH CK.SOL. ATM DEP WET T (UNITS) (83105)	PH FIELD ATM DEP WET T (UNITS) (83106)
JUN										
13-20 JUN	1430	0.28	108	0.200	0.07	0.038	0.270	0.70	4.34	6.02
20-27 JUN 27-	1430	1.81	96	0.250	0.11	0.037	0.620	1.26	4.31	6.03
JUL 04	1610	0.08	96	1.80	0.24	0.446	2.64	4.87	4.32	6.61
JUL 04-11	1430	0.14	94	0.500	0.15	0.100	1.26	2.46	4.27	5.01
JUL 11-18	1215	1.25	98	0.140	0.09	0.034	0.710	1.34	4,39	5.53
JUL 18-25	1510	- 12		0.060	0.09	0.011	0.360	0.07		
JUL 25- AUG 01	1400	0.21	95	0.470	0.14	0.074	0.590	2.09	4.33	5.81
AUG 01-08	1400	0.42	99	0.400	0.10	0.078	0.830	1.74	4.33	5.88
AUG 08-15	1515	0.24	96	0.850	0.19	0.150	1.69	4.07	4.31	6.35
AUG 15-22	1300	0.05	73	0.450	0.10	0.092	0.520	1.61		
AUG 22-29	1400	0.33	102					1.12	4.31	5.34
AUG 29-				0.160	0.06	0.024	0.460			
SEP 05 SEP	1400	2.36	98	0.150	0.07	0.022	0.630	0.90	4.32	6.11
05-12 SEP	1400	0.65	22	1.31	0.19	0.229	1.06	3.63	4.25	6.01
12-19 SEP	1400	0.02	133	1.01	0.51	0.137	1.45	3.96		
19-26 SEP 26-	1400	0.06	88	1.08	0.26	0.097	3.00	5.54	4.34	6.25
OCT 03	1430	0.04	91	1.34	0.20	0.294	1.11	2.51		
DATE	PH LAB ATM DEP WET T (UNITS) (83107)	PHOS- PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)	POTAS- SIUM ATM DEP WET DIS (MG/L) (83120)	SODIUM ATM DEP WET DIS (MG/L) (83138)	SPEC. CONDUC- TANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)	SPEC. CONDUC- TANCE FIELD ATM DEP WET TOT (US/CM) (83154)	SPEC. CONDUC- TANCE LAB ATM DEP WET TOT (US/CM) (83156)	SULFATE ATM DEP WET DIS AS SO4 (MG/L) (83160)	VOLUME ATM DEP WET (L) (83177)	
JUN	LAB ATM DEP WET T (UNITS) (83107)	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)	SIUM ATM DEP WET DIS (MG/L) (83120)	ATM DEP WET DIS (MG/L) (83138)	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156)	ATM DEP WET DIS AS SO4 (MG/L) (83160)	ATM DEP WET (L) (83177)	
JUN 13-20 JUN	LAB ATM DEP WET T (UNITS) (83107)	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)	SIUM ATM DEP WET DIS (MG/L) (83120)	ATM DEP WET DIS (MG/L) (83138)	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)	CONDUCTANCE LAB AIM DEP WET TOT (US/CM) (83156)	ATM DEP WET DIS AS SO4 (MG/L) (83160)	ATM DEP WET (L) (83177)	
JUN 13-20 JUN 20-27 JUN 27-	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)	CONDUCTANCE TANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68	ATM DEP WET (L) (83177) 0.522 2.988	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 <0.020 0.070	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152) 21.5 21.2 21.0	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156) 5.0 7.3 35.6	ATM DEP WET DIS AS SO4 (MG/L) (83150) 0.33 0.68 1.68	ATM DEP WET (L) (83177) 0.522 2.988 0.132	
JUN 13-20 JUN 20-27 JUN 27- JUL 04	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)	CONDUCTANCE TANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68	ATM DEP WET (L) (83177) 0.522 2.988	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 <0.020 0.070	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152) 21.5 21.2 21.0	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156) 5.0 7.3 35.6	ATM DEP WET DIS AS SO4 (MG/L) (83150) 0.33 0.68 1.68	ATM DEP WET (L) (83177) 0.522 2.988 0.132	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25 7.31 6.59	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 <0.020 0.070 <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8	CONDUCTANCE TANCE TANCE TANCE TANCE TANCE TANCE TANCE WET TOT (US/CM) (83156)  5.0  7.3  35.6  16.6	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68 1.68 1.81	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 <0.020 <0.020 <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0 7.3 35.6 16.6 8.4	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68 1.68 1.81 1.14	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 <0.020 <0.020 <0.020 <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5	CONDUCTANCE TANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6 16.6 8.4 2.1	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68 1.68 1.81 1.14	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 08-15	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111) <0.020 0.070 <0.020 <0.020 0.070 0.040 0.070	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045	CONDUCTANCE TANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156) 5.0 7.3 35.6 16.6 8.4 2.1 10.4	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68 1.68 1.81 1.14 0.04 0.88	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 08-15 AUG 15-22	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020 <0.020  <0.020 <0.020  0.040  0.070 <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009 0.019	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.036	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3	CONDUCTANCE TANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3 35.6 16.6 8.4 2.1 10.4 10.6	ATM DEP WET DIS AS SO4 (MG/L) (83160) 0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 125- AUG 01 AUG 01-08 AUG 08-15 AUG 15-22 AUG 22-29	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69	PHOROUS ORTHO ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009 0.019 0.083 0.137	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.036 0.042	CONDUCTANCE TANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6  16.6  8.4  2.1  10.4  10.6  21.5	ATM DEP WET DIS AS SO4 (MG/L) (83150) 0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23 2.19	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 01-08 AUG 01-08 AUG 22-29 AUG 29- SEP 05	LAB ATM DEP WET T (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69 6.39	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020 <0.020  0.040 <0.020 <0.020 <0.020 <0.020 <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009 0.019 0.083 0.137 0.053	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.036 0.042 0.107	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5	CONDUCTANCE TANCE ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6 16.6 8.4 2.1 10.4 10.6 21.5 12.1	ATM DEP WET DIS AS SO4 (MG/L) (83160)  0.33  0.68  1.68  1.81  1.14  0.04  0.88  1.23  2.19  1.62	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397 0.063	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 15-25 JUL 25- AUG 01 AUG 01-08 AUG 08-15 AUG 15-22 AUG 22-29 AUG 29-	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69 6.39 5.76	PHOROUS ORTHO ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009 0.019 0.083 0.137 0.053 0.012	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.036 0.042 0.107 0.041	CONDUCTANCE TANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1 21.3	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5 7.0	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6  16.6  8.4  2.1  10.4  10.6  21.5  12.1  6.4	ATM DEP WET DIS AS SO4 (MG/L) (83150) 0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23 2.19 1.62 0.75	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397 0.063 0.579	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 08-15 AUG 15-22 AUG 29- SEP 05 SEP 05	LAB ATM DEP WETT (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69 6.39 5.76 6.10	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.009 0.019 0.083 0.137 0.053 0.012	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.045 0.042 0.107 0.041 0.022	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1 21.3 21.3	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5 7.0 5.9	CONDUCTANCE TANCE ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6 16.6 8.4 2.1 10.4 10.6 21.5 12.1 6.4 6.3	ATM DEP WET DIS AS \$04 (MG/L) (83160)  0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23 2.19 1.62 0.75 0.73	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397 0.063 0.579 0.004	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 08-15 AUG 15-22 AUG 22-29 AUG 29- SEP 05 SEP 05-12 SEP 12-19 SEP	LAB ATM DEP WETT (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69 6.39 5.76 6.10 6.23 6.75	PHOROUS ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020 0.020 0.020 <0.020 0.040 0.070 <0.020 <0.020 0.040 0.070 <0.020 <0.020 0.030 <0.020 <0.020 <0.020 0.040 0.040	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.009 0.019 0.083 0.137 0.053 0.012 0.018 0.080 0.225	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.045 0.042 0.107 0.041 0.022 0.025 0.230	CONDUCTANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1 21.3 21.3 21.6	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5 7.0 5.9 20.9	CONDUCTANCE TANCE ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6 16.6 8.4 2.1 10.4 10.6 21.5 12.1 6.4 6.3 21.3 24.2	ATM DEP WET DIS AS \$04 (MG/L) (83160)  0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23 2.19 1.62 0.75 0.73 3.58 2.88	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397 0.063 0.579 0.004 0.247 0.046	
JUN 13-20 JUN 20-27 JUN 27- JUL 04 JUL 04-11 JUL 11-18 JUL 18-25 JUL 25- AUG 01 AUG 01-08 AUG 01-08 AUG 22-29 AUG 29- SEP 05 SEP 05-12 SEP 12-19	LAB ATM DEP WET (UNITS) (83107) 6.03 6.25 7.31 6.59 5.52 5.89 6.12 6.36 6.69 6.39 5.76 6.10 6.23	PHOROUS ORTHO ORTHO ATM DEP WET DIS AS PO4 (MG/L) (83111)  <0.020  0.070 <0.020  0.070 <0.020  0.070 <0.020  0.070 <0.020  0.070 <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020  <0.020	SIUM ATM DEP WET DIS (MG/L) (83120) 0.016 0.036 0.147 0.045 0.026 0.009 0.019 0.083 0.137 0.053 0.012 0.018	ATM DEP WET DIS (MG/L) (83138) 0.030 0.053 0.369 0.048 0.021 0.045 0.036 0.042 0.107 0.041 0.022 0.025	CONDUCTANCE TANCE CK.SOL. ATM DEP WET TOT (US/CM) (83152)  21.5 21.2 21.0 20.9 21.4 21.5 21.5 21.1 21.3 21.3 21.6	CONDUCTANCE FIELD ATM DEP WET TOT (US/CM) (83154)  4.5 6.1 30.8 19.1 8.5 10.1 10.3 18.5 7.0 5.9 20.9	CONDUCTANCE LAB ATM DEP WET TOT (US/CM) (83156)  5.0  7.3  35.6  16.6  8.4  2.1  10.4  10.6  21.5  12.1  6.4  6.3  21.3	ATM DEP WET DIS AS SOL (MG/L) (83160)  0.33 0.68 1.68 1.81 1.14 0.04 0.88 1.23 2.19 1.62 0.75 0.73 3.58	ATM DEP WET (L) (83177)  0.522 2.988 0.132 0.228 2.117 0.00 0.343 0.001 0.397 0.063 0.579 0.004 0.247	

The following water-quality data are for a sewage lagoon and a reservoir at EROS Data Center, and private wells downgradient of EROS Data Center near Garretson, South Dakota. The water samples were collected by USGS personnel and analyzed by the USGS laboratory in Arvada, Colorado, during the 1989 water year.

STATION NAME	STATION	NUMBER	DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN DEMAND, CHEM- ICAL (HIGH LEVEL) (MG/L) (00340)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
LAGOON 1	4344150	96371501	05-03-89	1030	1560	7.50	14.0	180	928	0.615	34.0
EROS LAKE	4344050	96365501	05-03-89	1200	1690	7.77	14.0	91	1040	0.429	0.320
103N48W 5CACA	4345080	96372701	05-03-89	1445	900	7.33	10.5	59	594	0.077	0.100
103N48W 9CCDA		96362201	05-04-89		1860	7.28	10.0	82	1130	4.10	0.040
103N48W17ACCC	4343320	96371501	05-04-89	1015	920	7.37	10.0	89	590	0.047	0.190
STATION NAME	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS NH4) (71846)	ALUM- INUM, TOTAL RECOV- ERABLE (UG/L AS AL) (01105)	BORON, TOTAL RECOV- ERABLE (UG/L AS B) (01022)	BROMIDE DIS- SOLVED (MG/L AS BR) (71870)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	CYANIDE TOTAL (MG/L AS CN) (00720)	IRON, TOTAL RECOV- ERABLE (UG/L AS FE) (01045)	IODIDE, DIS- SOLVED (MG/L AS I) (71865)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)
LAGOON 1	44	180	1500	10	40	0.110	3300	0.210	31	2.0	70
EROS LAKE	0.41	120	1100	5.2	4	<0.010	210	0.091	<1	<1.0	20
103N48W 5CACA	0.13	30	200	0.030	1	<0.010	830	0.004	<1	<1.0	280
103N48W 9CCDA	0.05	30	110	0.42	1	0.020	40	0.021	<1	<1.0	60
103N48W17ACCC	0.24	30	310	0.050	<1	<0.010	60	0.008	<1	<1.0	10

DATE	TIME		TEMPER- ATURE WATER (DEG C)		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
05051650 LA BELL	E CR NE.	AR VEBLEN	SD (LAT 4	5 53 33N	LONG 097 11	56W)
MAR 1989						
13	1240	1.7	0.0			
23 27	1455 1410	1.1	0.0	12.0	1200 210	
31	1115	9.1	0.0			
APR						
18	1220	4.1	5.5	7.0	570	
MAY 30	1100	0.18	12.0	11.5	1360	
05289985 BIG COUL	EE CR N	EAR PEEVER	SD (LAT	45 29 14N	LONG 097 5	7 34W)
MAR 1989						
13	1520	6.5	0.0	3.0		
23	1040	1.8	0.0	13.0		
27 31	1725 1430	43 20	1.0		265	
APR	1430	20	2.0	12.5		
18 MAY	1500	7.4	7.5	11.5	940	
30 SEP	1310	0.55	12.5	14.0	1460	
12	1445	0.03	11.5	20.0	1570	
OCT 1988	. 0945	2.3	7.0		49N LONG 103	3 38 23W)
29	1300	3.3	0.0	2.0	650	
JAN 1989 18	1020	2.1	0.0	1.0	1800	
FEB 28	1145	2.6	0.0	-9.0	1600	
MAR 28	0930	184	1.0	11.5	1750	
APR					200	
07 24	1015 1635	50 7.8	6.0 12.0	12.0 10.5	890 1520	
MAY	1005	7.0	12.0	10.5	1520	
25	1045	54	9.0	9.0	800	
JUN	1240	10	21 0	21 0	1500	
26 JUL	1340	12	21.0	21.0	1500	
25	1600	38	30.0	26.5	980	
SEP 06	1215	0.80	19.0	19.0	1580	
	1213	0.00	15.0	13.0	1500	
06354860 SPRING	CR NEAR	HERREID SI	) (LAT 45	48 52N L	ONG 100 06	28W)
MAY 1989 08	1245	13	14.5		495	
06354882 OAK C	R NEAR	WAKPALA SD	(LAT 45	42 43N LC	ONG 100 33 3	2W)
APR 1989 11	1730	13	6.5	10.0	665	
MAY						
08 JUN	1520	18	15.5			
16	1250	0.71	19.0		1060	

	DATE	TIME	FEET PER SECOND	TEMPER- ATURE WATER (DEG C) (00010)		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06355500 NO	RTH FORK GRA	AND R NI	EAR WHITE B	UTTE SD	(LAT 45 48	10N LONG 102 21	45W)
	JAN 1989						
	31	0945	2.6	0.0	-1.0	4860	
	MAR 08 APR	1045	0.12	0.0	3.0	5120	
	13	0900	16	7.0	7.5	2040	
	MAY 11	0925	31	12.5	20.0	2390	
	JUN						
	JUL 21	0840	4.5	18.0	13.5	2910	
	20	1250	0.90	27.5	31.0	3510	
06356000		GRAND I	R AT BUFFAL	O SD (LA	T 45 34 341	N LONG 103 32 38W	)
	OCT 1988	1200	2.0	6.5	9.0	1200	
	NOV 29	0940	2.5	0.0	0.5	1560	
	JAN 1989 18	1250	1.7	0.0	4.0	1600	
	FEB 28	1515	E5.0	0.0	-11.0	1460	
	MAR 28	1235	12	6.0	14.0	700	
	APR 07	1220	4.0	7.0	9.0	1430	
	24 MAY	1155	2.7	11.0	11.0	1890	
	25	1400	2.2	12.0	9.0	1680	
	JUN 26 JUL	1120	10	16.0	16.0	1330	
	25	1150	2.0	25.0	30.0	1600	
	SEP 06	1400	1.0	19.0	23.0	2040	
06356500		GRAND I	R NEAR CASH	SD (LAT	45 38 56N	LONG 102 38 27W)	
	OCT 1988 19	1505	9.7	5.5	7.5	2450	
	NOV 14	1430	7.0	2.0	5.0	2280	
	DEC 29	1500	2.7	0.0	-2.0	3490	
	JAN 1989 31	1350	5.4	0.0	-8.5	2780	
	APR 13	1130	19	7.5	13.0	1990	
	MAY 11	1230	32	15.0	25.0	1240	
	JUN 20	1815	18	25.5	25.0	2220	
	JUL 20	1015	40	23.0	26.5	1530	
	AUG 29	1800	8.0	21.5	23.0	1210	

DAT	'E TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	DUCT- ANCE (US/CM)	
06357800 GR		TLE EAGLE S	D (LAT 4	5 39 28N	LONG 100 49	04W)
OCT 1 18 NOV		13	8.0	10.5	2450	
22 FEB 1		15	0.0	7.0	2570	
14		5.7	0.0	-1.0	3220	
MAR 08	. 1550	5.3	0.0		3170	
MAY 01		2370		13.5	387	
09 JUL		150	11.5			
20		47	31.0			
30	. 1015	63	18.0	19.5	2160	
06359500	MOREAU R NEA	R FAITH SD	(LAT 45	11 52N LO	NG 102 09 2	2W)
OCT 1		4.7	11.0	14.0	2880	
NOV 15		9.1	0.0	2.0		
DEC 28		5.2	0.0		3390	
JAN 1	.989					
30 MAR		1.9	0.0	17.0	2900	
07 APR		0.75		7.5		
13 MAY		39	12.5	(##)	1520	
03 10		4130 146	9.5 16.5	15.0 22.0	798 1010	
JUN 20	. 1510	13	27.0	28.5	2130	
JUL 19	. 1730	213			2050	
AUG 29	. 1515	88	20.0	25.0	915	
06360500 MOR	FAU D WEAD I	THE TOP OF C	D /T AM //	15 01W	TONG 100 50	22517
		ULITEHORSE S	D (LAI 4:	) 15 ZIN	LONG 100 30	33W)
MAR 1 13 MAY	. 1305	156	0.0	3.5	1170	
01		4140		7.0	1050	
02 09		4480 658	12.0	21.5	1070 806	
JUL 21	. 1130	334	24.0	32.0	834	
06395000 CH	EYENNE R AT	EDGEMONT SD	(LAT 43	18 20N L	ONG 103 49	14W)
OCT 1		4.7	7 6	7.0		
NOV		4.7	7.5	7.0	1000	
15 JAN 1	989	1.5	0.0	-3.0	1900	
MAR		0.50	0.0	-2.0	1560	
23 APR		38	1.0	5.5	3200	
20 MAY		9.0	17.0	25.0	5900	
12 JUN	. 0815	8.2	14.0	16.0	5800	
13 JUL	. 0905	3.1	15.0	16.0	5060	
. 11	. 0830	0.26	21.0	27.0	5200	
22 SEP	. 0815	0.04	16.0	24.5	8000	
28	. 0915	29	15.0	17.0	2250	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
064	00000 HAT CR	NEAR EI	OGEMONT SD	(LAT 43	14 24N LO	NG 103 35	16W)
	MAR 1989	1015	0.00			2050	
	23 APR	1245	0.29	6.0	8.0	2250	
	20 MAY	1300	0.10	19.0	30.0	3100	
	12 SEP	1045	0.06	18.0	19.5	3200	
	28	1245	1.1	20.0	25.0	820	
06400497	CASCADE SPRI	NGS NEAF	R HOT SPRI	NGS SD (L	AT 43 20	10N LONG 1	03 33 07W)
	OCT 1988 04	0845	18	18.5	4.0	2000	
	NOA					1900	
	15 JAN 1989	1335	19	19.0	4.0		
	10 FEB	1400	18	18.0	-3.0	1580	
	23 MAR	1130	18	19.0	14.0	2700	
	23 APR	1530	18	21.0	14.0	2700	
	20	1445	19	21.0	29.5	2750	
	. MAY 12	1200	18	20.5	21.0	2700	
	JUL 11	1315	18	21.0	32.0	2680	
	AUG 22	1215	19	21.0	36.0	2650	
	SEP						
	28	1515	18	20.5	29.0	2700	
06401500	CHEYENNE R	BELOW AN	NGOSTURA DA	AM SD (LA	T 43 20 4	2N LONG 103	3 26 12W)
	OCT 1988 04	1145	2.3	10.0	7.0	2200	
	FEB 1989						
	MAR	1115	1.2	0.0	-5.0	2560	
	24 APR	1045	1.1	7.0	10.5	2650	
	20 MAY	1715	0.98	23.0	28.0	2600	
	23 JUN	1300	1.2	23.0	29.0	2300	
	13	1345	1.6	18.0	15.0	2510	
	JUL 11	1500	1.0	31.5	34.0	2800	
	AUG 22	1515	0.88	27.5	35.0	2600	
064	02000 FALL R	AT HOT	SPRINGS SI	D (LAT 43	25 50N L	ONG 103 28	33W)
	OCT 1988	1610	22	21 0	8.0	1220	
	NOV	1610		21.0			
	15 JAN 1989	1520	24	20.0	0.0		
	FEB	0815	23	18.0	-4.0	1250	
	22	1645	23	20.0	1.0	1280	
	MAR 23	1715	22	23.0	11.5	1300	
	APR 21	0715	22	23.5	14.0	1240	
	MAY 12	1330	22	25.0	20.5	1280	
	JUL 12	0730	20	26.0	25.0	1340	
	AUG						
	22	1700	21	27.5	32.5	2650	

DA	ATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06402500 BEA	AVER CR	NEAR BU	JFFALO GAP	SD (LAT	43 27 56N	LONG 103	18 22W)
OCT	1988						
04.		1400	7.5	9.0	9.0	2510	
NOV 16		0915	8.3	2.0	-2.0	1650	
	1989	1000				2250	
FEB		1200	11	0.0	0.0	2250	
22. MAR		1445	11	1.0	1.0	2350	
24		1245	9.7	9.0	12.5	2550	
APR 21		0845	1.6	12.0	21.5	2620	
MAY							
23. JUN	• • •	1445	2.2	20.5	29.5	2500	
14.		0810	2.0	11.0	10.5	2710	
AUG 23		0930	3.8	18.0	29.5	2600	
06403300 FI		R ABOVE	FAIRBURN	SD (LAT 4	3 43 02N	LONG 103	22 03W)
05. NOV	1988	0830	0.51	6.0	3.5	310	
16.		1200	1.3	1.0	1.0	290	
04.	1989	1200	0.99	0.0	1.0	290	
FEB 24 MAR		1220	0.42	0.0	10.5	280	
29.		1215	3.7	4.0	10.5	250	
MAY 02. JUN		1100	1.1	9.5	15.0	260	
06.		1205	0.38	16.0	28.0	257	
JUL 06.		1030	0.16	20.0	26.5	298	
AUG 17		1250	0.74	23.0	28.0	239	
SEP 29		1500	1.4	15.0	26.0	304	
06404000 I	BATTLE	CR NEAR	KEYSTONE	SD (LAT 4	3 52 21N	LONG 103	20 10W)
	1989	1445	2.0	0.5	10.0	220	
28. APR		1445	3.8	8.5	19.0	320	
18. MAY		1515	1.6	14.5	18.0	345	
16. Jun		1215	2.8	16.5	18.5	340	
14. SEP		1210	0.18	14.0	14.0	360	
29.		1215	4.9	16.0	27.0	240	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)		
06404800	GRACE COOLIDGE	CREEK	NEAR HAYWA	RD, SD (	LAT 43 48	07N LONG	103 26	03W)
	JAN 1989							
	05	1040	0.14	0.0	1.0	115		
	FEB							
	24 MAR	0930	0.07	0.5	1.0	135		
	28	1315	0.44	5.5	21.0	90		
	APR		••••					
	21	1330	0.27	14.0	24.0	80		
	MAY 02	1525	0.27	10.5	12.5	83		
	28	1630	0.20	18.5	26.5	90		
	JUN	1000	0.20	10.5	20.5	30		
	02	1230	0.22	13.0	14.5	91		
	17	1330	0.34	18.0	21.5	91		
	28	1330	0.23	21.0	32.5	83		
	AUG 16	1140	0.00	15.0	25.0	106		
	SEP	1140	0.08	15.0	25.0	106		
	21	1110	18	8.0	6.0	67		
	25	1530	3.0	12.0	19.0	82		
00404990 GAA	OCT 1988 05 NOV	1035	0.27	6.5	5.0	320	LONG TO	3 21 49W)
	16	1340	0.49	2.0	2.0	245		
	JAN 1989	20.0	0.10	2.0				
	04	1020	0.80	0.0	4.0	250		
	MAR	1045	2.7	2.5		160		
	08 28	1045	3.7	8.0	8.5 15.0	168 220		
	APR			0.0	20.0			
	21	1100	0.68	17.5	25.0	227		
	MAY	1015	0.70	01.0		007		
	23 JUN	1345	0.70	24.0	24.0	237		
	01	1345	0.60	20.0	21.0	259		
	17	1500	0.73	21.0	24.5	248		
	28	1215	0.73	23.0	33.5	241		
	JUL							
	14 AUG	1930	2.9	19.0	17.5	197		
	16	1620	0.57	22.0	27.0	232		
	SEP	1020	0.57	22.0	27.0	202		
	21	1300	15	10.0	9.5	224		
	25	1100	4.7	12.5		265		
06405	800 BEAR GULCE	I NEAR	HAYWARD, S	D (LAT 4	3 47 30N L	ONG 103 2	20 47W)	
	JUL 1989							
	17	1530	18	18.0	23.0			
	SEP							
	21 29	1415 1847	10 1.3	11.0 15.5	11.0 18.0	190 225		

				WAIER QUAL	LIII DAIR			
	D	ATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)		ATURE AIR (DEG C)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06406	000	BATTLE	CR AT	HERMOSA SD	(LAT 43	49 41N LO	NG 103 11	44W)
	05	1988	1335	1.4	8.0	11.0	730	
			0850	2.0	0.0	-1.0	720	
	04	1989	1400	2.0	0.0	4.0	700	
			1330	2.1	2.0	7.0	720	
	MAR 21		1515	1.8	5.5	10.5	670	
	APR 18		1400	1.6	13.0	15.0	700	
	MAY		1445	1.2	15.5		730	
	JUN		1025		12.0		730	
	JUL		1215	0.63	21.5		740	
	AUG							
	SEP		1100	0.21	19.0	32.5	790	
	08		1315 1345	6.9	13.5	11.0	220 330	
	29	•••	1330	1.2	18.5	29.5	720	
064065	00	BATTLE	CR BELC	W HERMOSA S	SD (LAT 4	3 43 30N 1	LONG 102 5	4 15W)
		1989	1745	5.5	0.5	8.0	850	
			1230	3.2	4.0		800	
			1045	1.2	10.5	12.0	1090	
			1230	0.21	13.5	17.0	1120	
06407900	SPR	ING CRE	EK NEAR	ROCKERVILI	LE SD (LA	T 43 58 4	5N LONG 10	3 20 46W)
		1989				020.120		
	MAR		0845	0.09	0.0	-9.0	450	
	APR		1500	2.6	3.5	10.0	280	
	21 MAY	• • •	1045	1.1	13.0	25.0	300	
			1400	0.96	17.0	20.0	310	
			1410	1.4	18.0	17.0	320	
			1100	0.42	15.0	28.0	295	
0640870	O RI	HOADS F	ORK NEA	R ROCHFORD	SD (LAT	44 08 12N	LONG 103	51 29W)
	14	1988	1110	5.2	7.0	16.0	450	
	NOV 22		1215	4.7	6.0	5.5	480	
	DEC		1115		2.0		440	
	FEB	1989	1050	4.2	3.0	1.0	405	
	MAR		1445					
	APR					10.0	455	
	MAY		1045	4.5	7.0			
	JUN		1415	4.2	11.5		440	
	JUL		1500	4.3	9.0	12.5	450	
	03 AUG		1115	4.4	14.0	25.0	450	
	17 SEP		1205	4.3	14.0	25.5	460	
			1125	4.2	9.0	20.0	525	

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	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)		
06408860	RAPID CRE	EK NEAR	ROCHFORD,	SD (LAT	44 06 17N	LONG 103	38 35W)	
	OCT 1988							
	NOV	0845	9.2	4.0	0.0	412		
	16	0930	3.5	0.5	-3.0	485		
	22 DEC	1545	11	0.5	7.0	420		
	22	1140	12	0.0	-4.0	425		
	FEB 1989 10	1315	9.3	0.0	1.5	435		
	MAR 13	0930	19	0.5	5.5	325		
	APR							
	13	0825	15	1.0	-3.0	410		
	09	1415	20	14.0	18.0	390		
	JUN 01	0930	16	6.5	3.0	374		
	07	0825	14	10.0	11.0	395		
	JUL 03	0910	9.1	14.0	20.0	410		
	AUG 17	0845	14	12.5	14.0	390		
	SEP	0043						
	13 26	1300 0900	9.4 8.6	9.5 7.0		400 420		
06409000 CASTLE	CR ABOVE DE	ERFIELD	RES NEAR	HILL CITY	SD (LAT	44 00 49N	LONG 103 49	48W)
	NOV 1988							
	28	1115	7.9	0.0	4.0	480		
	DEC 27	1320	8.6	0.0	-9.0	480		
	FEB 1989							
	10 MAR	1440	8.4	0.0	-1.5	435		
	16 APR	1100	13	0.0	-8.0	440		
	13	1240	11	5.0	13.0	475		
	18 MAY	1300	11	7.0	9.5	410		
	09	1740	12	14.5	12.5	450		
	JUN 02	1315	9.9	10.5	14.0	460		
	AUG 17	1410	9.0	18.0	24.0	440		
	SEP							
	26	1340	8.5	11.0	24.0	465		
06410000	CASTLE CR	BELOW D	EERFIELD D	AM SD (L	AT 44 01 4	5N LONG 1	03 46 53W)	
	OCT 1988	1220		10.0	17.0	400		
	14 FEB 1989	1330	6.9	10.0	17.0	400		
	10 MAR	1640	2.2	0.0	-5.0	410		
	16	0915	2.3	1.0	-8.0	400		
	APR 13	1420	17	4.0	13.0	490		
	MAY							
	JUN JUN	1015	16	6.0	20.0	420		
	02	1100	9.2	7.5	11.0	410		
	JUL 03	1000	13	8.5	22.0	410		
	AUG 21	1540	16	9.5		405		
	SEP							
	26	1535	11	10.0	20.0	370		

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06410500 RAPID CR ABOVE PA	ACTOLA RI	ES AT SILV	ER CITY,	SD (LAT	44 05 05N LON	3 103 34 48W)
OCT 1988						
12 NOV	0835	17	3.5	3.5	400	
23	1315	23	0.5	12.0	390	
DEC 30	1025	8.9	0.0	1.0	412	
FEB 1989 09	1355	9.4	0.0	5.0	431	
MAR						
15 APR	1130	13	0.0	1.0	360	
14 MAY	0945	36	3.0	4.5	420	
11	1705	36	17.0	22.0	400	
JUN 01	1315	28	13.0	22.5	400	
JUL 05	0855	22	15.0	23.0	365	
AUG 21	1015					
SEP		27	13.0		410	
28	0900	20	9.0	10.0	412	
06411500 RAPID CR	BELOW PA	ACTOLA DAM	SD (LAT	44 04 36N	LONG 103 28	54W)
OCT 1988	1010	17		11.5	275	
12 NOV	1010	17	8.0			
23 DEC	1045	13	7.0	13.5	360	
21 FEB 1989	0900	15	3.0	3.0	320	
09	1040	13	2.5	3.0	384	
MAR 15	1330	13	3.0	2.5	395	
APR 13	1015	14	5.5	16.0	375	
MAY						
11 JUN	1340	51	8.0	23.5	385	
01 JUL	1515	69	7.5	19.0	390	
05 AUG	1100	98	8.0	38.0	385	
01	1330		9.0		382	
16	1100	94	8.0	20.0	410	
06412200 RAPID CREEK AB V	ICTORIA	CR NR RAP	ID CITY,	SD (LAT 4	4 02 48N LONG	103 21 06W)
OCT 1988 14	1040	14	9.0	18.0	380	
NOV						
21 DEC	0855	11	0.0	-6.0	395	
21 FEB 1989	1200	13	0.5	13.0	360	
15	1515	8.0	0.0	-2.0	450	
MAR 15	1000	14	0.5		390	
21 APR	1445	38	0.5	5.0	367	
13 JUN	1300	15	8.5	22.0	380	
01	1510	55	10.5		370	
06 JUL	0755	107	9.5	10.0	392	
06 AUG	1145	92	14.0	25.5	385	
01	1200		22.0		364	
15 SEP	0820	102	12.0	15.0	395	
13	1030	21	9.5	17.0	380	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)		
06412500 RAPI	D CR ABOVE CAL	NYON LA	KE NEAR RA	PID CITY	SD (LAT 44	03 04N	LONG 103	18 47W)
	OCT 1988							
	14	1840	5.0	13.0		370		
	25 NOV	1015	4.0	5.0	7.0	370		
	02	0845	3.6	7.5	20.5	370		
	21	1050	3.9	0.0	5.0	385		
	DEC 21	1415	5.8	2.0	9.0	380		
	27	1030	0.72	0.0	-2.0	410		
	FEB 1989							
	08 MAR	1130	5.3	0.0	-10.0	410		
	13	1045	7.6	2.0	13.5	360		
	APR							
	12 JUN	0910	5.8	2.0	7.5	385		
	06	1005	96	12.0	24.5	390		
	JUL 06	0920	77	15.0	23.0	395		
	AUG 14	1520	80	16.0	21.0	380		
	23	1500	15	20.5		370		
06412600 CLEG	NOV 1988 22 DEC	1120	11	1.0	8.5	370	LONG 103	1/ 54W)
	28	1300	9.8	11.0	-5.0	360		
	FEB 1989 15	1130	8.5	9.0	0.0	400		
	APR 12	1400	9.9	12.0	11.0	430		
	MAY 08	1125	11	11 0	18.0	368		
	08	1155	11 8.9	11.0 11.0	18.0	369		
	JUN 14	1200		14.0	19.0	371		
	JUL	1200		14.0	15.0	3/1		
	05 AUG	1300	7.3	14.5	34.5	380		
	15 SEP	1600		13.0	19.5	374		
	28	1240	9.6	13.0	23.0	374		
06412700 CLEGH	ORN SPGS S CH	ANNEL A	T FISH HAT	CH AT RC	, SD (LAT 4	4 03 311	N LONG 10	3 17 56W)
	14 NOV	1315	1.3	12.0	27.0	360		
	22 DEC	0930	1.6	9.5	3.0	372		
	28	1115	1.2	11.5	-5.0	360		
	FEB 1989 15	1000	1.5	9.0	-4.0	410		
	APR 12	1535	1.3	12.0	12.0	400		
	MAY 08	1330		11.0	17.0	369		
	JUN 15	1425	2.0	11.5		363		
	JUL 05	1345	1.8	13.0	34.5	380		
	AUG 15	1450		14.0		372		
	SEP							
	28	1000	1.2	12.0	21.5	375		

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06412800	CLEGHORN SPGS N C	HANNEL AT	FISH HAT	CH AT RC,	SD (LAT	44 03 32N LC	NG 103 17 54W)
	OCT 1988						
	NOV	1645	0.58	12.0	25.5	370	
	22 DEC	1030	0.71	10.0	8.0	375	
	28 FEB 1989	1345	0.87	11.0	-5.0	360	
	15 APR	1050	0.89	9.0	0.0	410	
	12	1430	0.91	12.0	11.0	400	
	JUN 15	1200	1.7	12.0	26.0	364	
	JUL 05	1215	1.3	13.0	36.5	380	
	AUG 15	1610		11.0	24.0	373	
	SEP 28	1205	0.55		23.0	374	
	20	2200	0.55	12.0	20.0	0.1	
06412900	RAPID CREEK BLW	CLEGHORN	SPGS AT R	APID CITY	SD (LAT	44 03 33N LO	NG 103 17 49W)
	OCT 1988						
	13 25	1410 1200	19 18	13.0 9.0	25.0 8.5	370 240	
	NOV 02	1045	25	11.5	23.5	370	
	22 DEC	0805	18	6.0	-3.0	380	
	28	1015	14	10.0		365	
	FEB 1989 15	0850	16	0.0	-8.0	410	
	MAR 13	1315	19	9.5	15.5	370	
	APR 12	1045	22	8.0	8.0	385	
	MAY 04	1425	24	12.0	15.0	385	
	JUN 06					390	
	JUL	1155	115	13.0	26.0		
	06 AUG	1425	95	17.0	24.5	385	
	15 SEP	1105	106	15.0	23.0	390	
	27	0905	20	12.0	24.5	390	
06413200	RAPID CREEK BELO	W PARK DE	RIVE AT RA	PID CITY :	SD (LAT 4	4 03 33N LON	IG 103 17 02W)
	OCT 1988 13	1130	17	13.0	24.5	370	
	25 NOV	1335	18	10.0	14.0	370	
	23	1055	22	5.0	11.0	370	
	DEC 21	1530	18	4.5	10.5	360	
	FEB 1989 14	1430	23	3.0	-3.0	400	
	MAR 13	1430	20	9.5	15.0	370	
	APR 13	1430	23	8.5	19.0	360	
	JUN 06		99			380	
	JUL	1330		15.0	27.0		
	06 AUG	0650	79	18.0	16.5	380	
	01 15	1100 1450	100	22.0 16.0	24.0	369 380	
	SEP 27	1130	16	15.0	30.0	415	
		-100		25.0	50.5		

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06413300 LEEDY	DITCH AT HEAD	DGATE BI	LW CLD AT	RAPID CIT	Y SD (LAT	44 03 27N LONG 103 17	12W)
	OCT 1000						
	OCT 1988 13 NOV	1710	1.2	14.0	25.0	360	
	22	1300	0.74	5.0	10.0	365	
	MAY 1989 08 JUL	1455	2.0	14.0	12.0	358	
	03 AUG	1330	2.0	17.5	33.5	380	
	17	1730		17.0	27.0	360	
	SEP 28	1425	0.71	18.0	24.0	362	
06413550 L	EEDY DITCH A	T MOUTH	AT RAPID	CITY SD (	LAT 44 03	49N LONG 103 16 22W)	
•	OCT 1988	1845	0.73	14.0	14.0	380	
	NOV 22	1355	0.18	4.0	11.0	375	
	MAY 1989		0.15				
	08 JUL	1645	0.15	13.0	15.0	367	
	O3	1500	0.62	20.0	28.5	390	
	15 SEP	0820		15.5	20.0	387	
	28	1500	0.06	16.5	22.0	377	
06413570 RAP	ID C AB JACK	SON BLVI	AT RAPID	CITY, SD	(LAT 44	03 55N LONG 103 16 21W	)
	OCT 1988						
	13	0910	16	12.0	23.0	370	
	25	1510	16	10.5	14.0	372	
	NOV	1000				260	
	07 23	1230 1305	19	9.5	15.0	360 375	
	DEC						
	28 FEB 1989	1600	13	2.0	-10.0	400	
	14	1100	19	0.0	-4.0	410	
	MAR 13	1530	19	10.0	13.5	370	
	APR 14	1530	20	15.0	18.0	360	
	MAY 10	1110	34	14.0	20.0	933	
	JUN 13	1515	93	11.5	11.5	385	
	JUL 05	1530	86	21.0	34.5	380	
	AUG 15	1250	99	16.0	25.0	377	
	SEP 28	0835	13	17.0	22.0	387	

D	DATE TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C)	ATURE AIR			
06413650 LIME C	REEK AT MOUTH	AT RAPID	CITY, SD	(LAT 44 04	27N LONG	103 15	53W)
	1988		- 3.0				
NOV							
21 DEC	1240	1.1	4.0	7.0	985		
	1330 1989	0.98	4.5	7.0	1040		
	1255	1.2	0.0	0.0	1030		
15	1130	0.90	4.5	0.0	1030		
	1015	0.65	9.0	9.0	1000		
MAY 09	1515	1.1	18.5	18.0	958		
JUN 07					1060		
JUL	1030				1140		
AUG							
14	0930		20.0 17.0		1230 1130		
SEP 27	1525	0.58	16.5	28.5	1160		
	1988		APID CITY			LONG 10	3 16 15W)
NOV							
DEC					380		
	1989	2.5	4.0	5.0	360		
14 MAR	0910	1.5	0.0	-6.0	395		
	1500	1.0	8.5	-2.0	330		
13	1630	3.5			350		
	1105	3.8	15.0	18.0	370		
	1150	3.7	12.0	18.0	382		
JUL 05	1610	4.2	20.5	35.0	368		
AUG	1500				379		
SEP				24.0	368		
20	1130	1.6	135	24.0	300		
06413670 STORYBOO	K DITCH AT MO	UTH AT RAP	ID CITY S	D (LAT 44 0	4 29N LO	NG 103	15 44W)
12	1445	0.34	15.0	25.0	380		
	1430	1.8	6.5	17.0	370		
DEC 29	1430	1.8	0.5	4.5	390		
	1989 1530	1.1	0.0	-4.0	370		
APR			17.0		330		
MAY							
JUL			19.0		367		
AUG					336		
14 SEP	1330		20.0	26.5	373		
	1640	1.4	21.0	27.0	368		

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06413700	RAPID CR AB WATER	TREAT	PLANT AT R	APID CITY	SD (LAT	44 04 29N	LONG 103 15 34W)
	OCT 1988						
	12 25 NOV	1140 1615	14 19	12.5 10.0	24.0 10.0	420 455	
	02 25	1415 0930	21 21	12.5	20.0 -3.0	410 450	
	DEC 29	1300	18	2.5	4.0	460	
	FEB 1989	1355	18	0.0	-1.5	425	
	MAR 15	1545	20	8.5	2.5	560	
	APR 12	1245	22	12.0	12.5	420	
	JUN 09	1155	102	14.0	21.0	390	
	JUL 07	1005	97	18.5	28.0	395	
	AUG						
	08 SEP	1030	84	10.5	21.0	390	
	27	1340	14	19.0	26.0	470	
06413800	DEADWOOD AVE DRA	IN AT N	OUTH AT RA	PID CITY	SD (LAT 4	4 04 58N	LONG 103 15 22W)
	11 16	1415 1350	2.0	14.0	22.0	880	
	NOV						
	25 DEC	1120	2.7	5.0	2.0	820	
	22 FEB 1989	1430	2.4	5.0	3.0	900	
	09 MAR	1520	2.5	3.0	3.0	900	
	15	1315	2.5	7.0	5.0	970	
	APR 14	0900	2.3	11.0	14.5	930	
	MAY 10	1415	2.5	17.0	24.0	374	
	JUN 15	1000	2.1	14.5	24.5	955	
	JUL 03	0915	2.0	20.0	27.5	950	
	12 14	2140 1625	3.3 17	22.0 21.0	19.0 19.0	935 730	
	AUG 01	1230	100	26.0	32.5	960	A Part of the
	14 SEP	1210	1.8	21.5	28.0	1010	
	27	1405	2.6	17.0	31.0	1060	
	06414000 RAPID C	R AT RA	APID CITY S	D (LAT 44	05 09N L	ONG 103 1	4 31W)
	OCT 1988 11	1045	13	10.5	15.0	550	
	NOV 25	1315	23	4.0	5.0	522	
	DEC 29	1545	19	0.5	1.0	530	
	FEB 1989						
	13 MAR	1125		0.0	-1.0	540	
	15 APR	1445	21	2.5	2.0	670	
	12 JUN	1425	23	14.0	15.0	500	
	09	0900	93	13.5	17.0	420	
	JUL 07	1210	66	20.0	30.0	410	
	AUG 14	0830	77	16.0	19.0	385	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06418900 RAPI	O CR BELOW S	EWAGE 1	PLANT NR RAI	PID CITY	SD (LAT 4	4 01 24N LONG 1	103 05 43W)
	OCT 1988 07	0945	26	11.0	6.0	1130	
	NOV 18	1045		4.0	-5.0	1010	
	JAN 1989 06	0950		2.0	-5.0	1060	
	FEB						
	17 MAR	1010		1.0	-17.0	1100	
	30 APR	1030		10.0	5.5	1180	
	17 MAY	1315	38	9.5	5.0	940	
	15 JUN	1515	37	16.5	21.0	870	
	15 JUL	1230	32	18.0	25.0	1100	
	20 AUG	1115	24	21.5	29.5	1120	
	24	1045	18	22.0	29.5	1210	
06422		ER CR I	NEAR NEMO SI	(LAT 44	08 38N L	ONG 103 27 16W)	
	OCT 1988 12	1235	1.3	12.0	22.0	370	
	NOV 16	1300	1.7	1.0	0.0		
	28 DEC	1440		0.5		380	
	30	1325	1.5	0.0	3.0	410	
	FEB 1989 07	1450	1.3	0.0	-8.0	410	
	MAR 13	1300	10	2.5	11.0	230	
	APR 14	1225	6.3	9.0	10.0	325	
	MAY 09	1115	12	13.0	15.5	280	
	JUN 01	1030	10	12.5	16.5	290	
	JUL 03	1500		22.0	18.0	325	
	AUG						
	SEP	1300		21.0		340	
	12 28	1330 1230		14.0 15.5		350 360	
0642350		RIVER	NEAR WASTA,	SD (LAT	44 04 52N	LONG 102 24 03	W)
	OCT 1988 13	1235	79	14.0	25.0	2350	
	NOV 21	1115		0.0	8.0	2450	
	DEC 28	1215		0.0		300	
	FEB 1989						
	07 MAR	1700		0.0	-8.0	2900	
	20 30	1325 1600		0.0 10.5	-4.0 10.0	1850 2140	
	APR 10	0935	94	0.0	-0.5	2140	
	MAY 12	1120		16.5	21.5	2670	
	JUN 06			22.0	30.5	2600	
	JUL	1115					
	06 AUG	0935		21.5	26.5	2250	
	18 SEP	1415	11	24.0	30.0	1910	
	25	1305	90	15.5	18.0	1710	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	ATURE WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
0642	5100 ELK CR	NR RAP	ID CITY SD	(LAT 44 1	4 25N LO	NG 103 09	03W)
	OCT 1988 07	0715	0.0		-4.0		
06425	500 ELK CR	NEAR ELI	M SPRINGS	SD (LAT 44	14 54N	LONG 102 3	30 10W)
	NOV 1988 24	1100	0.32	1.5	7.5	5100	
	MAR 1989	1100	0.32	1.5	7.3	3100	
	20 APR	0950	0.21	0.0	-9.0	1800	
	05	1320	0.20	11.0	9.5	5040	
06428500	BELLE FOURCH	E R AT	WY-SD STAT	E LINE (LA	AT 44 44	59N LONG	LO4 02 49W)
	OCT 1988						
	19 27	0810 1100	14 14	7.0 3.0	4.0 -2.0	2030 1470	
	NOA	0010					
	30 JAN 1989	0910	12	0.0	2.0	550	
	19	0925	2.9	0.0	-1.0	2510	
	MAR 01	1355	7.7	0.0	-15.0	2350	
	23	1145	108	0.0	5.0	1110	
	29 APR	1150	142	10.0	11.0	1340	
	21	0920	31	14.0	19.5	2050	
	MAY 02	1345	334	11.0	11.0	1320	
	JUN						
	01 27	1440 1125	31 104	22.0 23.0	21.5 25.5	1950 1460	
	JUL						
	26 SEP	0855	102	24.0	21.5	1540	
	05	1830	59	D23.5	28.0	1670	
06429997 MURR	OCT 1988						ONG 104 03 20W
	19 JUN 1989	1415	2.3	11.0	13.0	1390	
	02	1500	6.5		15.5		
	27 JUL	1135	8.2	18.5	27.0	1330	
	24	0930	12	17.0	25.0	1690	
	SEP 05	1330	13	16.5	29.5	1440	
06430500	REDWATER C	R AT WY	-SD STATE	LINE (LAT	44 34 26	N LONG 10	02 54W)
	OCT 1988	1550	27	10.0	13.0	1440	
	NOV	1550	27	10.0	13.0		
	30 JAN 1989	1200	27	3.0	3.0	1110	
	19 MAR	1240	30	0.0	0.0	1320	
	02	0920 1310	25 29	0.0 8.0	-15.0 6.0	1500 1490	
	APR 26	1745	32	9.5	7.5	1420	
	MAY						
	24 JUN	1055	31	14.0	14.5	1400	
	27 JUL	1440	21	21.0	30.0	1410	
	24	1140	4.6	19.0	28.5	2050	
	SEP 05	1500	12	18.5	31.0	1400	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	ATURE AIR	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06430770	SPEARFISH	CREEK	NEAR LEAD,	SD (LAT	44 17 56N	LONG 103	52 02W)
	NOV 1988						
	07	1010	16	2.0		460	
	29 DEC	1300	13	1.5	-1.0	540	
	19	0930	15	0.0	-13.0	440	
	FEB 1989 07	1005	14	0.0	-12.0	445	
	MAR						
	06 APR	1040	15	2.0	4.0	450	
	05	1415	16	3.0	4.5	435	
	MAY 04	1135	23	4.0	3.0	435	
	23	1245	19	11.5		435	
	31	1250	15	4.5		425	
	JUN 28	1145	15	10.5	28.5	450	
	JUL	1175	13	10.5	20.5	450	
	26 SEP	1115	14	11.0	23.0	445	
	07	0900	15	8.5	15.0	430	
0643080	O ANNIE CE	EEK N	EAR LEAD, SI	D (LAT 4	4 19 37N L	ONG 103 5	3 38W)
	NOV 1988						
	07	1210	0.16	1.0	3.0	330	
	29	0930		0.0		430	
	DEC 19	1150	0.04	0.0	3.0	355	
	FEB 1989	1150	0.04	0.0	0.0	033	
	07 MAR	1215	E0.15	0.0	-13.0	385	
	06	1240	0.0				
	10	1145	0.33	0.0	14.0	410	
	APR 06	1000	0.56	0.5	2.0	225	
	MAY						
	03	1230		2.0		135	
	05 08	1345 1430		5.5		110 110	
	22	1330	2.4	11.0		157	
	31	1055		5.0		190	
	JUN						
	28 JUL	1445	0.51	16.0	30.5	240	
	26	1255	0.21	18.0	26.0	290	
	SEP 07	1016	0.06	11 6	10.0	318	
	07	1215	0.06	11.5	18.0	310	
06430850 LI		ISH C	REEK NEAR L	EAD, SD	(LAT 44 20	58N LONG	103 56 08W)
	NOV 1988	1005				105	
	07 28	1325	15 14	6.0		465 480	
	DEC						
	19 FEB 1989	1325	15	0.0	-1.0	465	
	07	1325	13	0.0	-11.0	460	
	MAR 06	0915	14	5.0	5.0	470	
	APR						
	06 MAY	1215	14	6.5	3.5	460	
	04	1345	16	6.5	5.0	455	
	22	1045	14	9.5	24.0	465	
	31 JUN	0920	15	5.0	3.0	460	
	29	1500	13	12.5	25.0	460	
	JUL 26	1410	12	12 0	26.0	460	
	SEP	1410		13.0			
	07	1400	14	10.0	21.0	450	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06430898	SQUAW CREEK	NEAR	SPEARFISH,	SD (LAT	44 24 041	N LONG 103 5	3 35W)
	NOV 1988						
	09 DEC	0835	0.75	0.0	-2.0	288	
	21	0920	0.66	0.0	-0.5	315	
	FEB 1989 06	1050	0.44	0.0	-11.0	330	
	MAR						
	07 APR	0815	0.46	0.0	2.0	330	
	06 MAY	1645	2.0	2.0	5.5	225	
	03	1430	15	2.5	4.0	125	
	05	1500	26	6.0	10.5	100	
	08	1305	36	8.0	10.0	110	
	12	1245	12	9.0	20.0	120	
	JUN 01	1040	2.6	7.0	15.5	210	
	29	1230	1.6	17.5	28.0	250	
	JUL 24	0910	0.75	15.0	16.0	310	
	SEP 08	0845	0.43	11.5	10.0	322	
06430900 SI	PEARFISH CREINOV 1988	0950	VE SPEARFIS	SH, SD (LA	AT 44 24 (	06N LONG 103	53 40W)
	DEC 21	1115	41	1.5	7.0	435	
	FEB 1989			1.5			
	06 APR	1220	42	0.0	-11.5	455	
	07 MAY	1620	42	6.0	5.5	410	
	03	1610	80	4.0	3.0	410	
	05	1615	99	8.5	12.5	310	
	12	0830	74	8.0	17.0	370	
	JUN						
	01	1210	46	8.0	17.0	425	
	29 JUL	1400	40	14.0	27.0	420	
	24	1035	43	11.0	19.0	440	
	SEP 08	1045	41	8.5	10.0	418	
06431500	) SPEARFISH						, CWO
00431300		CK AI	SPEAKE 150	SD (LAI .	44 20 3/1	LONG 103 31	4011
	NOV 1988	1016	27			200	
	09 DEC	1215	37	1.5	-1.5	268	
	21 FEB 1989	1335	40	1.5	6.0	430	
	06	1445	40	0.0	-10.0	445	
	MAR 07	1255	38	2.0	6.0	425	
	APR 07	1130	36	5.0	15.0	420	
	MAY					720	
	04 JUN	1600	81	5.0	8.5		
	01	0910	48	7.0	13.5	415	
	29 JUL	1015	37	13.0	25.0	415	
	24 SEP	1300	37	14.0	24.0	430	
	08	1350	40	9.0	12.0	410	

06432020 SPEARFISH CREEK BELOW SPEARFISH, SD (LAT 44 34 48N LONG 10  OCT 1988  17 1015 66 8.0 7.0 790  NOV	93 53 37W)
17 1015 66 8.0 7.0 790 NOV	
17 1015 66 8.0 7.0 790 NOV	
28 1025 52 2.5 6.0 660	
JAN 1989 17 1050 48 2.0 8.0 600	
FEB 27 1300 46 0.0 -4.0 635	
MAR	
24 1055 52 5.5 5.0 665 APR	
27 1305 74 4.5 1.5 530 MAY	
05 1150 93 8.0 10.0 475	
08 0950 100 10.0 17.0 430	
31 0950 37 8.5 10.5 630 JUN	
08 1135 37 13.5 18.0 675 JUL	
27 0930 9.6 16.0 23.0 900	
SEP 05 1100 18 13.5 30.5 900	
05 1100 18 13.5 30.5 900 11 0900 29 7.0 5.0 690	
06433000 REDWATER RIVER ABOVE BELLE FOURCHE SD (LAT 44 40 02N LONG 1	.03 50 20W)
OCT 1988 17 1420 140 10.0 10.0 1200	
NOV	
28 1250 127 1.0 4.0 1200 JAN 1989	
17 1435 137 0.0 6.5 1120 FEB	
27 1450 122 0.0 -4.0 1200	
MAR 23 1445 126 8.0 7.0 1290	
APR 26 1230 130 9.5 8.5 1200	
JUN	
01 1750 85 17.5 23.5 1220	
26 1130 54 18.0 19.0 1200	
JUL 26 1155 4.6 25.5 26.0 1700	
SEP 05 1645 12 21.0 35.5 1700	
06433500 HAY CR AT BELLE FOURCHE SD (LAT 44 40 01N LONG 103 50	46W)
MAR 1989 27 1330 1.7 3.0 14.0 2700	
APR 26 1005 0.22 9.5 10.0 2620	
MAY 0.22 5.5 10.0 2020	
02 1615 21 14.0 15.0 825 JUN	
02 1205 2.1 14.0 15.0 2620	
26 1800 0.27 23.5 24.5 2670	

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	ATURE WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06434500 INLET C	ANAL NEAR	BELLE FOU	RCHE (LAT	44 42 141	N LONG 103	49 23W)
OCT 1988						
19	1430	161	11.5	14.5	1300	
25 NOV	1630	143	10.0	12.0	1360	
29	1345	142	2.5	2.5	1260	
JAN 1989 19	1315	133	0.0	5.0	1190	
MAR	1015	100	0.0	3.0	1130	
13 APR	1530	704	1.0	4.0	670	
25	1200	143	11.0	8.0	1380	
JUN		70				
06 27	1445 1630	73 169	24.5 26.0	29.0 31.0	1600 1410	
JUL						
24 SEP	1620	98	28.0	30.0	1560	
13	1030	89	11.0	21.5	1500	
06436000 BELLE FOUR	RCHE R NEA	R FRUITDA	LE SD (LAT	44 41 2	N LONG 10	3 44 14W)
007 1000						
OCT 1988 19	1105	5.1	10.0	10.0	2300	
NOA						
28 JAN 1989	1450	4.1	0.0	3.0	1800	
18	1645	3.3	0.0	0.0	2560	
MAR 03	0935	2.9	0.0	-15.0	2400	
27	1500	6.8	8.0	15.0	2000	
APR 21	1425	2.8	21.0	20.0	2400	
JUN	1423	2.0	21.0	29.0	2400	
02	1005	1.2	16.0	13.0	2640	
26 JUL	1555	4.3	24.5	22.5	2140	
26	1515	3.9	29.5	30.5	1960	
SEP 06	0800	7.8	17.5	14.0	2150	
· · · · · ·	0000	7.0	17.5	14.0	2130	
06436156 WHITETA	AIL CREEK	AT LEAD,	SD (LAT 44	20 36N 1	LONG 103 4	5 57W)
NOV 1988 08	1020	1.2	3.0	4.5	420	
DEC	1020	1.2	3.0	4.3	420	
20	1100	1.1	0.0	-7.0	415	
JAN 1989 30	1325	1.1	0.0	10.0	485	
MAR						
08 APR	1200	1.3	3.0	10.0	450	
04	1620	2.0	2.5	1.0	440	
MAY	0045	16			355	
04 05	0945 1130	15 20	4.0 5.5	5.5 6.5	315	
23	0930	7.0	9.0	21.0	320	
30 JUN	1210	6.1	6.0	5.0	340	
28	1015	3.1	11.5	27.5	390	
JUL				26.0	410	
25 SEP	0935	1.6	14.0	26.0	410	
12	1030	0.91	5.5	9.0	425	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	ATURE WATER (DEG C)	ATURE AIR (DEG C) (	SPE- CIFIC CON- DUCT- ANCE US/CM) 00095)	
06436170	WHITEWOOD	CREEK	AT DEADWOO	D (LAT 44	22 48N LC	NG 103 43	25W)
N	OV 1988			2.35			
D	08 EC	1220	15	8.0	8.0	1030	
	20	1250	12	0.0	-3.0	1220	
	AN 1989 30	1450	14	7.0	15.0	1160	
	AR 08	1445	21	8.0	14.0	1030	
A	PR 05	1115	15	6.0	8.0	990	
M	AY						
	02	0850	42	3.0	10.0	620	
	05 30	1015 1335	130 30	5.5 9.0	4.5 5.0	380 710	
	UN	1000	30	3.0	5.0	,10	
	27 UL	1245	19	17.0	27.0	840	
	25	1145	14	19.0	28.0	990	
	EP 12	0945	14	7.0	11.0	1320	
06436180 W	HITEWOOD CE	ABOVE		SD (LAT	44 26 32N	LONG 103 3	7 44W)
				,			4.4.4.4
	CT 1988 20	1650	16	10.0	12.0	940	
	EC					- 1-	
	01	1330	15	3.0	11.0	1050	
	AN 1989 23	1100	15	0.0	-5.0	1080	
	AR 02	1535	12	0.0	-17.0	1090	
	22	0900	19	3.0	7.0	920	
A	PR 13	1315	23	12.5		828	
	AY						
	02 31	1900 0930	80 31	11.5 9.0	12.5 8.0	550 730	
	UN		10	00.5	22.0	040	
	20 UL	1415	16	23.5	23.0	940	
	20 UG	1530	15	25.5	29.0	910	
	23	0930	10	16.0	32.5	1070	
	EP 19	1200	13	15.0	24.0	1160	
	10	1200	13	15.0	24.0	1100	
06436190 WH	ITEWOOD CRE	EK NEA	AR WHITEWOO	D SD (LAT	44 32 30N	LONG 103	34 16W)
	CT 1988	1400	16	11 6	15.0	1080	
	20 EC	1420	16	11.5	15.0	1080	
	01 AN 1989	1200	14	3.0	12.0	1010	
	20	1350	22	1.0	6.0	1080	
	AR					1000	
	02 22	1330	11 21	6.0	-16.0 5.5	1220 1060	
	AY				11 6	610	
	03 05	1835	94 153	9.0	11.5 12.0	610 485	
J	UN						
	08 28	1455	21 17	22.5	20.0 33.5	865 940	
J	UL						
	27 EP	1230	9.1	25.0	30.5	1010	
	15	1145	9.8	15.0	30.0	1140	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
064361	198 WHITEWO	OD CR AE	SOVE VALE	SD (LAT 44	37 04N	LONG 103	28 52W)
	OCT 1988 20 DEC	1145	16	10.0	14.5	1100	
	01	0930	17	0.0	12.0	970	
	JAN 1989 20	1125	9.7	0.0	3.0	1260	
	MAR 07	1030	10	0.5	1.0	1220	
	29 APR	0845	27	6.0	8.0	1060	
	13	1000	23	8.5	21.0	960	
	MAY 04	1155	114	10.0	18.0	615	
	30	1230	40	11.0	12.0	880	
	JUN 20	0800	16	17.5	18.0	1060	
	JUL 20	0900	13	20.0	27.0	1000	
	AUG 22	0830	5.5	17.5	22.0	1080	
	SEP 19	1515	6.1	22.0	29.5	1160	
	10	1313	0.1	22.0	20.5	1100	
	21 26 MAY 03 28 JUL	1330 1600 1400 1140	2.8 2.5 748 32	9.0 10.5 24.0	15.5 20.0 10.0 32.0	4980 700 1860	
	27	1525	42	28.0	33.5	1830	
06437000	BELLE FOUR OCT 1988 26 JAN 1989	1200	EAR STURGE	S SD (LAT	44 30 47 7.0	N LONG 10	03 08 11W)
	04	1500				3500	
	APR 12	1545				2400	
	JUN 28	0915	193	23.0	24.0	1720	
	AUG		130	25.0	24.0		
	02 02	0800 1040	170	23.0	28.5	1820 2000	
06437020	BEAR BUTTE	CREEK NI	EAR DEADWO	OD, SD (LA	T 44 20	08N LONG	103 38 06W
	NOV 1988 08	0900	1.1	0.0	1.0	285	
	DEC 20	0930	0.95	0.0	-4.0	300	
	JAN 1989					300	
	MAR	1200	0.75	0.0	11.5		
	08 APR	0830	1.6	0.0	-1.0	250	
	04 MAY	1310	3.1	1.0	1.5	240	
	03	0910	15	2.5	5.0	210	
	30 31	1020 1400	6.3 5.7	7.0 8.5	3.0 7.5	200 194	
	JUN 27	1430	2.3	19.5	27.0	240	
	JUL						
	25 SEP	0830	1.3	15.0	17.0	320	
	12	1200	1.3	7.5	8.0	350	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06438000	BELLE FOURCH	RIVER	NEAR ELM	SPRINGS (	LAT 44 22	11N LONG	102 33 56W)
	OCT 1988						
	13 DEC	0900	37	8.0	7.0	2410	
	28	1700	10	0.0	-10.0	3800	
	FEB 1989 07	1300	9.7	0.5	-4.0	3750	
	APR 06	1135	106	7.0	9.0	2250	
	JUN						
	06 AUG	1430	104	26.0	32.0	2000	
	18	1030	148	16.0	24.0	1900	
	SEP 09	1330	202	16.0	20.5	2150	
	25	0920	72	12.0	14.0	2210	
06439	000 CHERRY CE	NEAR	PLAINVIEW	SD (LAT 4	4 44 35N	LONG 102 0	3 11W)
	APR 1989 14	1410	8.2	11.5		3720	
	MAY				11.4		
	10 AUG	1245	49	15.0	21.5	1740	
	29	1225	7.8	21.0	25.0	505	
06439300	NOV 1988						1 29 24W)
	16 JAN 1989	1245	128	0.0	10.0	2490	
	30 FEB	1320	106	0.0	17.5	2600	
	28	1410	105	0.0	-2.0	2420	
	MAR 09	1455	84	0.0	22.0	2450	
	MAY 09	1210	500	15.5	15.0	1390	
	JUN	1210	590	15.5	15.0	1390	
	02 JUL	1530	90	19.0	20.0	2750	
	19	1300	291	24.0	31.0	1890	
06	441000 BAD R MAR 1989	NEAR M	IDLAND SD	(LAT 44 0	4 01N LONG	G 101 09 3	5 <b>W</b> )
	10	1705	113	0.0	17.5	984	
	28 MAY	1110	17	8.5		725	
	15	1420	0.10	21.0	25.0	2250	
0644	1110 PLUM CRE	EK BELO	OW HAYES,	SD (LAT 4	4 12 38N I	LONG 100 4:	3 34W)
	SEP 1989 21	1740	703	12.0		1620	
	22	1345	53	12 0		1130	
	25	1035		11.5		1250	
06441400	WILLOW CREEK	NEAR 1	FORT PIER	RE, SD (LA	T 44 19 0	N LONG 10	0 25 08W)
	SEP 1989						
	21	1615 1615	89 26	12.0 13.5		- 22	
	25	1200	3.3	15.0	1470.0		
	29	1400	0.01				

MAR 1989 08 1445	DA	TE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
APR 20 1500 1.3 2980 MAY 01 1205 57 9.0 11.0 1640 SEP 25 1450 12 15.5 18.0 1370  06442500 MEDICINE CR AT KENNEBEC SD (LAT 43 54 17N LONG 099 52 35W)  MAR 1989 16 1650 0.10 0.0 -6.0 513 AFR 06 1555 1.5 9.0 6.5 1680  06442718 CAMFBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720 MAR 1988 02 1545 7.5 0.0 1.0 1040 APR 01 1015 0.28 3.0 7.5 2680 MAY 13 1000 0.11 11.5 14.5 3530 JUN 16 1110 0.04 22.0 25.0 3220 MAR 1989 24 1125 28 1.0 4.0 454 AFR 05 1030 0.18 5.0 6.5 2700 MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3555 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 PEB 22 1020 16 0.0 -6.0 860 MAR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1530 19 17.0 17.0 790 AUG 21 1550 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970	06441500 B	AD R NEA	R FORT	PIERRE SI	(LAT 44	19 36N 1	ONG 100 2	23 02W)
APR 20 1500 1.3 2980 MAY 01 1205 57 9.0 11.0 1640 SEP 25 1450 12 15.5 18.0 1370  06442500 MEDICINE CR AT KENNEBEC SD (LAT 43 54 17N LONG 099 52 35W)  MAR 1989 16 1650 0.10 0.0 -6.0 513 AFR 06 1555 1.5 9.0 6.5 1680  06442718 CAMFEELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  CCT 1987 30 0835 0.01 2.0 5.5 3720 MAR 1988 02 1545 7.5 0.0 1.0 1040 AFR 01 1015 0.28 3.0 7.5 2680 MAY 133 1000 0.11 11.5 14.5 3530 JUN 16 1110 0.04 22.0 25.0 3220 MAR 1989 24 1125 28 1.0 4.0 454 AFR 05 1030 0.18 5.0 6.5 2700 MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1450 9.9 0.0 2.0 1060 FEB 22 1155 33 0.5 9.0 650 APR 1990 09 1450 9.9 0.0 2.0 1060 FEB 22 1715 33 0.5 9.0 650 APR 199 1450 9.9 0.0 2.0 1060 FEB 19 1450 4.9 9.9 0.0 2.0 1060 FEB 19 1545 41 15.5 27.5 650 APR 19 1545 41 15.5 5 27.5 650 APR 19 1545			0.02		2.22			
01   1205   57   9.0   11.0   1640   SEP   25   1450   12   15.5   18.0   1370    06442500   MEDICINE CR AT KENNEBEC SD (LAT 43 54 17N LONG 099 52 35W)  MAR 1989   16   1650   0.10   0.0   -6.0   513   AFR   06   1555   1.5   9.0   6.5   1680    06442718   CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  CCT 1987   30   0835   0.01   2.0   5.5   3720   MAR 1988   02   1545   7.5   0.0   1.0   1040   AFR   1988   02   1545   7.5   0.0   1.0   1040   AFR   1988   02   1015   0.28   3.0   7.5   2680   MAY   13   1000   0.11   11.5   14.5   3530   JUN   16   1110   0.04   22.0   25.0   3220   MAR 1989   24   1125   28   1.0   4.0   454   AFR   05   1030   0.18   5.0   6.5   2700   MAY   03   1435   1.5   20.0   19.5   1930   26   1130   0.05   13.5   14.5   3550   JUN   16   1135   0.01   22.5   25.0   3660   SEP   21   1150   7.3   16.0   13.5   582    06445685   WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)   OCT 1988   03   1400   7.4   12.5   14.0   910   NOV   14   1350   11   5.0   11.0   1040   JAN 1989   09   1450   9.9   0.0   2.0   1060   FEB   22   1715   33   0.5   9.0   650   APR   19   1455   41   15.5   27.5   650   MAY   11   1530   31   20.0   30.0   710   JUN   12   1350   19   17.0   17.0   790   AUG   21   1350   19   17.0   17.0   790   AUG   21   1350   19   17.0   17.0   790   AUG   SEP   1615   3.9   25.5   31.5   970   SEP   19   1545   41   15.5   27.5   650   AUG   21   1615   3.9   25.5   31.5   970   SEP   22   1615   3.9   25.5   31.5   970   SEP   23   1615   3.9   25.5   31.5   970   SEP   23   1615   3.9   25.5   31.5   970   SEP   23   23   23   23   23   23   23   23   23   23   23   23   23   23	APR		1445	4.5	0.0	10.0	1280	
SEP   25   1450   12   15.5   18.0   1370			1500	1.3			2980	
25 1450 12 15.5 18.0 1370  06442500 MEDICINE CR AT KENNEBEC SD (LAT 43 54 17N LONG 099 52 35W)  MAR 1989 16 1650 0.10 0.0 -6.0 513 AFR 06 1555 1.5 9.0 6.5 1680  06442718 CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720 MAR 1988 02 1545 7.5 0.0 1.0 1040 AFR 01 1015 0.28 3.0 7.5 2680 MAY 13 1000 0.11 11.5 14.5 3530 JUN 16 1110 0.04 22.0 25.0 3220 MAR 1989 24 1125 28 1.0 4.0 454 AFR 05 1030 0.18 5.0 6.5 2700 MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG AUG 21 1615 3.9 25.5 31.5 970	01.		1205	57	9.0	11.0	1640	
MAR 1989  16 1650 0.10 0.0 -6.0 513  AFR 06 1555 1.5 9.0 6.5 1680   06442718 CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720  MAR 1988 02 1545 7.5 0.0 1.0 1040  AFR 01 1015 0.28 3.0 7.5 2680  MAY 13 1000 0.11 11.5 14.5 3530  JUN 16 1110 0.04 22.0 25.0 3220  MAR 1989 24 1125 28 1.0 4.0 454  AFR 05 1030 0.18 5.0 6.5 2700  MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550  JUN 16 1135 0.01 22.5 25.0 3660  SEP 21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1530 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970		••	1450	12	15.5	18.0	1370	
16 1650 0.10 0.0 -6.0 513 AFR 06 1555 1.5 9.0 6.5 1680  06442718 CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720  MAR 1988 02 1545 7.5 0.0 1.0 1040 AFR 01 1015 0.28 3.0 7.5 2680  MAY 13 1000 0.11 11.5 14.5 3530  JUN 16 1110 0.04 22.0 25.0 3220  MAR 1989 24 1125 28 1.0 4.0 454  AFR 05 1030 0.18 5.0 6.5 2700  MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550  JUN 16 1135 0.01 22.5 25.0 3660  SEP 21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970	06442500 M	EDICINE	CR AT I	CENNEBEC S	SD (LAT 43	54 17N	LONG 099	52 35W)
AFR 06 1555 1.5 9.0 6.5 1680  06442718 CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720  MAR 1988 02 1545 7.5 0.0 1.0 1040  AFR 01 1015 0.28 3.0 7.5 2680  MAY 13 1000 0.11 11.5 14.5 3530  JUN 16 1110 0.04 22.0 25.0 3220  MAR 1989 24 1125 28 1.0 4.0 454  AFR 05 1030 0.18 5.0 6.5 2700  MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550  JUN 16 1135 0.01 22.5 25.0 3660  SEP 21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970			1650	0.10	0.0	-6.0	513	
O6442718 CAMPBELL C NR LEE'S CORNER (LAT 44 04 39N LONG 099 22 51W)  OCT 1987 30 0835 0.01 2.0 5.5 3720  MAR 1988 02 1545 7.5 0.0 1.0 1040  AFR 01 1015 0.28 3.0 7.5 2680  MAY 13 1000 0.11 11.5 14.5 3530  JUN 16 1110 0.04 22.0 25.0 3220  MAR 1989 24 1125 28 1.0 4.0 454  AFR 05 1030 0.18 5.0 6.5 2700  MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550  JUN 16 1135 0.01 22.5 25.0 3660  SEP 21 1150 7.3 16.0 13.5 582  O6445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN AUG 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970	APR			4		1		
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30 0835 0.01 2.0 5.5 3720  MAR 1988  02 1545 7.5 0.0 1.0 1040  APR  01 1015 0.28 3.0 7.5 2680  MAY  13 1000 0.11 11.5 14.5 3530  JUN  16 1110 0.04 22.0 25.0 3220  MAR 1989  24 1125 28 1.0 4.0 454  APR  05 1030 0.18 5.0 6.5 2700  MAY  03 1435 1.5 20.0 19.5 1930  26 1130 0.05 13.5 14.5 3550  JUN  16 1135 0.01 22.5 25.0 3660  SEP  21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988  03 1400 7.4 12.5 14.0 910  NOV  14 1350 11 5.0 11.0 1040  JAN 1989  09 1450 9.9 0.0 2.0 1060  FEB  22 1020 16 0.0 -6.0 860  MAR  22 1715 33 0.5 9.0 650  APR  19 1545 41 15.5 27.5 650  MAY  11 1530 31 20.0 30.0 710  JUN  12 1350 19 17.0 17.0 790  AUG  21 1615 3.9 25.5 31.5 970	06442718 C	AMPBELL	C NR LI	EE'S CORNE	ER (LAT 44	04 39N	LONG 099	22 51W)
MAR 1988  02 1545 7.5 0.0 1.0 1040  AFR  01 1015 0.28 3.0 7.5 2680  MAY  13 1000 0.11 11.5 14.5 3530  JUN  16 1110 0.04 22.0 25.0 3220  MAR 1989  24 1125 28 1.0 4.0 454  AFR  05 1030 0.18 5.0 6.5 2700  MAY  03 1435 1.5 20.0 19.5 1930  26 1130 0.05 13.5 14.5 3550  JUN  16 1135 0.01 22.5 25.0 3660  SEP  21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988  03 1400 7.4 12.5 14.0 910  NOV  14 1350 11 5.0 11.0 1040  JAN 1989  09 1450 9.9 0.0 2.0 1060  FEB  22 1020 16 0.0 -6.0 860  MAR  22 1715 33 0.5 9.0 650  AFR  19 1545 41 15.5 27.5 650  MAY  11 1530 31 20.0 30.0 710  JUN  12 1350 19 17.0 17.0 790  AUG  21 1615 3.9 25.5 31.5 970			0835	0.01	2.0	5.5	3720	
AFR 01 1015 0.28 3.0 7.5 2680 MAY 13 1000 0.11 11.5 14.5 3530 JUN 16 1110 0.04 22.0 25.0 3220 MAR 1989 24 1125 28 1.0 4.0 454 AFR 05 1030 0.18 5.0 6.5 2700 MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970	MAR	1988						
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24 1125 28 1.0 4.0 454 AFR 05 1030 0.18 5.0 6.5 2700 MAY 03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 APR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1350 19 17.0 17.0 790 AUG 21 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970			1110	0.04	22.0	25.0	3220	
05 1030 0.18 5.0 6.5 2700  MAY  03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550  JUN 16 1135 0.01 22.5 25.0 3660  SEP 21 1150 7.3 16.0 13.5 582   06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970  SEP	24.		1125	28	1.0	4.0	454	
03 1435 1.5 20.0 19.5 1930 26 1130 0.05 13.5 14.5 3550 JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 APR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	05.		1030	0.18	5.0	6.5	2700	
JUN 16 1135 0.01 22.5 25.0 3660 SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	03.		477/2/15/75/					
SEP 21 1150 7.3 16.0 13.5 582  06445685 WHITE R NR NE-SD STATE LINE (LAT 43 00 53N LONG 102 50 07W)  OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 APR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP		••	1130	0.05	13.5	14.5	3550	
OCT 1988  03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970  SEP		• •	1135	0.01	22.5	25.0	3660	
OCT 1988 03 1400 7.4 12.5 14.0 910 NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 APR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	21.	••	1150	7.3	16.0	13.5	582	
03 1400 7.4 12.5 14.0 910  NOV 14 1350 11 5.0 11.0 1040  JAN 1989 09 1450 9.9 0.0 2.0 1060  FEB 22 1020 16 0.0 -6.0 860  MAR 22 1715 33 0.5 9.0 650  AFR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970  SEP	06445685 WH	ITE R NR	NE-SD	STATE LIN	NE (LAT 43	00 53N	LONG 102	50 07W)
NOV 14 1350 11 5.0 11.0 1040 JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP			1400	7.4	12.5	14.0	910	
JAN 1989 09 1450 9.9 0.0 2.0 1060 FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	NOV							
FEB 22 1020 16 0.0 -6.0 860 MAR 22 1715 33 0.5 9.0 650 AFR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	JAN	1989						
MAR 22 1715 33 0.5 9.0 650 APR 19 1545 41 15.5 27.5 650 MAY 11 1530 31 20.0 30.0 710 JUN 12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	FEB							
APR 19 1545 41 15.5 27.5 650  MAY 11 1530 31 20.0 30.0 710  JUN 12 1350 19 17.0 17.0 790  AUG 21 1615 3.9 25.5 31.5 970  SEP		•	1020	16	0.0	-6.0	860	
19 1545 41 15.5 27.5 650 MAY  11 1530 31 20.0 30.0 710 JUN  12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP		••	1715	33	0.5	9.0	650	
11 1530 31 20.0 30.0 710  JUN  12 1350 19 17.0 17.0 790  AUG  21 1615 3.9 25.5 31.5 970  SEP	19.		1545	41	15.5	27.5	650	
12 1350 19 17.0 17.0 790 AUG 21 1615 3.9 25.5 31.5 970 SEP	11.		1530	31	20.0	30.0	710	
21 1615 3.9 25.5 31.5 970 SEP	12.		1350	19	17.0	17.0	790	
SEP	21.		1615	3.9	25.5	31.5	970	
			1715	9.4	18.0	31.0	500	

# MISCELLANEOUS TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06445980	WHITE CL.	AY CR N	EAR OGLALA	SD (LAT	43 08 46N	LONG 102	40 58W)
	CT 1988 03	1145	3.9	9.0	12.0	960	
NO	V						
Al	14 PR 1989	1105		3.0			
	19 AY	1345	11	14.0	25.0	480	
	11 UN	1345	9.3	18.5	26.0	490	
	12	1200	6.2	17.0	18.0	485	
	JL 12	1100	1.7	24.0	31.0	450	
	UG 21	1345	0.34	24.5	33.5	450	
	EP 27	1430	4.1	17.0	32.5	480	
0644600	00 WHITE	R NEAR	OGLALA SD	(LAT 43	15 17N LO	NG 102 49	29W)
	CT 1988	0015				405	
NO	03 OV	0945		8.0			
	14 AN 1989	0925	7.4	2.5	5.0	955	
(	09 EB	1100	11	0.0	-2.0	1100	
2	21	1100	14	0.0	1.0	910	
2	AR 22	1345	58	1.0	23.0	530	
	PR 19	1145	45	12.0	26.0	680	
	AY 11	1200	37	17.0	25.5	770	
	JN 12	1015	20	17.0	17.5	830	
AU	JG 21	1145		21.5			
SE	EP 27	1245					
	٠,	1243	51	15.0	31.5	800	
0644700	OO WHITE	R NEAR	KADOKA SD	(LAT 43	45 09N LO	NG 101 31	28W)
	OV 1988 03	1530	10	10.5	15.0	770	
DE	EC		13	10.5			
JA	13 AN 1989	1245	36	0.0	14.0	807	
	10 EB	1630	6.2	0.0	-9.0	1620	
1	13	1545	13	0.0	22.0	1070	
M/	AR 10	1515	2500	0.5	24.0	393	
	28	1750	139	13.5		478	
2	25	1700	74	12.0	7.0	614	
	18	1630	271	23.0	26.5	565	
JU	JN 12	1500	5.0	20.0	22.0	827	
JU		1440	5.2	28.0	36.5	613	
AU	JG						
SE		1530	1.3	29.5		77	
	12 22	1255 1325	843 3370	11.0	18.0 15.0	490	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	ATURE AIR (DEG C)		
0644750	OO LITTLE WH	ITE R NE	EAR MARTIN	SD (LAT	43 10 00N	LONG 101	37 47W)
	NOV 1988						
	DEC	0945	13	6.0	7.0	201	
	14 JAN 1989	0945	19	0.0	-1.0	240	
	11 FEB	1015	6.8	0.0	3.0	264	
	14 MAR	0915	6.4	0.0	4.0	234	
	29	0835	39	9.5	7.0	254	
	APR 26	0930	18	7.0	10.0	305	
	MAY 24	0840	13	19.0		295	
	JUN 13	0910	7.8	14.0	9.5	254	
	JUL 24	1715	3.6	25.5	30.5	222	
	SEP 15	0845	8.1	12.5	10.0	217	
06449000	LAKE CR BELO	W REFUGI	NEAR TUTE	HILL SD	(LAT 43 08	46N LONG	101 30 38W)
	NOV 1988					-20-	
	DEC	1145	0.07	8.0	15.0	648	
	14 JAN 1989	1050	0.06	1.5	0.0	605	
	11 FEB	1200	8.4	0.0	4.0	853	
	14 MAR	1055	8.4	0.0	2.0	648	
	29	1105	38	10.0	9.5	361	
	APR 26	1150	20	8.0	13.0	376	
	MAY 23	1735	15	32.0	35.0	410	
	JUN 20	0850	8.7	22.0	21.0	456	
	JUL 24	1540	38	26.0	28.5	565	
	SEP 14	1645	0.73	20.0		808	
064493	LOO LITTLE W	HITE R 1	NEAR VETAL	SD (LAT	43 06 03N	LONG 101	13 49W)
	JAN 1989						
	11 FEB	1515	26	0.0	4.0	379	
	MAY	1410	32	0.0	4.0	353	
	23 JUL	1430	51	25.5	31.5	346	
	24	1320	30	25.5	28.5	420	
0644930	OO LITTLE WH	ITE R AI	BV ROSEBUD	SD (LAT	43 15 47N	LONG 100	55 02W)
	NOV 1988	1646	70	10.5	17.0	275	
	DEC DEC	1645	72	10.5		275	
	14 JAN 1989	1300	91	2.0		280	
	12 FEB	1330	60	0.0	7.0	322	
	16 JUL	1030	70	0.0		298	
	25	1020	59	22.0	23.0	345	

# MISCELLANEOUS TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS

	D.	ATE	TIME	DIS- CHARGE INST. CUBIC FEET PER SECON (00061	, D (	EMPER ATURE WATER DEG C 00010	) (	EMPER- ATURE AIR (DEG C)	DUC ANG (US)	FIC N- CT-				
06	449400	ROSEBUI	CR AT	ROSEBUD	SD	(LAT	43 1	4 09N	LONG :	100 :	51 12	2W)		
		1988												
	02 DEC	• • •	1430	7.9		8.	0	18.0		338				
	14	1000	1545	8.2		2.	0	7.0		350				
	12	1989	1515	6.8		0.	0	5.0		356				
			1225	7.4		0.	0	11.0		338				
	MAR 30		1240	7.8		6.	5	2.0		337				
	APR		1500	8.5		12.		2.5		339				
	MAY													
	JUN		1605	6.9		21.		18.0		342				
	JUL JUL	• • • •	1335	4.8		19.	5	16.0		312				
	25 SEP		1235	4.8		23.	5	32.0		299				
		•••	1435	5.9	h	16.	0	23.0		337				
06449	NOV 02 DEC 14 JAN 11 FEB	1989	1300 1700 1730 1720	66 102 45 88	BUD	9. 1. 0.	0	21.0 -1.0 2.0 4.0		289 294 337 307	0 5	3 00	) (W)	
	MAR 30		1030	164		6.	5	1.0		295				
	APR		1240	122				1.5		308				
	MAY					11.								
	JUN		1725	95		23.	5	17.0		328				
	JUL		1655	71		30.	0	33.5		317				x -
			1500	59		24.	0	33.0		343				
			1215	59		14.	0	17.0		295				
06450500			R BELOW	WHITE	RIVE	R SD	(LAT	43 36	05N I	ONG	100	44	58W)	
		1988	1410	78		9.	0	13.0		297				
	DEC		0935	71		0.		-12.0		295				
	JAN	1989												
	FEB	•••	1045	64		0.		3.0		398				
	16 MAR	• • •	1530	80		0.	0	-2.0		315				
			0835	167		9.	5	2.0		323				
	27		0850	119		12.	0	1.5		326				
			0850	97		16.	5	12.5		342				
	JUN 19		1305	64		28.	0	31.0		327				
	JUL		1200	59		28.		34.0		350				
	SEP													
	14		0945	61		12.	J	10.5		295				

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06452000 WHITE	R NEAR	OACOMA SD	(LAT 43	44 54N LO	NG 099 33	22W)
FEB 1989 27 MAR	1500	81	0.0	2.0	549	
16	1315	1170	0.0	4.0	448	
10	1335	3.3	30.0	32.0	872	
06452320 PLATTE CI	REEK NE.	AR PLATTE,	SD (LAT	43 19 38N	LONG 098	58 13W)
NOV 1988						
DEC DEC	1330	1.0	7.5	14.0	2620	
16 JAN 1989	0845	0.89	0.0	-1.0	3290	
13 FEB	1015	0.73	0.0	9.0	3960	
15 APR	1020	1.5	0.0	-4.0	3470	
06 MAY	0840	4.6	9.5	9.0	1620	
04 26	0855 0735	1.2 0.50	12.5 15.0	13.0 11.0	2500 2750	
06453255 CHOTE	AU CR N	R AVON SD	(LAT 42 5	55 24N LONG	G 098 06 :	21W)
OCT 1988 14	0955	1.9	11.0	11.0	1520	
NOV 14	1210	2.0	7.0	13.0	1210	
DEC 08	0940	1.6	1.0	-4.0	1540	
FEB 1989 09	0825	1.8	1.0	-8.0	1760	
MAR 13	1740	15	2.0	4.5	990	
APR 14	0835	1.6	10.0	7.0	1300	
MAY						
18 JUN	1045	1.3	18.0	20.0	1520	
09 JUL	0940	1.2	12.0	17.0	1500	
21 AUG	1020	1.0	23.0	26.0		
SEP	1135	0.92	28.0	30.0	1490	
06	1320	0.94	25.0	29.0	1480	
06464100 KEYA PAHA	A R NEA	R КЕЧАРАНА	SD (LAT	43 07 45N	LONG 100	06 24W)
NOV 1988 02	1435	21	11.5	18.5	422	
DEC 15	1245	11	0.0	-8.0	491	
JAN 1989 19	1100	15	0.0	12.0	430	
FEB 15	1600	13	0.0	3.0	444	
MAR 31	1105	49	6.0	12.5	424	
APR 28	1230	28	9.0	6.5	458	
MAY 25	1250	18	18.5	21.5	437	
JUN 21	1105	10	16.0	16.0	429	
JUL 25			10.0		409	
SEP	1755	13	10.0	10.0		
13	1510	14	19.0	18.0	413	

			, QUIL	JIII DAIN			
	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET FER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC COM- DUCT- ANCE (US/CM) (00095)	
0646450	0 KEYA	PAHA R A	r wewela si	(LAT 43	01 44N L	ONG 099 46	49W)
	OV 1988 02	0855	47	4.5	5.0	428	
	EC 15	1440	31	0.0	-7.0	472	
	AN 1989 13	1430	27	0.0	13.0	491	
F	EB 15	1345	35	0.0	10.0	430	
M	AR 31	0850	123	1.5	12.0	440	
A	PR 28	1000	69	8.0	2.5		
М	AY						
J	25 UN	1500	35	22.5	23.5	464	
J	21 UL	0825	25	19.0	15.5	430	
	26 EP	0845	20			419	
	13	1300	28	14.0	15.0	412	
0646750	0 MISSO	URI R AT	YANKTON SI	(LAT 42	51 58N L	ONG 097 23	37W)
	CT 1988		21121				
N	05 <b>⊙</b> V	1300	31900	15.0	9.0	715	
	15 EC	1615	12700	7.0	0.5	810	
	19 AR 1989	1600	12500	0.5	9.0	720	
	14 22	1040 1140	8620 9780	2.0	2.0	750 740	
A	PR 18	1200	28300	9.0	15.5		
M	AY 16	1045	32000	16.0	24.0	760	
J	UN 29	1010	27900	21.0	25.0	780	
J	UL					790	
A	21 UG	0930	32300	23.0	26.0		
S	23 EP	1120		24.0	31.0	820	
	20	1215	27800	20.5	28.0	780	
064710	00 JAME	S R AT CO	DLUMBIA SD	(LAT 45 3	6 13N LO	NG 098 18 3	6W)
	PR 1989						
	03 05	1005 1015	463 658	3.0 5.5	5.0 7.0	200 185	
	10	1130	836	3.0	8.0	560	
	13 18	1200	783	5.5 8.0	13.0	528 530	
	21	1215 1135	861 839	12.0	24.0		
	AY		555	20.0			
	04	0850	174	14.5	19.0	530	
06471200	MAPLE R	AT ND-SI	STATE LIN	NE (LAT 45	56 20N	LONG 098 27	(W80
	AR 1989	bene	122	12			
	23 29	0945 1650	25 900	1.0 3.0	4.0	190	
	PR 19	1230	16	10.0	21.0	570	
M	AY 24	1155	1.4	20.0	24.0		
	-1111	1100	4.7	20.0	27.0	2500	

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	ATURE WATER (DEG C)		SPE- CIFIC CON- DUCT- ANCE (US/CM)	
06471500 ELM R	AT WE	ESTPORT SD	(LAT 45 39	22N LONG	098 29	48W)
NOV 1988 17	1400	8.1	0.5	-4.0	770	
DEC 16	0900	0.79	1.0	-4.0	1050	
FEB 1989		0.60				
16 MAR	1125		0.5	-10.0	1350	
23 31	1210 1020	36 1320	2.0	5.0 6.0	390 170	
APR 05	1620	342	7.0	20.0	265	
19	0945	48	9.0	10.0	510	
MAY 24	1330	6.6	21.0	20.0	630	
JUN 21	1520	7.1	15.5	12.5	860	
JUL 26	1310		28.0	34.0	340	
AUG		15				
24 SEP	1040	5.0	23.0	26.0	330	
22	0945	13	12.5	9.5	360	
06471550 JAMES RIVE NOV 1988 	1140	OW COLUMBIA	1.0	45 36 17N -5.0	LONG 09	18 18 18W)
DEC 15	1410	0.28	1.0	-5.0	2800	
MAR 1989 23	1520	1.5	1.0	6.0	1470	
30 APR	1155	1280	1.0	5.0	170	
03	1320	1400	5.0	10.0	180	
05	1255	1140	6.0	15.5	245	
07 10	1540 1310	926 909	5.0 4.0	7.0 9.0	270 320	
18	1350	991	10.0	11.0	410	
21	1300	1040	13.0	25.0		
26	1015	624	14.0	9.0	520	
MAY					410	
04	1130	260	15.0	16.0	565	
10 17	1425	52 18	16.0	25.0		
JUN	1910		19.5	23.0		
23 JUL	0925	3.1	20.0	19.0	570	
27	1210	0.75	26.0	26.0	1130	
AUG 24	0835	2.9	23.0	20.5	1330	
SEP 22	1225	1.2	14.5	11.0	1350	
06473000 JAMES	R AT	ASHTON SD	(LAT 45 00	02N LONG	098 28	57W)
MAR 1989	1625	221	5.0	9.0	302	
29 APR	1635	331	5.0	8.0	302	
03	1840	966	6.5	3.0		
13	1730	1110	8.0	20.0		
20	0950	1330	12.0	14.0	290	
MAY 05	1125	1170	12.5	8.0	520	

	DA	ATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)		TEMPER- ATURE AIR (DEG C) (00020)	DUCT- ANCE (US/CM)	
0647370	00	SNAKE	CR NEAR	ASHTON SD	(LAT 44	57 33N L	ONG 098 30	55W)
1	AR	1989						
			1515	98	1.0	8.0		
	29		1125 1900	1720 2250	3.0 4.5			
1	APR		1000	2230	4.5	0.0	210	
	03.		1600	1000	7.5	2.0		
	AAY	• • •	1205	114	13.0	23.0	490	
	19. JUN		1355	38	17.0	17.0	870	
	20 .		1330	11	19.5	26.0	880	
	19.		1440	5.2	25.0	29.0	980	
	21.		1340	0.35	24.0	28.0	1050	
5	25.		1525	0.01	20.0	15.0	1170	
06473750	WC	OLF CR	NEAR REI	HEIGHTS S	SD (LAT 4	4 36 25N	LONG 099	13 54W)
ŀ		1989	702.0		3.4	15 11 51	1200	
	28.		0945 1140	2.5 0.73	1.0			
1	APR	• •	1140	0.73	0.5	3.0		
	28.	••	0850	3.2	8.0	13.0	140	
			CR NEAF	R TULARE SI	(LAT 44	44 06N I	ONG 098 3	5 09W)
	22.	1988	1400	0.10	4.0	1.0	1000	
	DEC 21.		1040	0.42	0.5	-1.5	1280	
N		1989				70.00	5552	
			1140	0.18	1.5	8.0		
	28.	• •	1525 1545	34 984	1.0	-3.0 13.0		
	30.		1630	446	5.0	9.0		
	<b>IPR</b>		3332			2.7		
	28. MAY	• •	1115	9.2	10.0	7.0	770	
	19.		1145	1.9	17.0	17.0	900	
	JUN							
	19, TUL	• •	1550	0.48	25.5	31.0	970	
	19.		1220	0.47	22.5	28.5	1080	
			NE CR NE	CAR ZELL SI	(LAT 44	45 52N I	ONG 098 4	2 13W)
N	10V 22.	1988	1310	0.01	-1.0	. 4.0	2450	
M		1989	1000					
	20. 28.		1230 1230	17 367	1.0	-6.0 12.0	200 180	
				121	6.5	8.0	250	
	30.		1410					
A	PR		1410					
	PR 28.		1245	3.0	9.0	9.0	1700	
	PR 28.		1245					
N	PR 28.			3.0 0.61	9.0 16.0	9.0 17.0	1700 1580	
M J	28. 1AY 19. UN 19.		1245					
M J	28. 1AY 19.		1245 1000	0.61	16.0 23.5	17.0 34.5	1580	
M 3	28. 4AY 19. UN 19.		1245 1000 1445	0.61	16.0	17.0	1580 1610 990	

עם	ATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C)	ATURE AIR (DEG C)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06475000	JAMES	R NEAR	REDFIELD S	D (LAT 44	54 33N LO	IG 098 27	34W)
	1989	1355	3030	4.0	11.0		
01			1590	11.0		600	
JUN	• • •	1010	294	19.0		700	
JUL		1540	65	22.0	32.0	940	
26 AUG	• • •	1010	11	25.0	27.0	1020	
24 SEP		1350	0.73	27.0	33.0	1110	
		1345	0.01	24.0	31.0	1260	
	) JAMI 1989	ES R AT	HURON SD (	LAT 44 21	49N LONG	98 11 56	W)
24		1200	621	0.5	5.0	490	
APR		1240	2530		4.5	375	
04 MAY		1220	3240	6.0	7.0		
15 19		1340 1145	869 652	20.0 19.0		610	
JUN 05		1605				850	
JUL				22.0			
17	•••	0/50	<0.50	23.0	19.0	1020	
		CR NEAR	ALPENA SD	(LAT 44	9 15N LONG	9 098 26	06W)
14	1989	0900	130	1.0	2.0	310	
APR		0845	62	0.0	2.0	350	
20	•••	1355	4.1	19.0	32.5		
06477000		R NEAR F	ORESTBURG	SD (LAT 4	3 58 26N LO	ONG 098 0	4 14W)
14.		0850	12	8.5	7.0	2300	
NOV 17		0905	4.8	0.0	-3.0	2100	
DEC 20		0925	3.3	0.0	-2.0	2610	
MAR 13.	1989	1035	73	1.0	7.0	830	
APR 06		1125	2970	9.0	10.0	310	
20 MAY		0840	1480	12.0	20.5		
24 JUN	•••	1335	516	17.0	22.0	700	
07.		1450	165	24.0	27.0	930	
AUG 09		1010	3.3	23.0	20.0	1360	
SEP 15		0940	1.7	25.0	15.0	1300	
06477150	ROCK	CR NEAR	FULTON SD	(LAT 43	45 39N LONG	097 54	25W)
MAR 27	1989	1145	9.5		11		
APR 17		0800	0.90				

	D	ATE		TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)		SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06477500	FIRE	STEEL	CR	NEAR	MOUNT VERN	ON SD (LA	T 43 46 301	N LONG 098 14	33W)
	OCT	1988							
				1015	0.02	11.0	10.0	2700	
	17			1125	0.08	1.5	0.0	2710	
	DEC			1120	0.06	0.0	-1.5	2950	
	MAR	1989		1120	0.00	0.0	1.5	2330	
	13			1405		2.0	11.0	130	
	APR			1530	24	0.5	11.5	440	
	20 MAY	• • •		1110	2.6	15.5	19.0		
				1630	0.24	19.0	23.5	1500	
				1615	0.01	24.0	33.5	1750	
06478	MAR	1989	CR					NG 097 59 09V	1)
	APR			1320	1.3				
				0910	0.34	8.0	1.0		
0647	MAR	DRY 0	R I	NEAR :		(LAT 43 :	22 18N LONG	9 097 49 23W) 	
		324		25.07	1117				
0647			CR	NEAR	CLAYTON SD	(LAT 43 2	22 18N LONG	097 36 12W)	
	04	1988		0950	3.2	6.5	1.5	2450	
				1150	5.4	5.0	8.0	2450	
	DEC 22			1030	4.3	0.0	5.0		
	FEB	1989			2.5			2021	
	MAR.	• • • •		1140	1.1	0.0	-5.0	2450	
				1300	16	0.5	-7.0	1280	
	27			1640	31	14.0	12.5	1290	
	APR						0.215		
	17	• • • •		1155	12	7.5	11.5		
0647	8500		R	NEAR	SCOTLAND SI	) (LAT 43	11 09N LON	IG 097 38 07W	1)
		1988		1255	29	5.0	0.0	2180	
		1989		1355	29	5.0	9.0	2100	
				1000	242	21.0	19.0	990	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)		DUCT- ANCE	
0647851	3 JAMES RIV	ER NR Y	ANKTON SI	) (LAT 42	59 45N LC	ONG 097 22 10	(W)
	OCT 1988						
	04	1230	29	10.5	14.0	1950	
	NOV 14	1625	32	6.0	7.5	2180	
1	DEC						
	20	1025	34		-1.0		
	MAR 1989 14	1500	335	1.0	-3.0		
	29	1430	896	9.0	17.0	1020	
	APR						
	18 MAY	1510	2190	11.0	10.5		
	15	1550	1220	20.0	29.0	650	
	JUN						
	28	1545	169	25.5	31.0	1180	
	JUL 24	1415	40	28.0	33.0	1450	
	AUG	-,		20.0			
	22	1345	18	29.0	26.5	1580	
	SEP 19	1325	9.5	23.0	30.0		
				777			
	APR	1845	E0.05				
		1445	E0.02				
	17	1215	E0.01				
	ITTLE VERMII MAR 1989	LION R	NEAR SALI	EM SD (LAT	43 47 39	ON LONG 097 2	22 02W)
	15	1425	22	0.5	7.0	320	
	27	1405	19	4.5	23.5	303	
06478690 WES	FORK VERMI	ILLION R	NEAR PAI	RKER SD (L	AT 43 24	55N LONG 097	' 12 18W)
	26 DEC	1010	0.03	3.0	1.5	1460	
	09	0900	0.05	1.0	-9.0	1460	
1	MAR 1989	-000	0.03		3.0	2,50	
	14	1155	34	0.0	0.5	390	
	27	1615	21	5.5	20.0	570	
	APR 17	1445	1.2	9.5	7.5	930	
	YAY	-113	1.2	3.3	7.5	000	
	16	0915	0.02	17.0	17.0	1540	
	JUN	1700		04.0	00.0	2052	
	12	1730	0.08	21.0	22.0	2250	
		R NEAR	WAKONDA	SD (LAT 4	2 59 27N	LONG 096 57	49W)
1	MAR 1989	1020	120				
	29 APR	1030	138			75	
	17	1435	32	9.0	15.5	9	
				0.0			

ž i	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06479010	VERMILLION	RIVER NE	VERMILLIC	N SD (LA	T 42 49 0	2N LONG 096	55 26W)
	OCT 1988						
	NOV	1655	17	11.5	10.0	1500	
	16	1000	19	0.5	-2.0	1450	
	DEC 20	1450	22	0.0	-1.0	1600	
	FEB 1989 28	1510	8.2	0.0	-2.0	1580	
	MAR						
	15 29 APR	1040 0855	273 136	9.0	-3.0 9.0	450 890	
	19	0745	47	7.0	1.5		
	MAY 16	1405	23	20.0	28.0	1530	
	JUN 30	0810	16	22.5	24.0	1580	
	JUL. 20				29.5		
	AUG	1620	10	30.0		1480	
	23 SEP	1830	5.5	31.0	30.0	1650	
	20	1445	12	24.5	25.0	1050	
06479215	OCT 1988				45 10 51	N LONG 097	11 09W)
	31 DEC	1625	0.02	8.0		650	
	06 MAR 1989	1450	0.12	0.5	3.0	750	
	13	1730	138	0.0	0.0	130	
	23	0845 0840	0.81 192	1.0	3.0 4.0	320 175	
	APR 18	1645	6.5	11.5	12.0	507	
	MAY						
	30 JUN	1450	1.2	12.0	14.0	650	
	28 AUG	1025	0.13	20.5	25.0	579	
	01	1605	0.05	25.0	26.5	680	
	SEP 12	1615	0.10	12.5	15.0	660	
06479438	BIG SIOUX	R NEAR	WATERTOWN	SD (LAT	45 00 22N	LONG 097 09	9 53W)
	NOV 1988	1045	0.00			670	
	O1 DEC	1245	0.02	6.0	8.0	570	
	07 MAR 1989	1215	0.86	1.0	-2.0	860	
	22	1820	7.5	0.0	4.0	260	
	28 APR	1115	614	2.5	13.0	185	
	18 MAY	1900	18	9.0	13.5	540	
	31	0905	6.1	11.0	9.5	660	
	JUN 28	1330	1.6	25.5	26.0	556	
	AUG 02	1100	0.25		32.0	560	
	SEP			25.0			
	13	1000	0.76	11.0	16.0	535	

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06479525	BIG SIOU	K R NEAR	CASTLEWOO	D SD (LAT	44 43 541	LONG 097	02 39W)
	NOV 1988						
	01	1510	6.0	7.0	12.0	1140	
	DEC 07	1430	4.9	0.5	-2.0	1340	
	MAR 1989						
	22 28	1550 1350	6.2 134	0.0 2.0	7.0 8.0	880 180	
	APR	1000		2.0	0.0	100	
	19	0930	15	5.5	10.0	1080	
	MAY 31	1200	7.2	12.5	15.5	1160	
	JUN						
	28 AUG	1815	6.4	30.5	28.5	1010	
	02	1325	1.4	28.0	33.0	700	
	SEP 13	1225	6.2	15.5	18.0	1180	
			0.2	15.5	20.0	1100	
0647998	0 MEDARY	CR NEAR	BROOKINGS,	SD (LAT 4	44 13 27N	LONG 096	46 06W)
	NOV 1988 02	1305	1.1	3.0	11.0	850	
	DEC	1303	1.1	3.0	11.0	630	
	07	1635	2.3	0.5	-4.5	870	
	MAR 1989 22	0945	5.6	0.0	3.0	490	
	29	1005	168	4.0	8.5	380	
	APR 19	1250	15	10.5	17.5	770	
	MAY	1230	13	10.5	27.5	,,,	
	31	1445	3.6	15.0	23.0	700	
	JUN 29	0925	5.2	22.5	24.0	700	
	AUG						
	02 SEP	1700	3.7	29.0	30.0	690	
	13	1730	2.5	15.5	19.0	700	
06480000	BIG SIOUX I	RIVER NE	AR BROOKING	GS SD (LAT	r 44 10 48	N LONG 09	6 44 55W)
	NOV 1988 01 DEC	1705	11	6.5	5.0	1090	
	08	1030	14	0.5	-8.0	1180	
	MAR 1989 22	1230	69	0.0		380	
	29	1530	1740	6.0	13.0		
	APR 19	1235	115	10.0	20.0	930	
	MAY	1200	113	10.0	20.0	300	
	31	1645	44	15.5	14.0	1000	
	JUN 29	1235	66	26.0	28.0	880	
	AUG						
	03	0815	27	24.5	25.5	1000	
	SEP						

			william doin				
	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	ATURE WATER (DEG C)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC COM- DUCT- ANCE (US/CM) (00095)	
0648040	O SPRING CR	NEAR	FLANDREAU S	SD (LAT 44	07 18N	LONG 096 35 19W)	
	NOV 1988 02	1020	2.8	2.0	9.0	680	
	DEC 08	1210	2.9	0.0	-8.0	770	
	MAR 1989 21	1720	2.5	0.0	0.0	690	
	29 APR	1225	18	5.0	12.0	540	
	19 JUN	1105	5.5	7.5	16.0	670	
	30	1005 1105	2.8 3.1	12.5 25.0	13.0 26.0	640 650	
	AUG 03	1000	1.4	24.5	28.0	720	
	SEP 14	1040	2.9	12.0	16.5	690	
06480650	FLANDREAU C	R ABOV	E FLANDREAU	J SD (LAT	44 03 45	N LONG 096 29 14	W)
	NOV 1988 02	0830	2.0	3.0	8.0	940	
	DEC 08	1405	0.68	0.5	-5.0	1140	
	MAR 1989 21	1505	10	0.0	1.0	580	
	29 APR	1035	45	5.0	5.0	540	
	19 JUN	0915	8.7	7.0	9.0	930	
	01 29	1230 1700	2.6 6.4	19.0 28.0	17.0 27.5	1080 870	
	AUG 03	1135	1.4	26.0	28.0	830	
	SEP 14	1230	3.0	15.5	22.0	970	
06481000	BIG SIOUX R	NEAR	DELL RAPIDS	S SD (LAT	43 47 25	N LONG 096 44 42	W)
	OCT 1988 27	1355	13	5.5	4.5	920	
	DEC 13	1535	20	0.0	4.0	920	
	MAR 1989 28		2310	3.5	9.0	290	
	APR 18	0920	193	9.0	3.0	740	
	MAY 17	1125	99	21.0	23.5	940	
	JUN 13	1805	43	19.5	17.0	920	
	AUG 03	1105	42	26.5	30.0	860	
	SEP 06	1120	22	22.0	22.0	940	
064815						LONG 096 47 26W)	
	OCT 1988 27	0900	2.8	6.5	5.5	1100	
	DEC 12	1545		0.5	0.0		
	MAR 1989	1515	79	0.0	-2.0		
	28 APR	1300	67	8.0	11.5	630	
	18 MAY	1510	18	11.0	11.5	1160	
	16 JUN	1625	6.4	24.0	23.0	1420	
	13 AUG	0820	1.8	16.0	14.0	1120	
	02 SEP	1820	0.14	29.0	29.0	1120	
	05	1820	0.54	25.0	27.0	850	

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	TEMPER- ATURE AIR (DEG C) (00020)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)		
06482020 BIG SIOUX R AT	NORTH CLIFF	AVE AT S	IOUX FALL	S SD (LAT	43 34 01N	LONG 096	42 39W)
OCT 19	88						
26	1525	15	13.0	12.5	3020		
DEC	1525	10	20.0	10.0	0020		
08	1640	18	5.0	-8.0	3070		
MAR 19							
02	0905	12		-15.0	3710		
15	0915	329	0.0	-20.0	280		
28	1045	1590	5.0	6.0	350		
APR							
18	1330	217	10.5	10.5	930		
MAY					250		
16	1415	92	22.5	28.0	1270		
JUN		2. 1					
13	1315	24	19.0	16.0	1700		
AUG							
02	1630	40	28.5	30.0	1500		
SEP	1700	25	20 0	27.0	1200		
05	1700	25	28.0	27.0	1380		
06482610 SPL: OCT 19: 27		AT CORSON	SD (LAT 4	3 36 59N 1	LONG 096 3: 580	1 54W)	
DEC							
13	1220	11	0.0	2.5			
MAR 19	89						
02	1200	7.6		-15.0	760		
28	1520	224	8.0	10.0	310		
APR							
18	1115	30	8.0	5.5	500		
MAY							
17	0755	15	17.5	22.5	830		
JUN	1616	10	10 5	17.5	500		
13 AUG	1615	10	19.5	17.5	500		
03	0820	13	25.0	25.0	620		
SEP	0020	13	23.0	25.0	020		
06	0905	16	21.0	21.0	640		
	0005	10	21.0	21.0	040		
06482848 B		CANTON SD	(LAT 43	17 12N LO	NG 096 35	6W)	
26	1150	2.6	4.0	10.5	2590		
DEC	1130	2.0	4.0	10.5	2380		
13	0825	2.9	0.0	-1.0			
MAR 19		2.0	0.0				
01	1500	2.4	0.0	-13.0	2290		
14	0825	27	0.0	1.0	1140		
27	1825	11	6.0	16.0	1640		
APR							
17	1730	5.0	11.0	12.5	2600		
MAY							
16	1115	2.5	20.5	27.0	2650		
JUN							
14	1010	0.91	14.0	12.5	2500		
AUG	4050		67.5	00.0	0000		
02	1350	1.7	27.5	28.0	2000		
SEP	1420	1 1	22 6	27.0	2450		
05	1420	1.1	23.5	27.0	2430		

#### MISCELLANEOUS TEMPERATURE MEASUREMENTS AND FIELD DETERMINATIONS

DA	ATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	ATURE		
06485500	BIG SIOU	X R AT	AKRON IA	(LAT 42	49 42N LO	ONG 096 33	45W)
NOV	1988						
16.		1355	249	2.5	2.0	1350	
01.		1125	124	0.0	-10.0	1340	
15. APR		1820	2640	0.5	1.0		
19. MAY		1340	589	13.0	22.0		
16. JUL	••	1715	362	21.5	26.0	860	
20 . AUG	44	0955	566	24.0	23.5	870	
24.	.,	1130	135	24.5	25.5	830	
	RULE CREE	EK NR E	LK POINT	SD (LAT 4	2 48 32N	LONG 096	41 11W)
07.		0905	5.4	6.0	3.5	1010	
16.		1225	7.0	0.5	-1.0	1130	
20.	1989	1700	11	0.0	0.0	1210	
28. MAR		1745	5.4	0.0	-4.0	1100	
15.	1.10	1430	53	0.5	6.0	670	
28. APR		1725	22	13.5	17.5	980	
19. MAY		0950	14	7.5	11.0		
16. JUN	••	1540	6.6	23.0	29.0	1090	
30. JUL		1030	6.5	23.5	27.0	970	
20. AUG		1330	15	25.0	26.5	940	
23. SEP		1555	1.5	31.0	29.0	510	
20.		1655	1.6	24.0	25.5	730	

The following miscellaneous discharge measurements were made in the state. Sites are listed in downstream order.

		DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER	TEMPER- ATURE WATER	TEMPER- ATURE AIR	SPE- CIFIC CON- DUCT- ANCE	
		<b></b>		SECOND (00061)	(DEG C) (00010)	(DEG C)	(US/CM) (00095)	
4	53544096501000 LIT	TTLE MINNESC	TA RIVER	NEAR BRO	WNS VALLEY	Y, MN (LAT	45 35 44N LON	G 096 50 10
		MAR 1989	32.3	Turke.				
		31	1640	648				
	06400500	CHEYENNE R	NEAR HO	T SPRINGS	SD (LAT	43 18 19N	LONG 103 33 43	W)
		MAY 1988 04	1800	31	21.0	16.0	3550	
		JUN 22				35.5		
		AUG	1305	16	28.0		3050	
		22 NOV	1355	16	25.5	30.5	2800	
		01	1540	22	15.5	22.0	2890	
	06402150 FAI	L RIVER AT	MOUTH NR	HOT SPRI	NGS, SD (I	LAT 43 23	12N LONG 103 2	4 20W)
		MAY 1988 05	1145	23	18.0	19.0	1290	
		JUN 23	1520	24	30.0	32.5		
		AUG						
		NOV NOV	1440	21	24.0	28.5	1360	
		03	0820	26	15.0	15.5	1350	
	06402400	CHEYENNE RI	VER AB B	UFFALO GA	P, SD (LAT	r 43 22 35	N LONG 103 17	16W)
		03	1525	31	15.5	17.5	1810	
		JUN 21	1015	23	27.0	32.5	1900	
		AUG 23	1045	30	18.0	21.5	1980	
		NOV 02	1000	35	10.0	21.0	2020	
		02	1000	33	10.0	21.0	2020	
	0640252		NR BUFF	ALO GAP,	SD (LAT 43	3 26 55N L	ONG 103 09 23W	)
		MAY 1988 06	1200	2.0				
		JUNE 21	1320		27.0			
		AUG		1.4	27.0			
		23 NOV	1355	3.2			Televisia a	
		02	1230	2.5	14.0	24.0	2950	
	06402800 CC	OTTONWOOD CR	EEK NEAR	BUFFALO	GAP, SD (I	LAT 43 31	36N LONG 103 0	6 14W)
		MAY 1988 03	1030	0.24	13.0	18.0	2660	
		JUN						
		AUG	0945	0.22	22.0	32.0	1180	
		NOV	1125	0.07	15.5	29.0	2850	
		02	1500	0.18	10.0	19.0	2660	
	06403700	CHEYENNE R	IVER NR	FAIRBURN,	SD (LAT	43 42 00N	LONG 102 54 35	W)
		MAY 1988 06	1600	78	20.5	20.0	2580	
		JUN						
		20 AUG	1545	38	31.0	40.0	2670	
		26 OCT	1045	66	19.5	27.5	2750	

1200

71

9.5

21.0

2660

	DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	ATURE	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	
06405	797 BEAR GUL	CH ABOVE	HAYWARD	SD (LAT 4	3 47 37N	LONG 103 21 1	.7W)
	MAY 1989						
	23 JUN	1100	0.12	20.0	21.0	206	
	28	0930	0.17	15.5	22.0	175	
434843103153000 GR	ACE COOLIDGE	CREEK 3.	5 MILES S	W OF HERM	OSA, SD (	LAT 43 48 43N	LONG 103 15 30W)
	OCT 1988						
	05 NOV	1205	0.30	7.0		870	
	16	1435	0.38	1.5		940	
	MAR 1989 29	0930	0.32	8.5		880	
	MAY	1.1.1.1					
	02 JUN	1315	0.38	13.0		840	
	05	1645	0.12	19.5		880	
	JUL 06	1300	0.0			0.44	
	AUG 17	1610	0.0			44	
06412300	TITTLE SPRI	NGS AT R	APID CITY	SD (LAT	44 02 42	N LONG 103 19	37W)
11.1-11.				, 00 (1111			,
	APR 1989 13	0900	1.8	5.0		44	
	AUG 01	0815	2.1	12.0			
	SEP 27	1750	1.4	13.0	1441	390	
4402391031930	01 RAPID CRE	EK BELOW	TITTLE S	PRINGS, S	D (LAT 44	02 39N LONG	103 19 30W)
	AUG 1989 01	1030	74	16.5		384	
440321103181101 RA	PID CR AT BRA	EBURN AD	DITION AT	RAPID CI	TY, SD (L	AT 44 03 21N	LONG 103 18 11W)
	AUG 1989						
	01	0815	68	7-			
440330103175101 R	APID CR AB CO	NF WITH	CLEGHORN	SPRING AT	RC,SD (L	AT 44 03 30N	LONG 103 17 51W)
	AUG 1989	0.00					
	01	0950	68				
440428103154901	RAPID CR AB	CONF WI	TH LIME C	R AT RC,	SD (LAT 4	4 04 28N LONG	103 15 49W)
	APR 1989						
	13 AUG	1025	20	10.0			
	01	1200	65	20.0			
0641360	O CITY SPRIN	GS AT RA	PID CITY,	SD (LAT	44 05 25N	LONG 103 17	37W)
	FEB 1989						
	24	1330	0.0				
	APR 25	0900	0.0				
440455103151901 RAP	ID CR AB CONF	WITH DE	ADWOOD AV	E DRAIN A	T RC,S(LA	T 44 04 55N L	ONG 103 15 19W)
	APR 1989						
	13	1145	23	11.0			
	AUG 01	1125	55	24.0	33.0	381	
	VI	1123	22	24.0	33.0	301	

DIS-CHARGE, SPE-INST. CIFIC TEMPER-TEMPER-CON-DUCT-FEET ATURE ATURE DATE PER WATER AIR ANCE (DEG C) (US/CM) SECOND (DEG C) (00061) (00010) (00020) (00095)

440336103105801 RAPID CR BL CONF WITH MEADE ST DRAIN AT RC, SD (LAT 44 03 36N LONG 103 10 58W)

AUG 1989 01... 1255 48 -- -- 437

06430765 EAST SPEARFISH CREEK NEAR LEAD, SD (LAT 44 17 44N LONG 103 52 10W)

JUN 1989				
28	1320	6.2	15.0	 410
JUL				
26	0950	5.0	10.0	 450
SEP				
07	1125	5.0		 

#### 06430865 IRON CREEK NR LEAD (LAT 44 22 25N LONG 103 55 07W)

AUG 1988					
03	1120	1.5			
SEP					
08	1145	1.5	9.0		
NOV					
15	1140	1.3	4.0	-2.0	423
MAR 1989					
07	1200	1.3	5.0	10.0	420
MAY					
11	1130	3.2	11.0	23.0	310
SEP					
11	1400	1.1	8.0	17.0	400

# 06430950 SPEARFISH CR BL ROBISON GULCH NR SPEARFISH (LAT 44 26 14N LONG 103 52 32W)

TT 4000					
JUL 1988	1020	2.5	10.0		- 42
AUG	1030	2.5	18.0		177
17	0945	2.5			
SEP	0343	2.3			
13	1130	2.4			
OCT	1100	2.4			
19	1030	2.9	8.0	10.0	400
NOV	1000	2.0	0.0	20.0	
15	0840	2.5	3.0	-4.0	410
DEC					
14	0930	2.5	3.0	-1.0	401
JAN 1989					
17	1030	2.2	2.5	5.0	3800
FEB					
15	1145	2.6	1.0	-3.0	410
MAR					
10	0900	2.8	4.0	8.0	295
APR					
18	0930	3.6	2.5	3.0	370
MAY				124	
11	0830	6.4	7.5	17.5	329
JUN				4.0	500
14	1030	3.2	9.0	20.0	364
JUL					
19	1325	3.0	18.5	27.0	364
AUG	1000		10.0	24.0	105
17	1230	2.6	16.0	34.0	405
SEP	1000			10 6	200
11	1200	2.3	9.5	13.5	390

# 06432172 FALSE BOTTOM CREEK NR CENTRAL CITY (LAT 44 23 28N LONG 103 47 58W)

AUG 1988					
03	0815	0.36	16.0	17.0	440
SEP 13 NOV	0845	0.28	8.0	10.0	380
14 MAR 1989	1045	0.41	2.0	12.0	340
08 MAY	1350	0.55	2.0	10.0	260
10 SEP	1000	13	6.5	13.0	110
12	0800	0.36	4.0	7.5	360

# MISCELLANEOUS DISCHARGE MEASUREMENTS

	DATE	TIME	FEET		ATURE AIR (DEG C)	DUCT- ANCE	
06432180	FALSE BOTTOM	CREEK NE	AR SPEARF	ISH, SD (L	AT 44 27	09N LONG 103 4	8 22W)
	AUG 1988 03 SEP	1000	0.0				
	13 NOV	1030	0.0			: :	
	14 MAR 1989	1300	0.0				
	08	1600	0.01				
	APR 1988 25 JUN 20 AUG 29	 1555 1515	188 5.0 5.4	  			
	OCT 27	0845	147	6.5	0.0	1150	
064	36950 MEADE	LATERAL N	R VALE, S	D (LAT 44	36 20N LO	NG 103 16 00W)	
	JUN 1989 21	1200	6.0				
064	78000 JAMES	R NEAR MI	TCHELL SD	(LAT 43 4	1 36N LON	G 097 57 54W)	
	MAY 1989 18	1455	904	19.0		525	
	JUN 28 AUG	0945	99	24.0		(	
	01	1145	8.1	28.0		1320	

The ground-water observation well network in South Dakota is used to monitor quantitative and at times qualitative changes in the glacial and bedrock aquifers. Federal, state, and local agencies monitor approximately 2,000 wells throughout the state. These wells are a sample of the South Dakota observation well network. All measurements are in feet above or below land-surface datum. Wells in Hughes and Sully Counties are measured periodically with chalked tape by USGS personnel.

#### AURORA COUNTY

435039098263403.

LOCATION.--Lat 43°50'39", long 98°26'34", in SW\sW\sW\sW\sW\s\W\s sec.6, T.104 N., R.63 W., Hydrologic Unit 10160011, 8.5 mi north-northeast of Plankinton. Owner: South Dakota Department of Water and Natural Resources. AQUIFER. -- Niobrara.

WELL CHARACTERISTICS. -- Drilled artesian observation well, diameter 6 in., depth 134 ft, perforated 114 to 134 ft.

INSTRUMENTATION. -- Digital water-level recorder -- 60-minute punch.

DATUM. -- Elevation of land-surface datum is 1,418 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 2.0 ft above land-surface datum.
PERIOD OF RECORD. -- April 1979 to current year.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	62.61	62.02	61.53		60.61	59.13	57.68	56.87		69.32	72.80	75.20
2	62.55	61.84	61.41		60.63	59.13	57.59	56.84	65,44	69.71	72.92	75.21
3	62.45	61.60	61.31		60.63	58.94	57.50	56.80	65,69	69.92	72.90	75.22
4	62.39	62.29	61.31	64.78	60.59	58.95	57.54	56.69	65.89	70.15	72.76	75.31
5	62.30	63.54	61.13	64.43	60.43	58.96	57.55	56.72	66.05	70.34	72.91	75.32
6	62.16	64.27	60.94	64.14	60.29	58.96	57.53	56.74	66.21	70.61	73.03	75.35
7	62.07	64.99	60.87	63.82	60.21	58.82	57.51	56.73	66.48	70.76	73.07	75.36
8	61.89	65.50	61.04	63.64	60.22	58.75	57.40	56.66	66.70	70.88	73.13	74.27
9	61.74	66.00	62.42	63.51	60.22	58.75	57.42	56.70	66.90	71.02	73.35	74.11
10	61.88	66.45	63.40	63.23	60.11	58.69	57.42	56.70	67.01	71.21	73.40	74.36
11	63.27	66.70	64.10	63.05	60.01	58.66	57.35	56.68		71.15	73.32	73.87
12	64.16	66.97	64.59	62.89	59.99	58.64	57.32	56.64		71.14	73.53	72.73
13	64.77	67.11	64.98	62.79	59.81	58.60	57.27	57.06		71.19	73.72	71.97
14	65.31	66.42	65.65	62.52	59.81	58.58	57.17	57.40		71.20	73.78	71.29
15	65.80	65.37	66.10	62.33	59.85	58.49	57.16	57.40		71.23	73.85	70.73
16	66.22	64.70	66.37	62.27	59.85	58.48	57.05			71.28	73.98	70.23
17	66.66	64.28	66.67	62.09	59.85	58.47	57.13			71.28	73.99	69.84
18	67.01	63.91	66.82	61.94	59.80	58.42	57.12			70.79	74.04	69.46
19	67.20	63.58	67.05	61.86	59.62	58.35	57.10			70.37	74.23	69.14
20	66.79	63.34	67.43	61.83	59.47	58.28	57.00			70.70	74.34	68.86
21	65.58	63.10	67.62	61.70	59.41	58.27	56.96			70.93	74.36	68.53
22	64.93	62.83	67.73	61.47	59.48	58.15	56.92		67.50	71.13	74.47	68.28
23	64.32	62.60	68.09	61.34	59.48	58.03	56.88		67.93	71.37	74.54	68.14
24	63.94	62.33	68.36	61.33	59.31	58.00	56.88		68.19	71.64	74.67	67.83
25	63.61	62.17	68.58	61.28	59.27	57.95	56.91		68.41	71.86	74.71	67.53
26	63.34	62.06	68.61	61.16	59.22	57.87	56.91		68.53	72.05	74.81	67.40
27	62.90	61.87	68.90	61.07	59.18	57.78	56.90		68.74	72.21	74.91	67.17
28	62.82	61.86	69.13	60.92	59.12	57.77	56.86		68.94	72.31	74.94	66.94
29	62.69	61.66	68.84	60.91		. 57.76	56.84		69.13	72.38	74.93	66.77
30	62.49	61.61	67.42	60.73		57.75	56.87		69.16	72.54	74.93	66.56
31	62.18		66.66	60.58		57.75				72.73	75.03	
MAX	67.20	67.11	69.13		60.63	59.13	57.68			72.73	75.03	75.36

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# BEADLE COUNTY

AQUIFER . -- Glacial Outwash .

WELL CHARACTERISTICS. -- Drilled unused public supply artesian well, diameter 12 in., depth 74 ft, perforated 38 to 74 ft.

to /4 it.

INSTRUMENTATION. --Digital water-level recorder -- 60-minute punch.

DATUM. --Elevation of land-surface datum is 1,306.93 ft above National Geodetic Vertical Datum of 1929.

Measuring point: Top of platform 2.00 ft above land-surface datum.

PERIOD OF RECORD. --February 1954 to current year.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989 MAXIMUM VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51.32	48.32	48.14	49.09	49.09	48.77	48.57	43.08	42.26	42.88	44.36	52.13
2	51.31	48.22	49.32	48.89	49.30	48.76	48.57	42.91	42.25	42.76	44.44	52.38
3	51.44	47.80	49.74	48.52	48.59	48.61	48.44	43.35	42.39	42.68	44.36	52.39
4	51.45	47.74	49.82	48.56	48.84	48.76	48.70	42.68	42.34	42.67	44.56	51.98
5	51.37	47.84	49.69	48.27	48.89	48.77	48.75	42.79	42.21	42.47	44.83	51.62
6	51.33	47.86	49.67	47.00	48.85	48.60	48.83	42.85	42.04	42.52	45.10	51.24
7	51.33	47.66	49.82	46.38	49.16	48.68	48.85	42.70	42.10	42.58	45.04	50.95
8	51.36	47.74	49.91	47.31	49.26	49.16	48.87	42.41	42.22	42.47	45.10	50.64
9	51.42	47.76	49.85	47.66	49.18	49.19	48.95	42.47	42.33	42.46	45.27	50.33
10	51.45	47.85	49.91	46.23	49.02	49.08	48.98	42.47	42.28	42.49	45.33	50.24
11	51.52	47.86	49.81	46.14	49.05	49.18	48.79	42.40	42.19	42.65	45.48	50.16
12	51.55	47.55	49.65	46.17	48.89	49.25	48.82	42.35	41.94	42.97	45.55	51.29
13	51.54	47.43	49.49	46.15	48.52	48.92	48.80	42.32	42.03	43.17	45.65	51.29
14	51.34	47.48	49.80	45.85	48.66	48.76	48.82	42.29	42.24	43.10	45.65	51.56
15	51.22	47.20	49.95	45.91	48.94	48.46	48.90	42.16	42.30	43.12	45.72	51.68
16	51.19	47.18	49.78	45.83	49.02	48.74	49.11	42.10	42.23	43.10	46.26	51.82
17	51.17	46.99	50.13	45.75	49.10	48.93	49.23	41.95	42.28	43.03	46.75	51.83
18	48.87	47.04	50.04	45.94	49.02	49.22	-46.76	41.98	42.35	43.17	46.93	51.78
19	49.37	46.83	49.97	47.76	48.77	49.29	45.55	42.06	42.34	43.38	47.12	51.62
20	50.37	46.44	50.35	48.14	48.51	49.35	44.84	42.13	42.32	43.53	47.11	51.73
21	50.74	46.01	50.36	46.91	48.57	49.23	44.47	42.08	42.53	43.64	47.94	51.48
22	49.91	45.75	50.28	46.35	48.77	48.85	44.06	41.91	42.75	43.81	49.82	51.39
23	49.19	45.70	49.95	46.16	49.06	48.64	43.85	41.79	42.95	43.82	50.98	51.32
24	48.94	45.73	49.95	46.12	49.09	48.55	43.64	41.69	42.99	43.80	51.36	51.16
25	47.69	45.77	49.96	45.99	48.88	48.64	43.52	41.82	42.91	43.81	51.46	51.80
26	47.77	45.70	49.74	46.10	48.89	48.49	43.48	42.12	42.77	43.85	51.37	52.25
27	48.24	45.58	49.52	46.10	48.63	48.33	43.34	42.24	42.75	44.18	51.36	52.35
28	48.53	45.57	49.69	46.21	48.70	48.37	43.16	42.20	42.78	44.20	51.25	52.08
29	48.64	45.48	49.44	46.15		48.55	43.17	42.05	42.82	44.31	51.48	52.53
30	48.60	45.58	49.35	46.86		48.73	43.17	42.04	42.88	44.39	51.75	52.61
31	48.36		49.35	48.37		48.78	43.17	42.18		44.37	51.76	
MAX	51.55	48.32	50.36	49.09	49.30	49.35	49.23	43.35	42.99	44.39	51.76	52.61

WTR YR 1989 LOW 52,61

#### GROUND-WATER LEVELS

#### CODINGTON COUNTY

450905097072202.

LOCATION.--Lat 45°09'05", long 97°07'22", in NWaNWaNWa sec.25, T.120 N., R.52 W., Hydrologic Unit 10170201, 10 mi north-northeast of Florence. Owner: U.S. Geological Survey.

AQUIFER. --Prairie Coteau.

WELL CHARACTERISTICS. --Drilled observation well, diameter 40 ft of 4 in., 40 ft of 3 in., 80 ft of 2 in., and 15 ft sand point, depth 172 ft.

INSTRUMENTATION. --Digital water-level recorder -- 60-minute punch, driven by a manometer.

DATUM. --Elevation of land-surface datum is 1,828 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 3.6 ft above land-surface datum.

REMARKS.--Water level affected by pumping of nearby well. Records good except for estimated days, which are

poor.
PERIOD OF RECORD.--February 1986 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level, 11.88 ft below land surface datum, July 3-5, 1986. Lowest

water level, 52.98 ft below land surface datum, July 29, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	28.27	23.46		19.81	19.09	18.54	17.60	16.95	17.50	24.28		28.98
2	28.07	23.44		19.81	19.09	18.52	17.55	16.88	18.24	e24.78	40.51	28.71
3	27.85	e23.30		19.75	19.06	18.43	17.47	16.85	18.56		41.12	28.35
4	27.67	23.19		19.74	19.04	18.46	17.50	16.78	18.40		41.18	27.98
5	e27.52	e23.15		19.66	18.96	18.46	17.50	16.78	18.03		42.01	27.73
					-0.00	20.40	27.55	20.70	20.00			
6	27.24	e23.05		19.64	18.89	18.46	17.46	16.79	17.81		42.27	27.40
7	e27.13	e22.95	e20.84	19.57	18.88	18.40	17.46	16.76	17.73		42.48	27.15
8	e26.83	e22.85	20.82	19.59	18.90	18.39	17.40	16.74	18.24		41.90	26.90
9	e26.52	e22.85	20.79	19.59	18.90	18.39	17.45	16.76	18.61		42.22	26.67
10	e26.36	e22.85	20.70	19.52	18.82	18.35	17.45	16.73	20.42		43.65	e26.48
			455									
11	e26.20	e22.65	20.67	19.50	18.79	18.37	17.38	16.70	22.81		43.71	26.12
12	e26.00	e22.50	20.60	19.49	18.79	18.37	17.37	16.69	24.70		43.71	e25.90
13	e25.85	e22.35	20.51	19.49	18.75	18.28	17.34	16.68			42.63	
14	e25.65	e22.30	20.52	19.38	18.75	18.17	17.33	17.09	24.39		40.86	
15		e22.25	20.53	19.40	18.79	18.16	17.33	17.16	23.06		39.52	
16		e22.15	20.43	19.40	18.79	18.12	17.30	17.18	23.45		38,25	
17		e22.10	20.39	19.34	18.76	18.12	17.32	17.03			37.56	
18		e22.05	20.30	19.31	18.74	18.10	17.29	16.92			37.02	
19		e21.95	20.21	19.34	18.62	18.05	17.29	16.84			36.36	
20		e21.90	20.24	19.35	18.58	17.99	17.25	16.84	24.75		35.57	
1 7 2												
21		e21.85	20.24	19.28	18.61	17.99	17.25	16.80	24.45		34.74	
22			20.15	19.20	18.64	17.93	17.22	16.86	23.96		33.95	
23			20.10	19.24	18.63	17.86	17.20	16.97	23.86		33.29	
24			20.11	19.24	18.55	17.86	17.20	17.78	23.04		32.69	
25			20.11	19.22	18.54	17.84	17.20	17.79	22.53		32.12	
					20.51	27.04	17.20	27.70	22.50		02.12	
26			20.07	19.18	18.54	17.78	17.16	17.77	22.15		31.57	
27			19.95	19.13	18.51	17.74	17.09	17.59	21.83		31.06	
28			19.95	19.11	18.54	17.74	17.01	17.41	21.53		30.58	
29			19.95	19.11	10.54	17.73	16.99	17.30	21.28		30.18	
30			19.84	19.05		17.70	16.97	17.21	22.27		29.77	
31			19.81	19.09		17.69	10.97	17.14	22.27		29.30	
01			19.01	13.03		17.09		17.14			25.50	
MAX				19.81	19.09	18.54	17.60	17.79				

e Estimated

#### GROUND-WATER LEVELS

#### FALL RIVER COUNTY

432015103535801.

LOCATION.--Lat 43°20'15", long 103°53'58", in SWkSWkNEkSEk sec.20, T.8 S., R.2 E., Hydrologic Unit 10120106, 5 mi northwest of Edgemont. Owner: D. Heldman.

AOUIFER . -- Lakota .

WELL CHARACTERISTICS.--Drilled artesian stock well, diameter 5 in, depth 410 ft.

INSTRUMENTATION.--Periodically measured with chalked tape by USGS personnel.

DATUM.--Elevation of land-surface datum is 3,532 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of casing 0.60 ft above land-surface datum. PERIOD OF RECORD. -- September 1956 to current year.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

MAY 23, 1989 41.40

HUGHES COUNTY

SITE NUMBER 442451100155501 LOCAL NUMBER 111N78W18DCBA

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 55.28

SITE NUMBER 442504100160001 LOCAL NUMBER 111N78W18DBBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 20.07

LOCAL NUMBER 112N76W16DAAA SITE NUMBER 443018099580301

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE

JUL 17, 1989 11,96

SITE NUMBER 443018099594901 LOCAL NUMBER 112N76W17DBBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER DATE LEVEL

JUL 17, 1989 20.82

SITE NUMBER 443026099592101 LOCAL NUMBER 112N76W17ADDB

DATE

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

LEVEL

JUL 17, 1989 11.13

SITE NUMBER 443039099575901 LOCAL NUMBER 112N76W15BBBC

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 7.89

SITE NUMBER 443039099575902 LOCAL NUMBER 112N76W15BBBC2

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER LEVEL

DATE

JUL 17, 1989 10.97

HUGHES COUNTY--Continued

SITE NUMBER 443049099565901 LOCAL NUMBER 112N76W10DDCD

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

DATE WATER LEVEL

JUL 17, 1989 8.39

SITE NUMBER 443049099585801 LOCAL NUMBER 112N76W 9CCDD

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 5.79

SITE NUMBER 443102099594401 LOCAL NUMBER 112N76W 8DBCD

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

DATE WATER LEVEL

JUL 17, 1989 14.77

SITE NUMBER 443108099585801 LOCAL NUMBER 112N76W 9CBAA

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 15.70

SITE NUMBER 443134099575801 LOCAL NUMBER 112N76W10BBBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 9.11

SITE NUMBER 443142099472901 LOCAL NUMBER 112N75W 1DCDC

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

DATE WATER LEVEL

JUL 17, 1989 7.13

SITE NUMBER 443157099565001 LOCAL NUMBER 112N76W 3DADA

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER LEVEL

DATE

JUL 17, 1989 17.05

SITE NUMBER 443226099550501 LOCAL NUMBER 112N76W 1BAAB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

DATE LEVEL

JUL 17, 1989 12.42

SITE NUMBER 443226099560401 LOCAL NUMBER 112N76W 2ABBA

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

JUL 17, 1989 5.84

DATE

#### HUGHES COUNTY--Continued

SITE NUMBER 443226099560501 LOCAL NUMBER 112N76W 2ABBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER DATE LEVEL.

JUL 17, 1989 4.03

SITE NUMBER 443226099563701 LOCAL NUMBER 112N76W 2BBAB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER DATE LEVEL

JUL 17, 1989 5.81

SITE NUMBER 443226099564601 LOCAL NUMBER 112N76W 2BBBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER DATE LEVEL

JUL 17, 1989 5.37

#### LAWRENCE COUNTY

443515103513901.

LOCATION.--Lat 44°35'15", long 103°51'39", in SE\ne\nw\sec.10, T.7 N., R.2 E., Hydrologic Unit 10120203, 4.5 mi north of Spearfish. Owner: South Dakota Department of Water and Natural Resources. AOUIFER. -- Minnelusa.

WELL CHARACTERISTICS. -- Drilled artesian observation well, diameter 5 in, depth 1,306 ft, perforated 1,266 to 1,306 ft.

INSTRUMENTATION. -- Bristol water-pressure recorder.

DATUM. -- Elevation of land-surface datum is 3,205 ft above National Geodetic Vertical Datum of 1929. Measuring point: Base of gage 2.5 ft above land-surface datum. PERIOD OF RECORD. -- April 1963 to current year.

WATER LEVEL, IN FEET ABOVE LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

	25.5		WATER				WATER	-200		WATER	2.22		WATER
	DAT	E	LEVEL	D	ATE		LEVEL	DAT	E	LEVEL	DATE		LEVEL
OCT	05.	1988	+257.23	JAN	05.	1989	+268.76	APR	05.	1989 +267.61	JUL	05.	1989 +263.46
	10		+258.38		10		+267.61		10	+267.61		10	+263.00
	15		+258.38		15		+269.46		15	+266.46		15	+258.38
	20		+262.54		20		+268.76		20	+269.92		20	+262.99
	25		+258.38		25		+268.76		25	+266.46		25	+259.54
	31		+261.84		31		+269.92		30	+267.61		31	+261.84
NOV	05		+261.84	FEB	05		+269.46	MAY		+267.61	AUG	05	+261.84
	10		+263.00		10		+270.61		10	+267.61		10	+261.84
	15		+259.08		15		+271.07		15	+272.22		15	+258.38
	20		+263.00		20		+271.76		20	+267.61		20	+258.38
	25		+263.00		25		+271.76		25	+272.23		25	+258.38
	30		+265.30		28		+269.92		31	+269.92		31	+260.69
DEC	05		+264.15	MAR	05		+269.46	JUN	05	+269.92	SEP	05	+258.38
	10		+265.30		10		+272.22		10	+266.46		10	+258.38
	15		+267.61		15		+267.61		15	+267.61		15	+260.69
	20		+268.07		20		+269.92		20	+272.23		20	+261.84
	25		+267.61		25		+268.07		25	+267.84			
	31		+267.61		31		+272.23		30	+267.84			

NOTE: Instantaneous observations are minimum height above land surface.

#### LINCOLN COUNTY

431619096400202.

LOCATION.--Lat 43°16'19", long 96°46'02", in NE½NE½NE½ sec.32, T.98 N., R.50 W., Hydrologic Unit 10170102, 4 mi south of Worthing. Owner: South Dakota Department of Water and Natural Resources.

AQUIFER.--Dakota Sandstone.

AQUITER. --Darota Sandstone.

WELL CHARACTERISTICS. --Drilled observation artesian well, diameter 6 in, depth 383 ft, screened 363 to 383 ft.

INSTRUMENTATION. --Digital water-level recorder -- 60-minute punch.

DATUM. --Elevation of land-surface datum is 1,320 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder platform 3.0 ft above land-surface datum.

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

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	165.46	166.15	166.51	166.79	167.13	167.48	167.57	167.91	167.78			167.88
2	165.51	166.15	166.53	166.79	167.24	167.48	167.55	167.91	167.78		167.86	167.95
3	165.56	166.12	166.58	166.81	167.35	167.45	167.52	167.91	167.77		167.85	167.98
4	165.63	166.07	166.63	166.82	167.37	167.45	167.55	167.89	167.77		167.81	168.00
5	165.66	166.08	166.63	166.81	167.37	167.51	167.60	167.91	167.77		167.81	168.03
6	165.68	166.11	166.60	166.79	167.34	167.52	167.62	167.91	167.77		167.87	168.03
7	165.70	166.13	166.61	166.79	167.32	167.52	167.63		167.75		167.91	168.03
8	165.70	166.19	166.66	166.84	167.38	167.50	167.62		167.78		167.92	168.03
9	165.69	166.21	166.67	166.85	167.38	167.50	167.68		167.81		167.92	168.04
10	165.68	166.28	166.66	166.88	167.38	167.50	167.71		167.84		167.92	168.08
11	165.70	166.31	166.67	166.88	167.36	167.48	167.71		167.84		167.91	168.12
12	165.73	166.31	166.67	166.94	167.36	167.49	167.70		167.84		167.91	168.17
13	165.74	166.27	166.63	166.96	167.32	167.49	167.70		167.84		167.90	168.19
14	165.73	166.29	166.59	166.96	167.34	167.42	167.68		167.89		167.87	168.19
15	165.71	166.29	166.70	166.94	167.43	167.41	167.68		167.92		167.85	168.19
16	165.72	166.27	166.70	166.94	167.50	167.45	167.65	167.91	167.93		167.85	168.19
17	165.75	166.32	166.70	166.94	167.54	167.49	167.68	167.91	167.93		167.86	168.17
18	165.82	166.34	166.70	166.94	167.54	167.53	167.72	167.91	167.94		167.87	168.17
19	165.86	166.39	166.64	166.98	167.51	167.54	167.73	167.90	167.96		167.87	168.18
20	165.86	166.43	166.59	167.04	167.44	167.54	167.73	167.93	167.96		167.84	168.19
21	165.88	166.46	166.64	167.04	167.40	167.56	167.70	167.94	167.95		167.84	168.21
22	165.88	166.46	166.64	167.02	167.47	167.55	167.70	167.94	168.00		167.82	168.26
23	165.86	166.45	166.61	167.00	167.47	167.51	167.66	167.93	168.04		167.85	168.34
24	165.89	166.42	166.67	167.04	167.47	167.49	167.66	167.88	168.07		167.88	168.34
25	165.95	166.39	166.74	167.06	167.46	167.49	167.68	167.82			167.89	168.35
26	165.98	166.39	166.75	167.09	167.44	167.49	167.69	167.84			167.90	168.39
27	165.96	166.39	166.73	167.09	167.44	167.45	167.69	167.87			167.88	168.41
28	166.04	166.42	166.79	167.10	167.44	167.47	167.69	167.87			167.88	168.40
29	166.12	166.43	166.79	167.10		167,50	167.82	167.83			167.87	168.41
30	166.16	166.47	166.78	167.10		167.56	167.89	167.77			167.87	168.41
31	166.16		166.77	167.07		167.57		167.76			167.86	
MAX	166.16	166.47	166.79	167.10	167.54	167.57	167.89					168.41

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# GROUND-WATER LEVELS MARSHALL COUNTY

454745097450401.

LOCATION.--Lat 45°47'45", long 97°45'04", in SE\NE\SE\sec.23, T.127 N., R.58 W., Hydrologic Unit 09020105, within city limits of Britton. Owner: City of Britton.

within city limits of Britton. Owner: City of Britton.

AQUIFER.--Dakota Sandstone.

WELL CHARACTERISTICS.--Drilled unused public supply artesian well, diameter 8 in, depth 1,060 ft.

INSTRUMENTATION.--Digital water-level recorder -- 60-minute punch.

DATUM.--Elevation of land-surface datum is 1,360 ft above National Geodetic Vertical Datum of 1929. Measuring point: Top of recorder platform 2.50 ft above land-surface datum.

PERIOD OF RECORD.--July 1970 to current year.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1988 TO SEPTEMBER 1989

DAY	OCT	NOA	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42.20	42.03	41.91	41.94	41.95	41.87	41.55	41.80	41.76	41.79	42.13	42.05
2	42.25	41.89	41.88	41.92	42.09	41.85	41.54	41.76	41.76	41.88	42.04	42.06
3	42.35	41.79	42.15	41.92	42.09	41.77	41.54	41.69	41.79	41.94	41.93	42.01
4	42.40	41.86	42.12	41.88	42.06	41.97	41.67	41.55	41.77	41.91	41.91	42.02
5	42.33	41.96	41.92	41.81	41.93	42.01	41.68	41.67	41.69	41.95	42.04	42.03
6	42.30	41.93	41.95	41.81	41.83	41.96	41.72	41.71	41.71	42.16	42.10	41.98
7	42.29	41.97	42.07	41.71	41.88	41.76	41.70	41.68	41.79	42.17	42.08	42.00
8	42.20	41.97	42.07	41.87	42.03	41.82	41.66	41.65	41.86	42.03	42.03	42.07
9	42.16	42.01	42.02	41.87	41.97	41.82	41.80	41.71	41.87	42.02	42.04	42.10
10	42.24	42.04	42.03	41.84	41.85	41.74	41.80	41.71	41.89	42.06	42.05	42.13
11	42.26	42.04	42.00	41.80	41.83	41.83	41.71	41.68	41.87	42.03	42.05	42.14
12	42.24	41.87	41.91	41.87	41.83	41.82	41.71	41.65	41.68	42.06	42.07	42.20
13	42.19	41.97	41.82	41.86	41.79	41.69	41.66	41.63	41.74	42.12	42.05	42.08
14	42.09	41.99	42.10	41.74	41.88	41.60	41.65	41.65	41.88	42.13	42.11	41.98
15	42.02	41.84	42.16	41.82	42.08	41.60	41.65	41.68	41.90	42.15	42.08	41.94
16	42.05	41.86	41.94	41.78	42.13	41.71	41.70	41.74	41.92	42.12	42.08	41.89
17	42.12	41.95	41.98	41.74	42.14	41.76	41.77	41.74	41.89	42.05	42.10	41.90
18	42.16	41.94	41.80	41.75	42.06	41.76	41.73	41.74	41.93	42.06	42.11	41.87
19	42.16	41.99	41.75	41.94	41.85	41.73	41.71	41.66	41.91	42.11	41.96	41.93
20	42.11	41.99	41.98	41.97	41.77	41.81	41.63	41.73	41.89	42.15	41.97	41.93
21	42.12	41.97	41.98	41.77	41.89	41.78	41.65	41.72	41.90	42.15	41.95	41.85
22	42.06	41.89	41.82	41.73	42.04	41.65	41.55	41.64	41.86	42.14	41.98	42.03
23	42.02	41.81	41.89	41.87	41.95	41.60	41.59	41.61	41.83	42.14	42.02	42.06
24	42.05	41.77	42.03	41.90	41.79	41.60	41.64	41.49	41.81	42.24	42.03	41.89
25	42.09	41.79	42.06	41.83	41.83	41.61	41.70	41.61	41.71	42.24	42.01	41.98
26	42.09	41.79	42.04	41.81	41.84	41.50	41.70	41.78	41.65	42.27	42.04	42.02
27	42.06	41.93	41.93	41.75	41.73	41.48	41.69	41.78	41.72	42.34	42.09	41.91
28	42.19	41.93	42.02	41.83	41.88	41.55	41.64	41.78	41.74	42.33	42.01	41.93
29	42.20	41.88	41.98	41.81		41.59	41.77	41.75	41.81	42.15	42.06	41.93
30		41.92	41.88	41.67		41.66	41.80	41.75	41.85	42.10	42.02	41.84
31	41.98		41.88	41.79		41.66		41.76		42.12	41.91	
MAX		42.04	42.16	41.97	42.14	42.01	41.80	41.80	41.93	42.34	42.13	42.20

#### GROUND-WATER LEVELS

#### SULLY COUNTY

SITE NUMBER 443340099550801

LOCAL NUMBER 113N76W31BBBB

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

LEVEL

JUL 21, 1988 JUL 17, 1989 3.98 4.15

SITE NUMBER 443433099551201

LOCAL NUMBER 113N76W25AAAA

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER LEVEL

JUL 21, 1988 30.35 JUL 17, 1989 30.61

SITE NUMBER 443439099535901

LOCAL NUMBER 113N75W19DDDD

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

LEVEL

JUL 21, 1988 14.83 JUL 17, 1989 14.85

SITE NUMBER 443255099472401

LOCAL NUMBER 113N76W35CCDC

WATER LEVELS IN FEET BELOW LAND SURFACE DATUM

WATER

LEVEL

JUL 21, 1988 34.41 JUL 17, 1989 34.92

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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).

Multiply inch-pound units	Ву	To obtain SI units
	Length	
inches (in)	2.54x101	millimeters (mm)
	2.54x10 <sup>-2</sup>	meters (m)
feet (ft)	$3.048 \times 10^{-1}$	meters (m)
miles (mi)	1.609x10°	kilometers (km)
	Area	
acres	4.047x10 <sup>3</sup>	square meters (m <sup>2</sup> )
	4.047x10 <sup>-1</sup>	square hectometers (hm²)
	$4.047 \times 10^{-3}$	square kilometers (km <sup>2</sup> )
square miles (mi <sup>2</sup> )	2.590x10°	square kilometers (km <sup>2</sup> )
	Volume	
gallons (gal)	3.785x10°	liters (L)
	3.785x10°	cubic decimeters (dm <sup>3</sup> )
21	$3.785 \times 10^{-3}$	cubic meters (m <sup>3</sup> )
million gallons	$3.785 \times 10^{3}$	cubic meters (m <sup>3</sup> )
	$3.785 \times 10^{-3}$	cubic hectometers (hm³)
cubic feet (ft³)	2.832x10 <sup>1</sup>	cubic decimeters (dm <sup>3</sup> )
C 1	2.832x10 <sup>-2</sup>	cubic meters (m <sup>3</sup> )
cfs-days	$2.447 \times 10^3$	cubic meters (m <sup>3</sup> )
some fact (come ft)	$2.447 \times 10^{-3}$	cubic hectometers (hm³)
acre-feet (acre-ft)	1.233x10 <sup>3</sup>	cubic meters (m <sup>3</sup> )
	1.233x10 <sup>-3</sup> 1.233x10 <sup>-6</sup>	cubic hectometers (hm <sup>3</sup> )
	1.255X10°	cubic kilometers (km³)
	Flow	
cubic feet per second (ft <sup>3</sup> /s)	2.832x101	liters per second (L/s)
	2.832x101	cubic decimeters per second (dm <sup>3</sup> /s)
	2.832x10 <sup>-2</sup>	cubic meters per second (m <sup>3</sup> /s)
gallons per minute (gal/min)	6.309x10 <sup>-2</sup>	liters per second (L/s)
	6.309x10 <sup>-2</sup>	cubic decimeters per second (dm <sup>3</sup> /s)
	6.309x10 <sup>-5</sup>	cubic meters per second (m <sup>3</sup> /s)
million gallons per day	4.381x10 <sup>1</sup>	cubic decimeters per second (dm <sup>3</sup> /s)
	4.381x10 <sup>-2</sup>	cubic meters per second (m³/s)
	Mass	
tons (short)	9.072x10 <sup>-1</sup>	megagrams (Mg) or metric tons



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