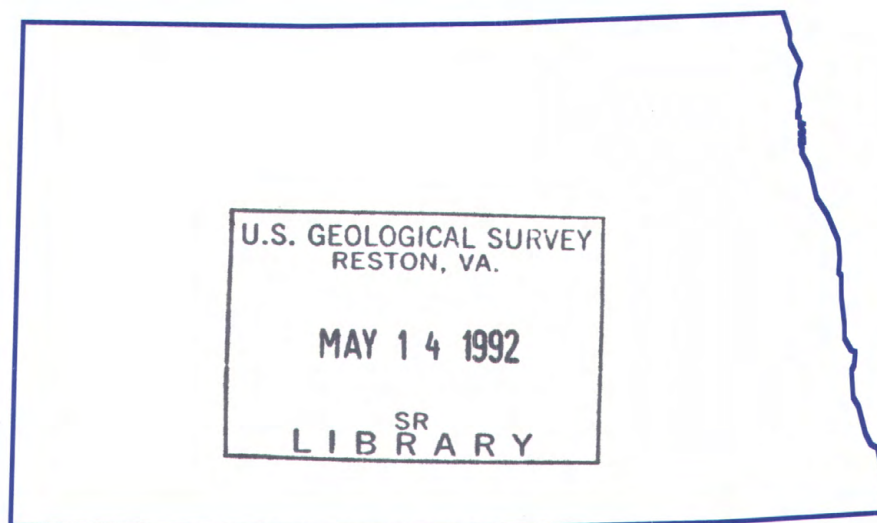


R
(200)
Ga 3
North Dakota
1991-1



Water Resources Data North Dakota Water Year 1991



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT ND-91-1
Prepared in cooperation with the State of North Dakota
and with other agencies

CALENDAR FOR WATER YEAR 1991

1990

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3							1
7	8	9	10	11	12	13								2	3	4	5	6	7	8
14	15	16	17	18	19	20	4	5	6	7	8	9	10	9	10	11	12	13	14	15
21	22	23	24	25	26	27	11	12	13	14	15	16	17	16	17	18	19	20	21	22
28	29	30	31				18	19	20	21	22	23	24	23	24	25	26	27	28	29
							25	26	27	28	29	30		30	31					

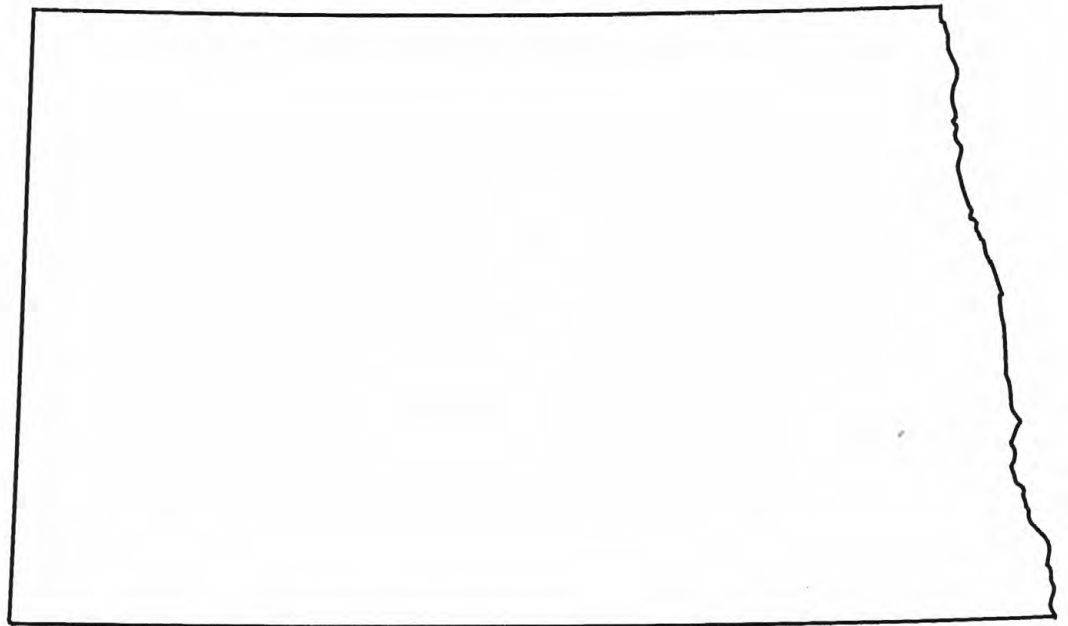
1991

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
		1	2	3	4	5						1	2						1	2
6	7	8	9	10	11	12								5	4	5	6	7	8	9
13	14	15	16	17	18	19	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20	21	22	23	24	25	26	10	11	12	13	14	15	16	17	18	19	20	21	22	23
27	28	29	30	31			17	18	19	20	21	22	23	24	25	26	27	28	29	30
							24	25	26	27	28			31						
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3							1
7	8	9	10	11	12	13								2	3	4	5	6	7	8
14	15	16	17	18	19	20	5	6	7	8	9	10	11	9	10	11	12	13	14	15
21	22	23	24	25	26	27	12	13	14	15	16	17	18	16	17	18	19	20	21	22
28	29	30					19	20	21	22	23	24	25	23	24	25	26	27	28	29
							26	27	28	29	30	31		30						
JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13								8	9	10	11	12	13	14
14	15	16	17	18	19	20	4	5	6	7	8	9	10	15	16	17	18	19	20	21
21	22	23	24	25	26	27	11	12	13	14	15	16	17	22	23	24	25	26	27	28
28	29	30	31				18	19	20	21	22	23	24	29	30					
							25	26	27	28	29	30	31							



Water Resources Data North Dakota Water Year 1991

by R.E. Harkness, N.D. Haffield, W.R. Berkas, and S.W. Norbeck



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT ND-91-1
Prepared in cooperation with the State of North Dakota
and with other agencies

DEPARTMENT OF THE INTERIOR

MANUEL LUJAN, JR., SECRETARY

U.S. GEOLOGICAL SURVEY

Dallas L. Peck, Director

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

PREFACE

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

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

Bismarck District Office

L. L. Albright
V. M. Dressler
G. E. Ghering

T. A. Gleich
J. D. Heidt
C. S. Helgesen

M. C. Pokladnik
T. D. Rutter
B. A. Sether

M. J. Voigt
J. E. Wagner
G. B. Wald

Grand Forks Field Headquarters

K. L. Boespflug
G. J. Burkhart
W. R. Westensee

Dickinson Field Headquarters

D. L. Ellenbecker
G. J. Klug
R. W. Riehl

This report was prepared in cooperation with the State of North Dakota and with other agencies under the supervision of William F. Horak, District Chief, North Dakota.

REPORT DOCUMENTATION PAGE	1. REPORT NO. USGS/WRD/HD-92/273	2.	3. Recipient's Accession No.
4. Title and Subtitle Water Resources Data, North Dakota Water Year 1991			5. Report Date Published April 1992
7. Author(s) R.E. Harkness, N.D. Haffield, W.R. Berkas and S.W. Norbeck			6.
9. Performing Organization Name and Address U.S. Geological Survey, Water Resources Division 821 East Interstate Avenue Bismarck, North Dakota 58501-1199			8. Performing Organization Rept. No. USGS-WDR-ND-91-1
			10. Project/Task/Work Unit No.
			11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address U.S. Geological Survey, Water Resources Division 821 East Interstate Avenue Bismarck, North Dakota 58501-1199			13. Type of Report & Period Covered Annual - Oct. 1, 1990 to Sept. 30, 1991
			14.
15. Supplementary Notes Prepared in cooperation with the State of North Dakota and with other agencies.			
16. Abstract (Limit: 200 words) Water-resources data for the 1991 water year for North Dakota consist of records of discharge, stage, and water quality for streams; contents, stage, and water quality for lakes and reservoirs; and water levels and water quality for ground-water wells. This report contains records of water discharge for 103 streamflow-gaging stations; stage only for 22 river-stage stations; contents and/or stage for 13 lake or reservoir stations; annual maximum discharge for 7 crest-stage stations; water levels for 30 ground-water wells; and water quality for 83 streamflow-gaging stations, 4 river-stage stations, 4 lake or reservoir stations, 2 crest-stage stations, 3 miscellaneous sample sites on streams and 67 ground-water wells. Also included are discharge measurement data for 43 miscellaneous sites and water-quality data for 2 precipitation-chemistry stations. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in North Dakota.			
17. Document Analysis. a. Descriptors *North 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, Floods, Drought. b. Identifiers/Open-Ended Terms c. COSATI Field/Group			
18. Availability Statement No restriction on distribution. This report may be purchased from: National Technical Information Service, Springfield, VA 22161		19. Security Class (This Report) Unclassified	21. No. of Pages 365
		20. Security Class (This Page) Unclassified	22. Price

CONTENTS

	Page
Preface.....	iii
List of gaging stations, in downstream order, for which records are published in this volume.....	vii
List of ground-water wells, by county, for which records are published in this volume.....	ix
List of discontinued surface-water discharge or stage-only stations.....	xi
List of discontinued surface-water quality stations.....	xiv
Introduction.....	1
Cooperation.....	1
Summary of hydrologic conditions.....	5
Climate.....	5
Streamflow.....	8
Chemical quality of streamflow.....	11
Ground-water levels.....	11
Special networks and programs.....	14
Explanation of the records.....	14
Station identification numbers.....	15
Downstream order system.....	15
Latitude-longitude system.....	15
Local well numbers.....	15
Records of stage and water discharge.....	15
Data collection and computation.....	15
Data presentation.....	17
Station manuscript.....	17
Data table of daily mean values.....	18
Statistics of monthly mean data.....	18
Summary statistics.....	18
Identifying estimated daily discharge.....	19
Accuracy of the records.....	19
Other records available.....	19
Records of surface-water quality.....	23
Classification of records.....	23
Arrangement of records.....	23
On-site measurements and sample collection.....	23
Water temperature.....	23
Sediment.....	25
Laboratory measurements.....	25
Data presentation.....	25
Remark codes.....	26
Records of ground-water levels.....	26
Data collection and computation.....	26
Data presentation.....	26
Availability of data.....	27
Records of ground-water quality.....	32
Data collection and computation.....	32
Data presentation.....	32
Access to WATSTORE data.....	32
Definition of terms.....	33
Publications on techniques of water-resources investigations.....	37
Station records, surface water.....	40
Discharge measurements at partial record and miscellaneous sites.....	311
Crest-stage partial-record stations.....	311
Miscellaneous discharge measurement sites.....	313
Analysis of samples collected at water-quality partial-record and miscellaneous sites.....	317
Station records, ground water.....	322
Ground-water levels.....	322
Quality of ground water.....	332
Chemical quality of precipitation.....	341
Index.....	347

ILLUSTRATIONS

	Page
Figure 1. Map showing location of active surface-water gaging stations.....	2
2. Map showing location of active surface-water-quality stations.....	3
3. Map showing location of selected ground-water observation wells.....	4
4. Comparison, by climatological division, of monthly precipitation, water year 1991, to normal monthly precipitation, 1951-80.....	6
5. Comparison of monthly mean discharge during water year 1991 to mean monthly discharge for the period of record.....	9
6. Water levels for well 134-052-06CCD2 completed in Sheyenne Delta aquifer, Richland County	13
7. Water levels for well 140-095-08AAA completed in Sentinel Butte aquifer, Stark County.....	13
8. System for numbering wells and miscellaneous sites (latitude and longitude).....	16
9. System for numbering wells and miscellaneous sites (township and range).....	16
10. Example of computer printout of annual peak discharges for the period of record on the Knife River at Hazen.....	20
11. Example of computer printout for annual peak flow frequency analysis for the Knife River at Hazen.....	21
12. Example of computer printout for peak flow frequency curve for the Knife River at Hazen.....	22
13. Example of "primary computation" computer printout for the Knife River at Hazen.....	24
14a. Water levels for well 139-078-27CBB completed in McKenzie aquifer, Burleigh County, 1962-76.....	28
14b. Water levels for well 139-078-27CBB completed in McKenzie aquifer, Burleigh County, 1977-91.....	29
15. Water levels for recorder well 134-052-06CCD2 completed in Sheyenne Delta aquifer, Richland County, water years 1987 and 1991.....	30
16. Water levels for well 153-063-30CBC completed in Spiritwood aquifer, Benson County, and monthly maximum water levels for Devils Lake, 1970-91.....	31

TABLES

Table 1a. Palmer drought severity index on selected dates for water years 1988, 1989, 1990, and 1991 for the nine National Weather Service climatological divisions in North Dakota.....	7
2. Period-of-record mean annual and median annual discharges; water years 1988, 1989, 1990, and 1991 mean and peak discharges; and ranking of water years 1988, 1989, 1990, and 1991 data versus record low mean and low peak discharges for period of record at selected streamflow-gaging stations.....	10
3. Statistical summary of specific-conductance measurements for the period of record and listing of specific-conductance measurements for water year 1991.....	12
4. Reported water use, by year, for irrigation from the McKenzie aquifer, in acre-feet.....	27

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

vii

[Letter after station name designates type of data: (d) discharge, (e) elevation, gage height, or contents, (c) chemical, (b) biological, (m) microbiological, (t) water temperature, (s) sediment, (r) radiochemical, (p) pesticides]

	Station number	Page
HUDSON BAY BASIN		
Lake Winnipeg (head of Nelson River)		
RED RIVER OF THE NORTH BASIN		
Red River of the North at Wahpeton (dc)	05051500	40
Red River of the North at Hickson (dc)	05051522	43
Wild Rice River near Rutland (dc)	05051600	45
Wild Rice River near Abercrombie (dc)	05053000	47
Red River of the North at Fargo (dc)	05054000	49
Sheyenne River above Harvey (dc)	05054500	51
Sheyenne River near Warwick (dc)	05056000	54
Devils Lake:		
Mauvais Coulee (head of Big Coulee)		
Mauvais Coulee Tributary #3 near Cando (dc)	05056060	56
Mauvais Coulee near Cando (d)	05056100	58
Edmore Coulee near Edmore (dc)	05056200	59
Edmore Coulee Tributary near Webster (d)	05056215	61
Morrison Lake near Webster (e)	05056222	62
Starkweather Coulee near Webster (dc)	05056239	63
Dry Lake near Penn (e)	05056241	65
Little Coulee near Brinsmade (d)	05056390	66
Big Coulee near Churchs Ferry (d)	05056400	67
Channel A near Penn (dct)	05056410	68
Devils Lake near Devils Lake (e)	05056500	71
Sheyenne River near Cooperstown (dc)	05057000	72
Lake Ashtabula:		
Baldhill Creek near Dazey (dc)	05057200	74
Lake Ashtabula at Baldhill Dam (e)	05057500	76
Sheyenne River below Baldhill Dam (dc)	05058000	77
Sheyenne River at Valley City (ec)	05058500	79
Sheyenne River at Lisbon (dc)	05058700	81
Sheyenne River near Kindred (dcms)	05059000	83
Sheyenne River near Horace (ec)	05059400	86
Sheyenne River at West Fargo (dc)	05059500	88
Maple River near Hope (dc)	05059600	91
Maple River near Enderlin (dc)	05059700	93
Rush River at Amenla (dc)	05060500	95
Red River of the North at Halstad, MN (dcms)	05064500	97
Goose River:		
Beaver Creek near Finley (dcms)	05064900	100
Goose River at Hillsboro (dc)	05066500	103
Red River of the North at Grand Forks (dc)	05082500	105
Forest River:		
Forest River near Fordville (dc)	05084000	108
Forest River at Minto (dc)	05085000	110
South Branch Park River (head of Park River):		
Homme Reservoir near Park River (e)	05088500	112
South Branch Park River below Homme Dam (dc)	05089000	113
Park River at Grafton (dc)	05090000	115
Red River of the North at Drayton (dc)	05092000	117
Pembina River:		
Hidden Island Coulee near Hansboro (dc)	05098700	119
Cypress Creek above International Boundary near Sarles (dc)	05098820	121
Snowflake Creek near Snowflake, Manitoba (d)	05099100	123
Mowbray Creek near Mowbray, Manitoba (d)	05099150	124
Pembina River near Windygates, Manitoba (d)	05099300	125
Pembina River at Neche (dc)	05100000	126
Tongue River at Akra (dc)	05101000	128
Red River of the North at Emerson, Manitoba (dcmts)	05102500	130
Assiniboine River:		
Souris (Mouse) River:		
Long Creek at Western Crossing of International Boundary, Saskatchewan (d)	05113360	134
Long Creek near Noonan (dc)	05113600	135
East Branch Short Creek Reservoir near Columbus (e)	05113750	137
Short Creek below International Boundary, near Roche Percee, Saskatchewan (d)	05113800	138
Souris (Mouse) River near Sherwood (dct)	05114000	139
Lake Darling near Grano (c)	05114700	145
Lake Darling near Foxholm (e)	05115500	146
Souris (Mouse) River near Foxholm (dc)	05116000	147
Des Lacs River near Kenmare (d)	05116150	149
Des Lacs River at Foxholm (dc)	05116500	150
Souris (Mouse) River above Minot (dc)	05117500	153
Souris (Mouse) River near Verendrye (dc)	05120000	155
Wintering River near Karlsruhe (dc)	05120500	158
Souris (Mouse) River near Bantry (dc)	05122000	161
Willow Creek near Willow City (d)	05123400	163
Stone Creek near Kramer (d)	05123500	164
Deep River near Upham (d)	05123510	165
Cut Bank Creek at Upham (d)	05123750	166
Boundary Creek near Landa (d)	05123900	167
Souris (Mouse) River near Westhope (dcms)	05124000	168

	Station number	Page
MISSOURI RIVER BASIN		
Missouri River near Culbertson, MT (d).....	06185500	171
Missouri River Stage Gage No. 4 near Nohly, MT (e).....	06185600	172
Missouri River Stage Gage No. 5 at Nohly, MT (e).....	06185650	173
Yellowstone River:		
Yellowstone River near Sidney, MT (d).....	06329500	174
Yellowstone River Stage Gage No. 1 near Fairview, MT (e).....	06329590	175
Yellowstone River Stage Gage No. 2 near Cartwright (e).....	06329610	176
Yellowstone River Stage Gage No. 3 near Buford (e).....	06329620	177
Missouri River Stage Gage No. 5A at Buford (e).....	06329640	178
Missouri River Stage Gage No. 6 near Buford (e).....	06329650	179
Missouri River Stage Gage No. 7 near Trenton (e).....	06329660	180
Missouri River near Williston (e).....	06330000	181
Missouri River Stage Gage No. 9 at Williston (e).....	06330110	182
LITTLE MUDDY RIVER BASIN		
Little Muddy River below Cow Creek near Williston (dc).....	06331000	183
BEAR DEN CREEK BASIN		
Bear Den Creek near Mandaree (dcms).....	06332515	185
LITTLE MISSOURI RIVER BASIN		
Little Missouri River at Marmarth (dc).....	06335500	188
Beaver Creek near Trotters (dc).....	06336600	190
Little Missouri River near Watford City (dcms).....	06337000	192
Lake Sakakawea near Riverdale (e).....	06338000	195
Missouri River at Garrison Dam (dcm).....	06338490	196
Missouri River above Stanton (e).....	06339010	199
KNIFE RIVER BASIN		
Knife River at Manning (dc).....	06339100	200
Knife River near Golden Valley (dc).....	06339500	202
Brush Creek near Beulah (dc).....	06339560	204
Spring Creek at Zap (dc).....	06340000	206
Knife River at Hazen (dcms).....	06340500	208
Missouri River near Stanton (e).....	06340700	211
Missouri River near Hensler (e).....	06340900	212
Missouri River at Washburn (e).....	06341000	213
TURTLE CREEK BASIN		
Turtle Creek above Washburn (dc).....	06341410	214
PAINTED WOODS CREEK BASIN		
Painted Woods Creek near Wilton (dc).....	06341800	216
Missouri River at Price (e).....	06342020	218
SQUARE BUTTE CREEK BASIN		
Square Butte Creek below Center (dc).....	06342260	219
BURNT CREEK BASIN		
Burnt Creek near Bismarck (d).....	06342450	221
Missouri River at Bismarck (d).....	06342500	223
HEART RIVER BASIN		
E. A. Patterson Lake near Dickinson (ec).....	06343500	225
Heart River at Dickinson (dc).....	06344300	227
Green River near New Hradec (dc).....	06344600	229
Heart River near Richardton (dc).....	06345500	231
Heart River above Lake Tschida near Glen Ullin (dc).....	06345780	233
Lake Tschida near Glen Ullin (ec).....	06346000	235
Big Muddy Creek near Almont (dc).....	06347500	238
Heart River near Lark (dc).....	06348000	240
Heart River at Stark Bridge near Judson (dc).....	06348300	242
Heart River near Mandan (dcms).....	06349000	244
Missouri River below Mandan (e).....	06349070	247
APPLE CREEK BASIN		
Long Lake Creek above Long Lake near Moffit (dc).....	06349215	248
Long Lake Creek below Long Lake near Moffit (d).....	06349275	250
Apple Creek near Menoken (dc).....	06349500	251
Missouri River near Schmidt (e).....	06349700	253
CANNONBALL RIVER BASIN		
Cannonball River at Regent (dc).....	06350000	254
Cedar Creek:		
White Butte Fork Cedar Creek near Scranton (dc).....	06351680	256
Cedar Creek near Haynes (dc).....	06352000	258
Cedar Creek near Raleigh (dc).....	06353000	260
Cannonball River at Breigh (dcms).....	06354000	262
BEAVER CREEK BASIN		
Beaver Creek at Linton (dc).....	06354580	265
GRAND RIVER BASIN		
Bowman-Haley Lake near Haley (e).....	06354988	267
North Fork Grand River at Haley (dc).....	06355000	268
Lake Oahe near Pierre, SD (e).....	06439980	270
JAMES RIVER BASIN		
James River near Manfred (d).....	06467600	271
James River near Grace City (dcsp).....	06468170	272
James River above Arrowwood Lake near Kensal (dbcs).....	06468250	274
Jamestown Reservoir near Jamestown (ec).....	06469000	276
Pipestem Creek near Pingree (dcp).....	06469400	279
James River at Jamestown (dbcs).....	06470000	281
James River at LaMoure (dbcts).....	06470500	284
Bear Creek near Oakes (dcp).....	06470800	290
James River at Oakes (ebcts).....	06470830	292
James River at Dakota Lake Dam near Ludden (dbctsp).....	06470875	298
James River at ND-SD State Line (e).....	06470878	307
James River near Hecla (ebcs).....	06470980	308
Elm River:		
Maple River at ND-SD State line (d).....	06471200	310

GROUND-WATER WELLS, BY COUNTY, FOR WHICH RECORDS ARE PUBLISHED IN THIS VOLUME

ix

	GROUND-WATER LEVELS	Page
BENSON COUNTY		
Well 480228098482501, Local number 153-063-30CBC.....		322
Well 480958099154801, Local number 154-067-15BBB.....		322
Well 481041099442701, Local number 154-071-11AAD1.....		322
BOWMAN COUNTY		
Well 461534103491701, Local number 132-105-16BDB.....		323
BURLEIGH COUNTY		
Well 464943100305801, Local number 139-078-27CBB.....		323
DIVIDE COUNTY		
Well 485649103155701, Local number 163-097-15BCC.....		323
DUNN COUNTY		
Well 471323102290101, Local number 143-093-09BCB.....		324
EDDY COUNTY		
Well 473720098592401, Local number 148-065-19DAA.....		324
EMMONS COUNTY		
Well 463632100171901, Local number 136-076-07CBC.....		324
GRAND FORKS COUNTY		
Well 474957097343501, Local number 150-054-04CCD.....		325
GRIGGS COUNTY		
Well 471612098113101, Local number 144-059-20CCC.....		325
Well 473425098232901, Local number 147-061-01CCC.....		325
Well 473600098065901, Local number 148-059-36AAB.....		326
HETTINGER COUNTY		
Well 463153102521001, Local number 135-097-04DCA.....		326
KIDDER COUNTY		
Well 470638099324301, Local number 142-070-16DDD.....		326
MC LEAN COUNTY		
Well 473752101055301, Local number 148-082-23BBB.....		327
OLIVER COUNTY		
Well 470642101162701, Local number 142-084-24BBA.....		327
PEMBINA COUNTY		
Well 485239097501702, Local number 162-056-01CCC2.....		327
PIERCE COUNTY		
Well 475323100092101, Local number 151-074-20AAA.....		328
RICHLAND COUNTY		
Well 462633097163402, Local number 134-052-06CCD2.....		328
STARK COUNTY		
Well 465755102410701, Local number 140-095-08AAA.....		328
STEELE COUNTY		
Well 471601097371001, Local number 144-055-26BBB.....		329
STUTSMAN COUNTY		
Well 463846098274101, Local number 137-062-26DDD.....		329
TRAILL COUNTY		
Well 473228097051501, Local number 147-051-22BBB.....		329
WALSH COUNTY		
Well 481657097473601, Local number 156-056-36CCC1.....		330
Well 482408097443201, Local number 157-055-21DBC.....		330
Well 482449098095801, Local number 157-058-18DDD.....		330
WARD COUNTY		
Well 480912101090301, Local number 154-082-24ABA.....		331
WELLS COUNTY		
Well 474419099371201, Local number 149-070-09DAA1.....		331
WILLIAMS COUNTY		
Well 483048103373101, Local number 158-100-17ADA.....		331

	QUALITY OF GROUND WATER	Page
BENSON COUNTY		
Well 480005098542001,	Local number 152-064-07BCA.....	332-336
BOWMAN COUNTY		
Well 460705103005301,	Local number 130-099-01BBB	332-336
Well 460645103021801,	Local number 130-099-03ADD	332-336
Well 460705103025601,	Local number 130-099-03BAA	332-336
Well 460645103033302,	Local number 130-099-04ADD2	332-336
Well 460705103041101,	Local number 130-099-04BAA	332-336
Well 461355103055701,	Local number 131-099-19DDD	332-336
Well 460902103043601,	Local number 131-099-21CCB1	332-336
Well 461355103043303,	Local number 131-099-21CCC3	332-336
Well 460856103024401,	Local number 131-099-22DCC1	332-336
Well 460856103020701,	Local number 131-099-23CCC1	332-336
Well 460856103020702,	Local number 131-099-23CCC2	332-336
Well 460804103010101,	Local number 131-099-26DDC1	332-336
Well 460843103032001,	Local number 131-099-27BBC1	332-336
Well 460843103032003,	Local number 131-099-27BBC3	332-336
Well 460823103030301,	Local number 131-099-27CAB	332-336
Well 460816103032701,	Local number 131-099-27CBC1	332-336
Well 460816103032702,	Local number 131-099-27CBC2	332-336
Well 460830103044504,	Local number 131-099-29ADD4	332-336
Well 460849103053201,	Local number 131-099-29BAB	332-336
Well 460834103055501,	Local number 131-099-29BCC	332-336
Well 460823103053201,	Local number 131-099-29CAB	332-336
Well 460804103052301,	Local number 131-099-29CDD	332-336
Well 460810103051301,	Local number 131-099-29DCB	332-336
Well 460751103044501,	Local number 131-099-32AAD	332-336
Well 460718103045501,	Local number 131-099-32DDB	332-336
Well 460747103032902,	Local number 131-099-33ADA2	332-336
Well 460747103032903,	Local number 131-099-33ADA3	332-336
Well 460757103021601,	Local number 131-099-34AAA	332-336
Well 460744103014801,	Local number 131-099-35BDB1	332-336
BURLEIGH COUNTY		
Well 464741100450001,	Local number 138-080-02CCC	332-336
Well 464457100462801,	Local number 138-080-28AAA1	332-336
Well 464457100462802,	Local number 138-080-28AAA2	332-336
Well 464457100462803,	Local number 138-080-28AAA3	332-336
Well 464943100305801,	Local number 139-078-27CBB	332-336
Well 465707100051301,	Local number 140-075-12CDD	332-336
Well 465521100043501,	Local number 140-075-24DDD	332-336
Well 465856100551801,	Local number 140-081-05AAA	332-336
CAVALIER COUNTY		
Well 484534098254401,	Local number 161-060-21BBB	332-336
Well 485600098561001,	Local number 163-064-21AAD	332-336
EDDY COUNTY		
Well 473627098351301,	Local number 148-062-29DAA	332-336
Well 473720098592401,	Local number 148-065-19DAA	332-336
Well 473934099032301,	Local number 148-066-03DDC	332-336
Well 474347099162901,	Local number 149-067-17BBB	332-336
EMMONS COUNTY		
Well 463632100171901,	Local number 136-076-07CBC	337-340
Well 463607100211501,	Local number 136-077-16AAD	337-340
FOSTER COUNTY		
Well 472216099085001,	Local number 145-067-13DCC	337-340
Well 472543098373301,	Local number 146-062-30CCC	337-340
Well 473419098330601,	Local number 147-062-10ABB	337-340
Well 473124098452501,	Local number 147-064-25ADD	337-340
Well 473031099073202,	Local number 147-066-31ACC2	337-340
GRIGGS COUNTY		
Well 471612098113101,	Local number 144-059-20CCC	337-340
Well 473425098232901,	Local number 147-061-01CCC	337-340
Well 473600098065901,	Local number 148-059-36AAB	337-340
MCHENRY COUNTY		
Well 482120100333601,	Local number 156-077-10BBB	337-340
Well 481948100305901,	Local number 156-077-13CCB1	337-340
Well 481948100305902,	Local number 156-077-13CCB2	337-340
Well 481848100333601,	Local number 156-077-22CCC	337-340
Well 482449100225902,	Local number 157-075-20BBB2	337-340
NELSON COUNTY		
Well 475445098231301,	Local number 151-060-07BDD	337-340
Well 475650098255101,	Local number 152-061-35BAA	337-340
PIERCE COUNTY		
Well 481125100100801,	Local number 154-074-03BCC	337-340
RAMSEY COUNTY		
Well 481929098392601,	Local number 156-062-20BBB	337-340
TRAILL COUNTY		
Well 473228097051501,	Local number 147-051-22BBB	337-340
WALSH COUNTY		
Well 482408097443201,	Local number 157-055-21DBC	337-340
Well 482449098095801,	Local number 157-058-18DDD	337-340
WELLS COUNTY		
Well 472724099323101,	Local number 146-070-13CCC1	337-340

PRECIPITATION SITES, FOR WHICH CHEMICAL QUALITY DATA ARE PUBLISHED IN THIS VOLUME

PEMBINA COUNTY		
Site 484714097442301,	Icelandic State Park.....	341
STUTSMAN COUNTY		
Site 470732099140204,	Woodworth.....	344

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

The following continuous-record surface-water discharge or stage-only stations (gaging stations) in North Dakota have been discontinued. Daily streamflow or stage records were collected and published for the period of record, expressed in water years, shown for each station. Those stations with an asterisk (*) after the station number are currently operated as crest-stage partial-record stations. Discontinued project stations with less than 3 years of record have not been included. Information regarding these stations may be obtained from the District Office at the address given on the back side of the title page of this report.

[Letters after station name designate type of data collected: (d) discharge, (e) elevation (stage only)]

Discontinued surface-water discharge or stage-only stations

Station name	Station number	Drainage area (mi ²)	Period of record
RED RIVER OF THE NORTH BASIN			
Bois de Sioux River near Fairmount, ND (d)	05050500	1,540	1919-44
Wild Rice River nr Cayuga, ND (d)	05051700	955	1956-79
Wild Rice River near Mantador, ND (d)	05052000	1,540	1944-50
Richland County Drain No. 65 near Great Bend, ND (d)	05052100	38	1981-84
Antelope Creek at Dwight, ND (d)	05052500	294	1944-49
Sheyenne River near Harvey, ND (d)	05055000	534	1946-56
North Fork Sheyenne River near Wellsburg, ND (d)	05055100	693	1957-67
Big Coulee nr Maddock, ND (d)	05055200	146	1957-67
Sheyenne River at Sheyenne, ND (d)	05055500	1,790	1929-33, 1940-51
Big Coulee near Fort Totten, ND (d)	05055520	23.2	1966-75
Webster Coulee at Webster, ND (d)	05056225	670	1980-85
Calio Coulee nr Starkweather, ND (d)	05056247	130	1986-88
Lake Alice-Irvine Channel near Churchs Ferry, ND (d)	05056255	999	1985-87
Little Coulee at Leeds, ND (d)	05056300	280	1956-67
Maple River near Mapleton, ND (d)	05060000	1,450	1944-75
Cass County Drain 52 near Amenia, ND (d)	05060510	13.5	1981-85
Rush River nr Prosper, ND (d)	05060550	170	1981-85
Lower Branch Rush River near Prosper, ND (d)	05060570	35.8	1981-85
Elm River near Kelso, ND (d)	05062200	199	1956-63, 1981-85
Beaver Creek near Hatton, ND (d)	05065000	162	1954-57
Goose River near Portland, ND (d)	05065500	517	1940-75
South Branch Goose River near Portland, ND (d)	05066000	362.0	1940-42
Turtle River at Manvel, ND (d)	05083000	613	1946-70 (d), 1980-82 (gh)
Red River of the North at Oslo, MN (d)	05083500*	31,200	1936-37, 1941-43, 1945-60
Forest River near Minto, ND (d)	05084500	578	1932-44
South Branch Park River near Park River, ND (d)	05088000	214	1940-50
Middle Branch Park River near Union, ND (d)	05089100	15.3	1966-83
Cart Creek at Mountain, ND (d)	05089500	16.9	1954-84
Pembina County Drain No. 20 near Glasston, ND (d)	05092200	80	1972-82
Cypress Creek near Sarles, ND (d)	05098800	71	1961-88
Little South Pembina River near Walhalla, ND (d)	05099400	182	1956-82
Herzog Creek near Concrete, ND (d)	05100500	18.9	1954-77
Tongue River at Cavalier, ND (d)	05101500	167	1939-52
Tongue River near Pembina, ND (d)	05102000	460	1940-42
Long Creek near Crosby, ND (d)	05113500	2,080	1943-65
West Branch Short Creek near Columbus, ND (d)	05113700	167	1978-81

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
RED RIVER OF THE NORTH BASIN--Continued			
Wintering River near Bergan, ND (d)	05120200	176	1957-78
Souris River near Towner, ND (d)	05121500	13,100	1933-41
Willow Creek at Dunseith, ND (d)	05122500	142	1953-70
Lake Metigoshe near Bottineau, ND (d)	05123000	59	1931-32, 1953-87 (gh)
Oak Creek at Lake Metigoshe Outlet near Bottineau, ND (d)	05123100	59	1954-81
Egg Creek near Granville, ND (d)	05123600	289	1957-81
Cut Bank Creek at North Lake Outlet near Granville, ND (d)	05123700	534	1957-80
MISSOURI RIVER BASIN			
Charbonneau Creek near Charboneau, ND (d)	06329597	149	1967-81
Missouri River Stage Gage No. 8 near Trenton, ND (e)	06329680	164,000	1959-79 (gh)
Blacktail Creek near Bonetrail, ND (d)	06330500	30	1956-60
Little Muddy Creek near Williston, ND (d)	06331500	1,010	1904-09, 1932-33, 1946-54
Stony Creek near Williston, ND (d)	06331570	146	1978-81
Missouri River Stage Gage No. 10 near Williston, ND (e)	06331600	165,000	1959-75 (gh)
Missouri River Stage Gage No. 11 near Williston, ND (e)	06331650	165,000	1959-80 (gh)
Tobacco Garden Creek near Watford City, ND (d)	06331680	135	1977-82
Beaver Creek near Ray, ND (d)	06331850	102	1978-82
White Earth River at White Earth, ND (d)	06332000	780	1954-81
Missouri River at Sanish, ND (d)	06332500	166,000	1928-32
Shell Creek near Parshall, ND (d)	06332520	465	1965-81
Little Beaver Creek near Marmarth, ND (d)	06335000	587	1938-79
Deep Creek near Amidon, ND (d)	06335750	250	1978-83
Little Missouri River at Medora, ND (d)	06336000	6,190	1903-09, 1922-24, 1928-34, 1946-50
Missouri River near Elbowwoods, ND (d)	06337500	179,800	1940-54
Missouri River below Garrison Dam, ND (d)	06339000	181,400	1948-69, 1970-76 (gh)
Stray Creek near Manning, ND (d)	06339180	30.3	1979-81
Knife River at Marshall, ND (d)	06339300	722	1971-81
Elm Creek near Golden Valley, ND (d)	06339490	82	1967-81
Coyote Creek near Zap, ND (d)	06339550	65.2	1978-83
Spring Creek below Lake Ilo at Dunn Center, ND (d)	06339800	116	1978-81
Spring Creek near Halliday, ND (d)	06339900	260	1978-81
West Branch Otter Creek near Beulah, ND (d)	06340200	26.5	1965-82
Antelope Creek above Hazen, ND (d)	06340520	47.2	1978-86
West Branch Antelope Creek No. 5 near Zap, ND (d)	06340524	4.37	1978-82
West Branch Antelope Creek No. 4 near Zap, ND (d)	06340528	8.46	1977-86
West Branch Antelope Creek No. 2 near Beulah, ND (d)	06340536	28.3	1977-80
West Branch Antelope Creek near Hazen, ND (d)	06340540	37.7	1978-83
Coal Creek near Stanton, ND (d)	06340580	15.8	1978-81
Alderin Creek near Fort Clark, ND (d)	06340780	21.9	1978-83

DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS--Continued

Station name	Station number	Drainage area (mi ²)	Period of record
MISSOURI RIVER BASIN--Continued			
Missouri River Tributary No. 2 near Hensler, ND (d)	06340890	9.80	1979-81
Coal Lake Coulee near Hensler, ND (d)	06340905	70.5	1978-89
Buffalo Creek near Washburn, ND (d)	06340930	57.3	1979-83
Turtle Creek near Turtle Lake, ND (d)	06341400	310	1957-76
Square Butte Creek near Hannover, ND (d)	06342040	16.9	1978-81
Square Butte Creek Tributary No. 2 near Center, ND (d)	06342100	13	1965-76
Square Butte Creek above Nelson Lake near Center, ND (d)	06342200	75.8	1978-82
Hagel Creek near Center, ND (d)	06342230	45.6	1978-82
Norwegian Creek near Belfield, ND (d)	06342850	39.8	1979-81
South Branch Heart River near South Heart, ND (d)	06342900	132	1979-83
North Creek near South Heart, ND (d)	06342970	40.8	1979-81
Heart River near South Heart, ND (d)	06343000	311	1946-70, 1978-84
Heart River below Dickinson Dam near Dickinson, ND (d)	06344000	404	1952-72
Heart River at Lehigh, ND (d)	06344500	443	1943-52
Green River Tributary near New Hradec, ND (d)	06344610	22.4	1979-81
Green River near Gladstone, ND (d)	06345000	356	1946-75
Heart River below Heart Butte Dam near Glen Ullin, ND (d)	06346500	1,710	1943-72
Antelope Creek near Carson, ND (d)	06347000	221	1948-75
Wilson Creek near Glen Ullin, ND (d)	06347100	41.4	1965-70
Sweetbriar Creek near Judson, ND (d)	06348500	157	1951-79
Cannonball River at New England, ND (d)	06349900	285	1979-81
Coal Bank Creek near Havelock, ND (d)	06349930	70	1974-83
Cannonball River below Bentley, ND (d)	06351000	1,140	1943-81
Cannonball River near Heil, ND (d)	06351500	1,340	1951-53
Cedar Creek near North Lemmon, ND (d)	06352300	901	1959-63
Cannonball River near New Leipzig, ND (d)	---	1,180	1943-50
Timber Creek near Bentley, ND (d)	06352400	100	1978-81
Cedar Creek near Pretty Rock, ND (d)	06352500	1,340	1943-76
Cannonball River near Timmer, ND (d)	06353500	3,670	1903-09, 1911-18, 1922, 1924, 1928-35
Beaver Creek at Linton, ND (d)	06354500	717	1949-89
Buffalo Creek Tributary near Gascoyne, ND (d)	06355310	15.7	1975-87
Big Slough at Hamberg, ND (d)	06467900	60	1957-68, 1970-75
James River at New Rockford, ND (d)	06468000	714	1950-69
Juanita Lake Tributary near Grace City, ND (d)	06468190	94	1986-89
Kelly Creek below Niccum Reservoir near Bordulac, ND (d)	06468300	188	1986-89
James River near Pingree, ND (d)	06468500	1,670	1953-68
Pipestem Creek near Buchanan, ND (d)	06469500	758	1950-74
Pilot Drain at Oakes, ND (d)	06470833	5.10	1972-82

DISCONTINUED SURFACE-WATER-QUALITY STATIONS

The following stations were discontinued as continuous-record surface-water quality stations prior to the current water year. Daily records of temperature, specific conductance or sediment were collected and published for the record shown for each station.

Discontinued continuous-record surface-water-quality stations

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record (water years)
Wild Rice River near Cayuga, ND	05051700	955	Temp.	1958
Wild Rice River near Abercrombie, ND	05053000	2,080	Temp. S.C.	1967-81 1968-81
Red River of the North at Fargo, ND	05054000	6,800	Temp. S.C.	1947-49, 1956-73 1965-73
Red River of the North below Fargo, ND	05054020	6,820	Temp., S.C.	1973-82
Sheyenne River above Harvey, ND	05054500	424	Temp.	1954
Sheyenne River near Warwick, ND	05056000	2,070	Temp. S.C.	1951-53, 1955-62, 1964-80 1952-60, 1964-80
Big Coulee near Churchs Ferry, ND	05056400	2,510	Temp., S.C.	1983-89
Channel A near Penn, ND	05056410	---	S.C.	1983-89
Sheyenne River near Cooperstown, ND	05057000	6,470	Temp. S.C.	1967-81 1968-81
Sheyenne River at Lisbon, ND	05058700	8,190	Temp. S.C. Sed.	1956-81 1964-80 1976-79
Sheyenne River near Kindred, ND	05059000	8,800	Temp. S.C. Sed.	1971-81 1976-81 1976-80
Sheyenne River near Horace, ND	05059400	8,800	Temp., S.C.	1976-80
Red River of the North at Grand Forks, ND	05082500	30,100	Temp.	1957-73
Red River of the North at Oslo, MN	05083500	31,200	Temp., S.C.	1974-78
Red River of the North at Drayton, ND	05092000	34,800	Temp.	1957-61, 1965-75
Pembina River at Walhalla, ND	05099600	3,350	Temp. S.C. Sed.	1962-81 1965-81 1962-76
Souris River near Sherwood, ND	05114000	8,940	Sed.	1975-81
Souris River near Foxholm, ND	05116000	9,470	Temp., S.C.	1973-81
Souris River near Verendrye, ND	05120000	11,300	Temp., S.C.	1973-83
Deep River Below Cut Bank Creek near Upham, ND	05123760	1,722	Temp. S.C. Sed.	1974-81, 1989 1974-81 1989
Souris River near Westhope, ND	05124000	16,900	Temp. S.C. Sed.	1955, 1957-64, 1967-68, 1974-81, 1989 1957-64, 1967-68, 1974-81 1956-59, 1989
Missouri River near Williston, ND	06330000	164,500	Temp. S.C.	1952-65 1952-60, 1965
Bear Den Creek near Mandaree, ND	06332515	74	Temp. S.C.	1969-71, 1989-91 1969-71
Little Missouri River at Marmarth, ND	06335500	4,640	Temp., Sed.	1952-54
Little Missouri River at Medora, ND	06336000	6,190	Temp. Sed.	1947-49 1946-51
Little Missouri River near Watford City, ND	06337000	8,310	Temp., S.C. Sed.	1972-81 1947-48, 1972-76
Missouri River Below Garrison Dam, ND	06339000	181,400	Temp.	1952-71
Knife River near Golden Valley, ND	06339500	1,230	Temp. Sed.	1964-65 1946-49, 1964-65
Knife River at Hazen, ND	06340500	2,240	Temp., S.C.	1975-82

Type of record: Temp. (temperature), S.C. (specific conductance), and Sed. (sediment).

WATER RESOURCES DATA - NORTH DAKOTA, 1991

xv

DISCONTINUED SURFACE-WATER-QUALITY STATIONS

Discontinued continuous-record surface-water-quality stations--Continued

Station name	Station number	Drainage area (mi ²)	Type of record	Period of record (water years)
Missouri River near Hensler, ND	06340900	183,000	Temp.	1967-77
Missouri River at Bismarck, ND	06342500	186,400	Temp. S.C. Sed.	1967-75 1972-75 1972-81
Heart River near Richardton, ND	06345500	1,240	Sed.	1946-52
Heart River near Mandan, ND	06349000	3,310	Temp., S.C. Sed.	1972-76, 1978-82 1972-76
Missouri River near Schmidt, ND	06349700	191,700	Temp.	1967-75
Cannonball River at Regent, ND	06350000	580	Temp., S.C., Sed.	1965-66
Cedar Creek near Pretty Rock, ND	06352500	1,340	Sed.	1946-49
Cannonball River at Breien, ND	06354000	4,100	Temp. S.C. Sed.	1972-82, 1991 1972-82 1972-76
North Fork Grand River at Haley, ND	06355000	509	Temp.	1951-52
Pilot Drain at Oakes, ND	06470833	5.10	Temp., S.C.	1972-80, 1982
James River at North Dakota-South Dakota Stateline	06470878	6,650	Temp., S.C.	1974-88

Type of record: Temp. (temperature), S.C. (specific conductance), and Sed. (sediment).

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 North 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 U.S. Geological Survey, the data are published annually in this report series entitled "Water Resources Data - North Dakota."

This report series includes records of discharge, stage, and water quality for streams; contents, stage, and water quality for lakes and reservoirs; and water levels and water quality for ground-water wells. This volume contains records of water discharge for 103 streamflow-gaging stations; stage only for 22 river-stage stations; contents and/or stage for 13 lake or reservoir stations; annual maximum discharge for 7 crest-stage stations; water levels for 30 ground-water wells; and water quality for 83 streamflow-gaging stations, 4 river-stage stations, 4 lake or reservoir stations, 2 crest-stage stations, 3 miscellaneous sample sites on streams, and 67 ground-water wells. Locations of these stations and wells are shown in figures 1, 2, and 3. Also included are discharge measurement data for miscellaneous sites (42 discharge measurements made by U.S. Geological Survey personnel for 18 miscellaneous sites and 141 discharge measurements made by North Dakota State Water Commission personnel for 24 miscellaneous sites). Data are included for 6 water-quality monitor sites on streams and for 2 precipitation-chemistry stations. These data represent that part of the National Water Data System collected by the U.S. Geological Survey and cooperating State and Federal agencies in North Dakota.

This series of annual reports for North 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 North 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 5 and 6." 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 ground-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 U.S. Geological Survey, Books and Open-File Reports, Federal Center, Building 810, Box 25425, Denver, CO 80225.

Publications similar to this report are published annually by the U.S. 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 ND-91-1." 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. Beginning with the 1990 water year, all water data also will be available on Compact Disc-Read Only Memory (CD-ROM). All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on the back of the title page or by telephoning (701) 250-4604. A limited number of CD-ROM discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225.

COOPERATION

The U.S. Geological Survey and agencies of the State of North Dakota have had cooperative agreements for the collection of streamflow records since 1903, ground-water levels since 1937, and water-quality records since 1946. Organizations that assisted in collecting the data in this report through cooperative agreement with the Survey are: North Dakota State Water Commission, David A. Sprynczynatyk, Chief Engineer; North Dakota Public Service Commission, Dale V. Sandstrom, President, succeeded by Bruce Hagen; Lower Heart River Water Resources District, W. S. Russell, Chairman; City of Minot, George M. Christensen, Mayor; City of Dickinson, R. B. Baird, Mayor, succeeded by Henry Schank.

Assistance with funds or services was given by the U.S. Army Corps of Engineers for 22 streamflow-gaging stations, 19 river-stage stations, 5 reservoir stations, 3 crest-stage stations, 25 ground-water wells, and water quality for 5 streamflow-gaging stations and 1 lake station; the U.S. Bureau of Reclamation for 2 streamflow-gaging stations, 1 river-stage station, 3 reservoir stations, and water quality for 9 streamflow-gaging stations and for 2 lake or reservoir stations; the International Joint Commission of the U.S. State Department for 11 streamflow-gaging stations and 1 reservoir station; the U.S. Fish and Wildlife Service for 7 streamflow-gaging stations and water quality for 2 streamflow-gaging stations; and other U.S. Department of the Interior agencies concerned with the Missouri River basin for 7 streamflow-gaging stations, 3 river-stage stations, 3 reservoir stations, and water quality for 6 streamflow-gaging stations, 2 river-stage stations, and 1 reservoir station.

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

Organizations that provided data are acknowledged in station descriptions.

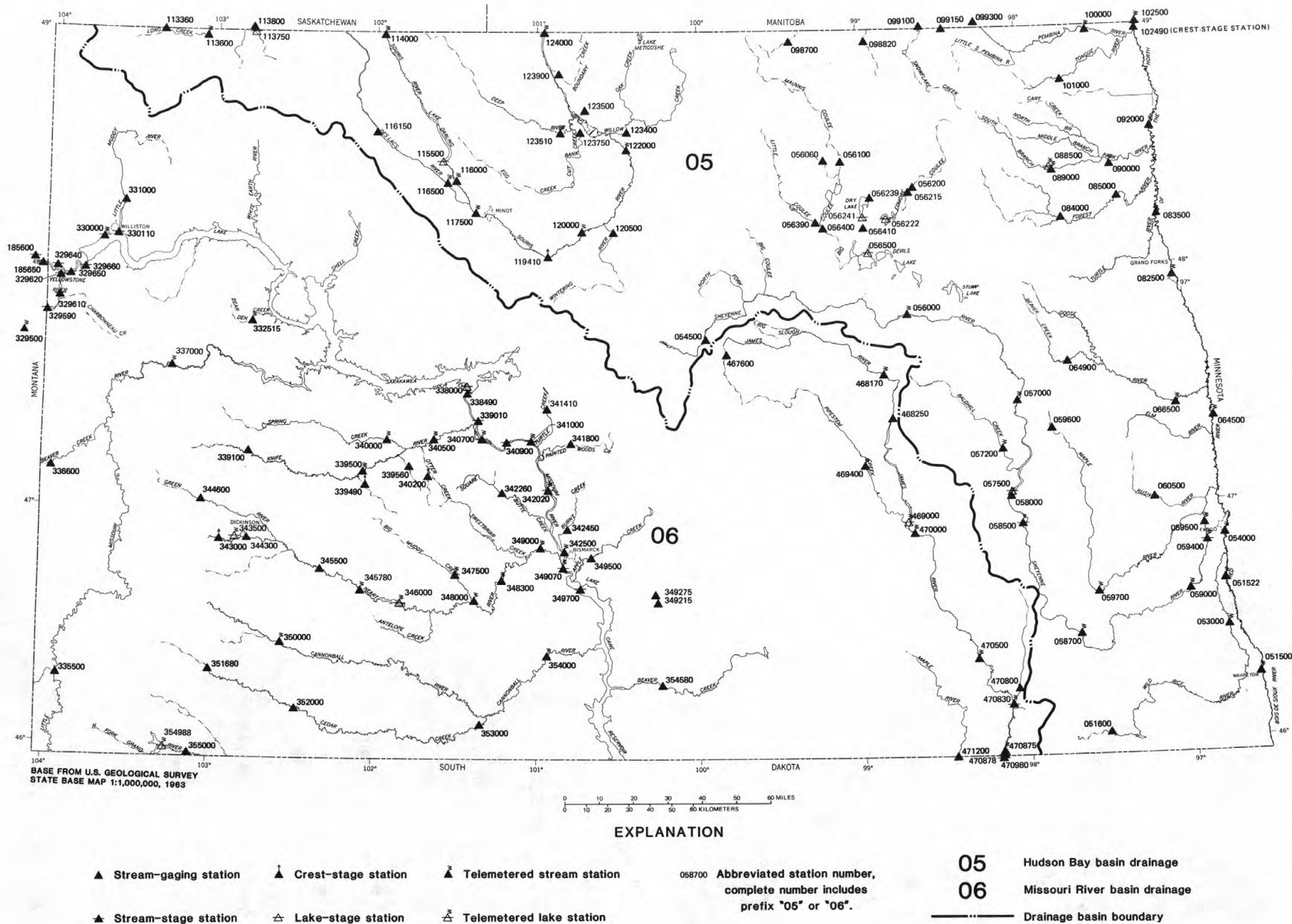


Figure 1.--Location of active surface-water gaging stations.

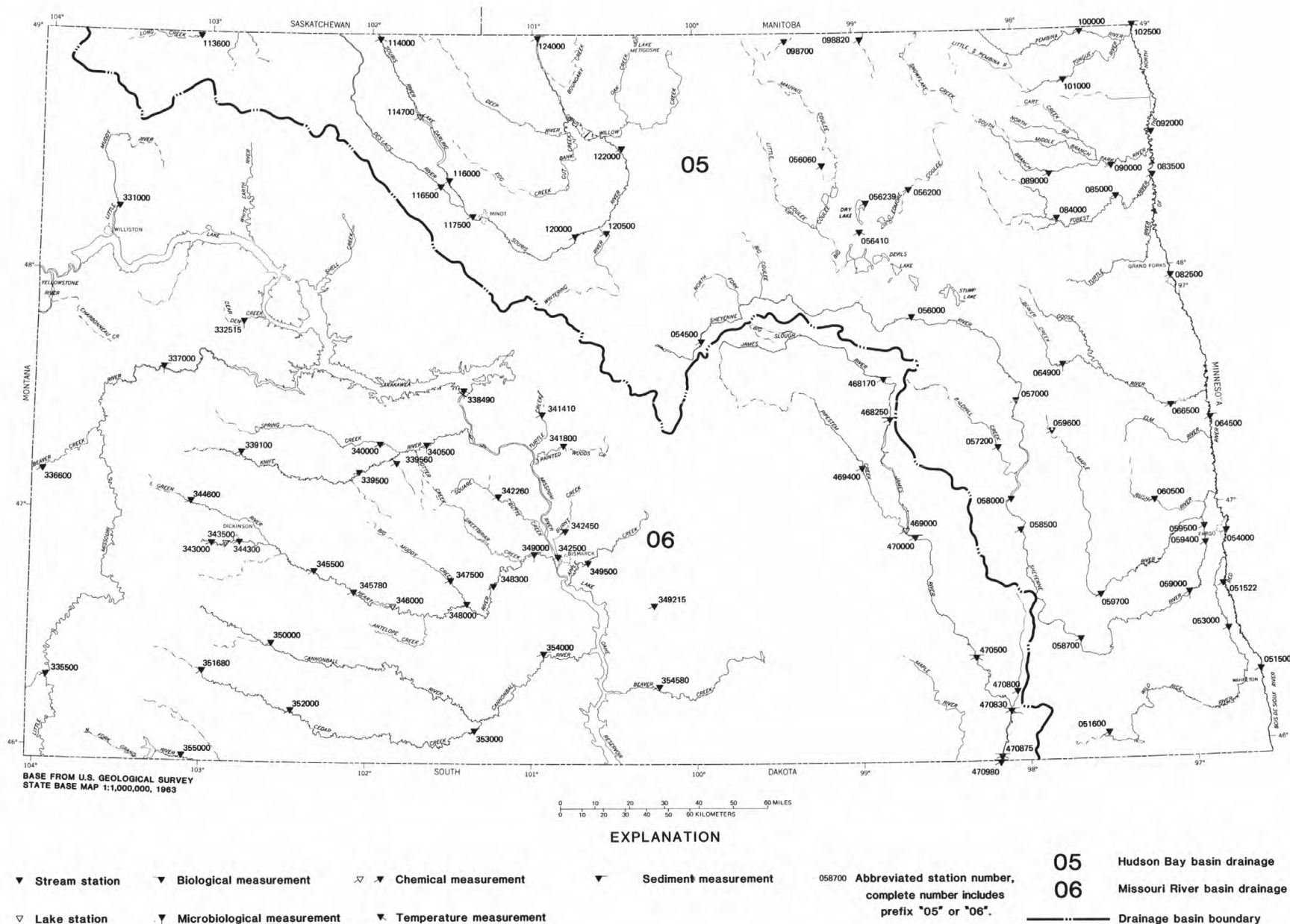


Figure 2.--Location of active surface-water-quality stations.

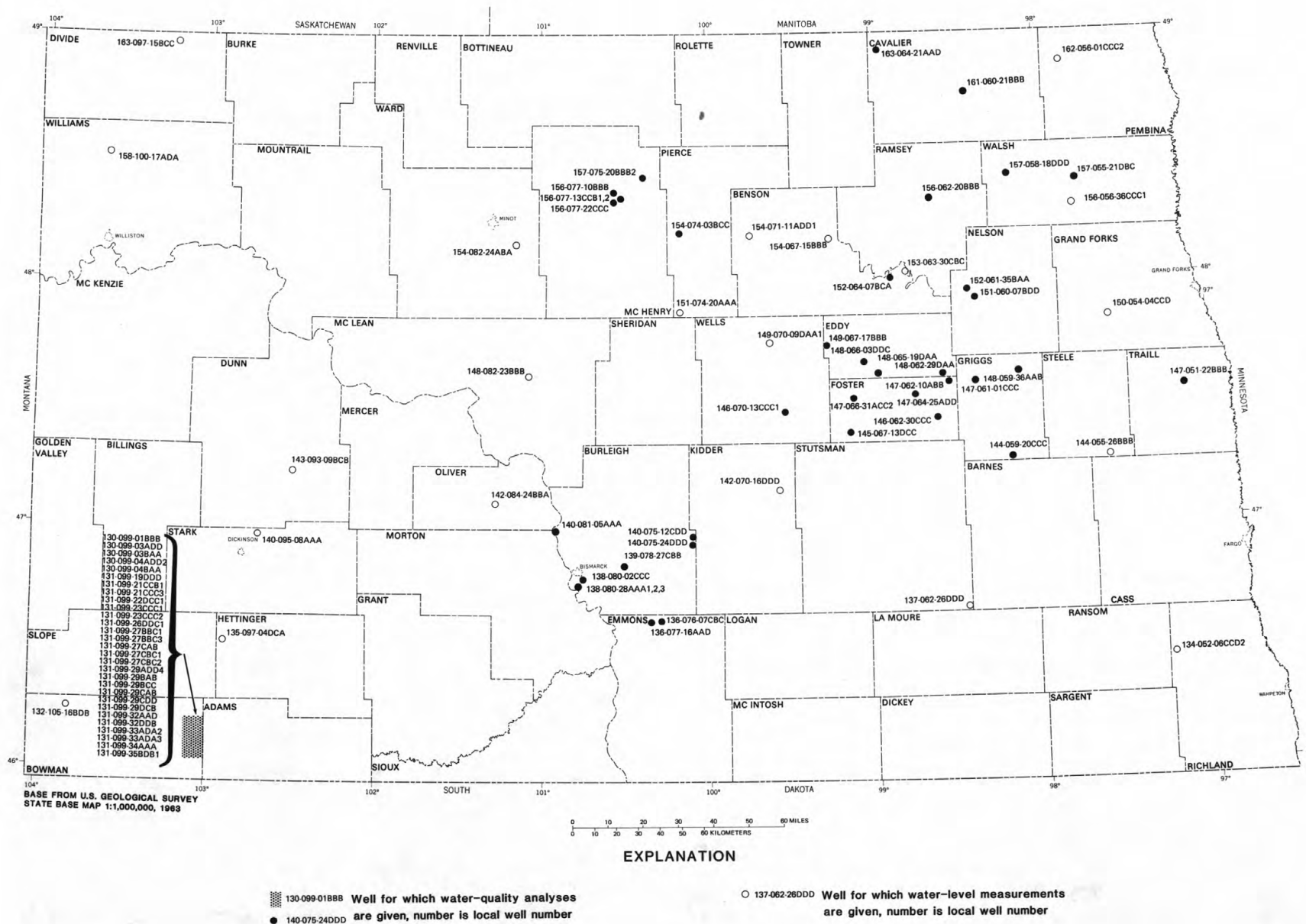


Figure 3.--Location of selected ground-water observation wells.

SUMMARY OF HYDROLOGIC CONDITIONS

Climate

In North Dakota, normal annual precipitation ranges from about 14 inches in the northwestern part of the State to about 22 inches in the southeastern part of the State (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, 1982, Monthly normals of temperature, precipitation, and heating and cooling degree days, 1951-80, North Dakota: Asheville, North Carolina, Climatography of the United States, No. 81). Three-fourths of this precipitation occurs during April through September. Greatest normal monthly precipitation for the entire State generally occurs during June. Normal, as used in reference to meteorological data in this report, is an average value for the reference period 1951 through 1980. Meteorological data were obtained from publications of the National Weather Service (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, 1990, 1991, Climatological data, North Dakota: Asheville, North Carolina, v. 99, no. 10-12, v. 100, no. 1-9).

North Dakota is divided into nine National Weather Service climatological divisions (fig. 4). Precipitation during water year 1991 ranged from about 2 inches less than normal in the south-central division to more than 4.5 inches greater than normal in the northeast division.

A comparison of monthly precipitation for water year 1991 to normal monthly precipitation for 1951-80 for the nine National Weather Service climatological divisions in North Dakota is shown in figure 4. The data shown in figure 4 are averages of the monthly precipitation for reporting stations within each climatological division.

Precipitation during the usually dry fall and winter months of October through March generally was much less than normal statewide, except for December when precipitation averaged near normal for the month and for February when precipitation in the three eastern climatological divisions was greater than normal. Precipitation during October averaged 0.5 inch statewide (about 49 percent of normal). Precipitation during November averaged less than 0.1 inch statewide (about 13 percent of normal). Precipitation during January averaged less than 0.2 inch (about 34 percent of normal) and during March averaged less than 0.4 inch (about 58 percent of normal). For the 6-month period October through March, precipitation was about 2.0 inches (about 56 percent of normal) statewide.

Precipitation during the spring and summer months of April through September was about 19 percent greater than normal. Precipitation during April averaged about 2.3 inches (about 50 percent greater than normal) statewide. The eastern three climatological divisions and the north-central division had the greatest amount of precipitation; about 1.0 to 1.2 inches greater than normal. The rest of the climatological divisions in the State averaged about 0.4 to 0.7 inch greater than normal.

Precipitation during May averaged about 3.0 inches (about 28 percent greater than normal) statewide. Precipitation for the three eastern climatological divisions ranged from 1.3 to 2.1 inches greater than normal (58 to 79 percent greater than normal). Only the southwest and west-central divisions had less than normal precipitation during May.

Precipitation during June averaged about 4.4 inches (about 27 percent greater than normal) statewide. About 24 percent of the average precipitation for the 1991 water year occurred during June. Precipitation during June ranged from about 3.5 inches (near normal) in the south-central division to about 5.8 inches (about 54 percent greater than normal) in the southeast division. As shown in figure 4, precipitation in the three eastern climatological divisions remained significantly greater than normal for April through June.

Precipitation during July and August declined significantly from the greater than normal amounts reported for June. In the northwestern, north-central, and northeastern climatological divisions, precipitation generally was near or greater than normal for July and August; in the remaining six divisions, with minor exceptions, precipitation averaged much less than normal. Precipitation in the southeast division, which had the greatest average precipitation of the nine climatological divisions during April, May, and June, averaged 1.0 inch less than normal in July and 1.1 inches less than normal in August.

Precipitation during September ranged from slightly less than normal in the east-central and south-central climatological divisions to 2.1 inches greater than normal in the northeast division.

Monthly average temperatures for the State during water year 1991 were within about 3°C (about 5°F) of normal, except during February and March. February temperatures were about 7°C (about 12°F) greater than normal and March temperatures were slightly more than 3°C (about 6°F) greater than normal. During an extended cold period from mid-December to mid-January, day-time maximum temperatures seldom were greater than freezing and night-time minimum temperatures usually were less than -18°C (0°F); occasionally, temperatures lower than -40°C (-40°F) were recorded.

Because of the dry winter conditions, there was no major accumulation of snow anywhere in the State. The greater than normal February and March temperatures caused the slow melting of what snow had accumulated. By the end of March, very little snow existed anywhere in the State. A snowstorm in mid-April deposited significant amounts of snow statewide; the largest accumulation was in the southern part of the State. Warm temperatures quickly melted the snow, and the ground was bare again in a few days.

The Palmer Drought Severity Index on selected dates for the nine National Weather Service divisions in North Dakota is shown in tables 1a, 1b, 1c, and 1d (M. T. Roletto, National Weather Service, written commun., 1989, 1990, 1991, and 1992). "The Palmer Drought Index is widely used as a measure of the severity of drought. Positive values indicate a moisture excess, values near zero indicate normal conditions, and values less than zero indicate drier than normal. An index of less than -3 is termed a severe drought, and an index of less than -4 is the worst condition, termed extreme drought." (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, U.S. drought 1988 -- A climate assessment: NOAA Climate Office, Rockville, MD, 1988, p. 2). Values for the 1988 water year are shown in table 1a, values for the 1989 water year are shown in table 1b, values for the 1990 water year are shown in table 1c, and values for the 1991 water year are shown in table 1d.

A comparison of values at the beginning of the four water years (see table 1a, 10/03/87; table 1b, 10/01/88; table 1c, 10/07/89; and table 1d, 10/06/90) shows that drought conditions were much more severe at the beginning of the 1989, 1990, and 1991 water years than at the beginning of the 1988 water year. The lowest Palmer Drought Severity Indexes recorded statewide during the 1988 water year (table 1a, 09/10/88) indicated much more severe conditions than for the most severe condition during the 1989 water year (table 1b, 08/05/89), during the 1990 water year (table 1c, 09/29/90), or during the 1991 water year (table 1d, 10/06/90). Comparison of index values at the beginning and end of each water year indicates that, although conditions may have

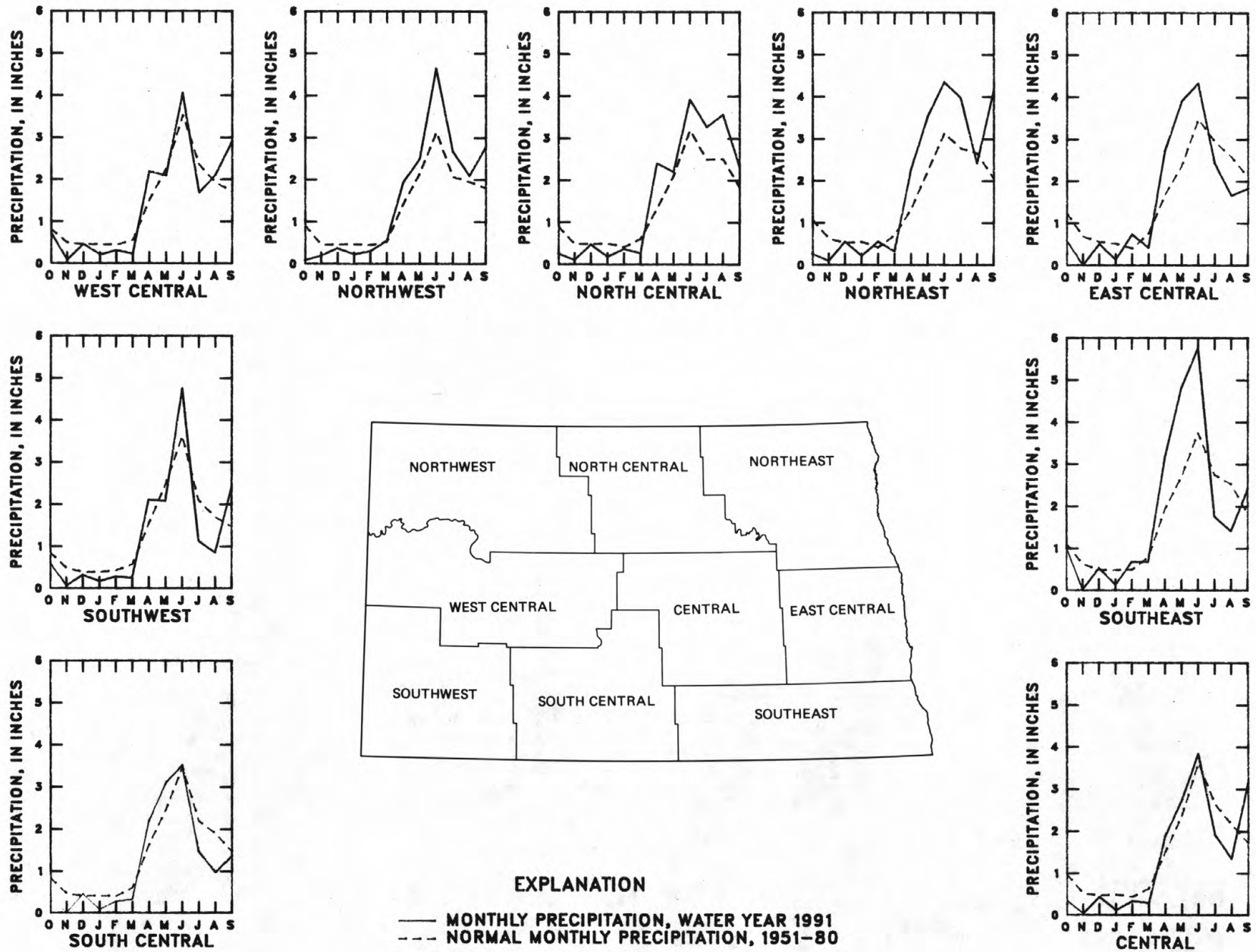


Figure 4.--Comparison, by climatological division, of monthly precipitation, water year 1991, to normal monthly precipitation, 1951-80.

Table 1.--Palmer Drought Severity Index on selected dates for water years 1988, 1989, 1990, and 1991 for the nine National Weather Service climatological divisions in North Dakota (M. T. Roletto, National Weather Service, written commun., 1989, 1990, 1991, 1992)

[Below -4.0, extreme drought; -3.9 to -3.0, severe drought; -2.9 to -2.0, moderate drought; -1.9 to -1.0, mild drought; -0.9 to -0.5, incipient drought; -0.4 to +0.4, near normal; +0.5 to +0.9, incipient moist spell; +1.0 to +1.9, moist spell; +2.0 to +2.9, unusual moist spell; +3.0 to +3.9, very moist spell; +4.0 and above, extreme moist spell]

Table 1a.--Water year 1988

National Weather Service climatological division	Palmer Drought Severity Index by date of computation				
	10/03/87	01/01/88	04/02/88	07/02/88	09/10/88
Northwest	+1.5	-2.7	-2.5	-5.6	-7.0
North central	+2.4	-1.6	-1.1	-4.2	-6.5
Northeast	+2.4	-1.2	+0.3	-4.2	-5.4
West central	+1.3	-1.8	-1.7	-5.3	-7.5
Central	+2.1	-1.4	-1.5	-4.5	-6.0
East central	+3.5	+1.9	+1.7	-3.8	-5.2
Southwest	+2.4	-1.2	-1.1	-4.1	-6.5
South central	+3.8	-1.4	-1.4	-4.3	-5.8
Southeast	-2.3	-2.4	-2.8	-6.3	-7.2

Table 1b.--Water year 1989

National Weather Service climatological division	Palmer Drought Severity Index by date of computation				
	10/01/88	12/31/88	04/01/89	07/01/89	08/05/89
Northwest	-5.9	-4.2	-3.0	-3.3	-5.2
North central	-5.3	-3.4	-3.0	-2.2	-4.4
Northeast	-5.4	-4.5	-3.8	-3.6	-5.6
West central	-6.8	-5.4	-4.5	-4.7	-5.8
Central	-5.6	-4.4	-3.9	-5.1	-6.2
East central	-3.9	-2.8	-1.8	-3.2	-5.3
Southwest	-6.0	-4.5	-4.5	-4.4	-4.9
South central	-5.4	-3.6	-3.3	-4.2	-5.6
Southeast	-5.5	-3.6	-2.5	-3.4	-4.2

Table 1c.--Water year 1990

National Weather Service climatological division	Palmer Drought Severity Index by date of computation				
	10/07/89	12/30/89	03/31/90	06/30/90	09/29/90
Northwest	-5.4	-3.1	-3.1	-3.8	-4.2
North central	-4.3	-4.3	-2.7	-0.7	-3.3
Northeast	-5.3	-5.4	-3.1	-2.4	-4.8
West central	-5.7	-4.1	-4.5	-3.7	-6.4
Central	-3.3	-3.2	-3.1	-2.9	-4.5
East central	-2.3	-3.3	-1.4	-1.4	-3.5
Southwest	-4.8	-2.8	-2.2	-2.4	-5.9
South central	-2.8	-3.3	-3.5	-3.6	-5.4
Southeast	-1.6	-3.0	-2.5	-3.8	-3.7

Table 1.--Palmer Drought Severity Index on selected dates for water years 1988, 1989, 1990, and 1991 for the nine National Weather Service climatological divisions in North Dakota (M. T. Rolletto, National Weather Service, written commun., 1989, 1990, 1991, 1992)--Continued

Table 1d.--Water year 1991

National Weather Service climatological division	Palmer Drought Severity Index by date of computation				
	10/06/90	12/29/90	03/30/91	06/29/91	09/28/91
Northwest	-4.3	-3.4	-3.4	-2.3	-0.9
North central	-3.4	-2.8	-3.6	-3.3	-1.1
Northeast	-5.0	-4.8	-5.2	-2.8	+0.1
West central	-6.4	-4.8	-4.7	-4.2	-3.2
Central	-4.7	-3.6	-3.8	-3.4	-2.3
East central	-3.8	-3.1	-3.5	-2.7	-2.5
Southwest	-6.0	-4.7	-4.6	-3.8	-3.6
South central	-5.5	-4.6	-4.7	-2.9	-4.1
Southeast	-4.1	-3.6	-3.6	+1.5	+0.4

improved somewhat each year during the summer months when precipitation normally is greater, once the drought started in 1988 there was little difference between index values at the beginning and end of each subsequent water year until the 1991 water year. Index values for 09/28/91 (table 1d) indicate much improvement from conditions at the beginning of the 1991 water year. However, only two of the nine climatological divisions (the northeast and southeast divisions) are classified as near normal, and drought conditions ranging from an incipient drought (-0.9 in northwest division) to an extreme drought (-4.1 in south-central division) still exist.

Streamflow

The largest mean monthly discharge of North Dakota rivers generally is coincident with snowmelt runoff. Because the springtime temperatures normally are greater in the southwestern part of the State than in the northeastern part, snowmelt usually begins first on the Missouri River tributaries in western North Dakota and progresses from west to east across the State. Hydrographs of mean monthly discharge (fig. 5) for the period of record of selected streams verify this trend. For example, the largest mean monthly discharge for Bear Den Creek near Mandaree, which is in the National Weather Service west-central climatological division, normally occurs in March; whereas, the largest mean monthly discharge for the remaining streamflow-gaging stations normally occurs in April. Mean monthly discharge for March is almost as large as mean monthly discharge for April for Cedar Creek near Haynes in the National Weather Service southwest climatological division, further substantiating the general trend of snowmelt progressing from west to east in North Dakota.

Although many inferences can be made about hydrologic conditions of the State by using precipitation data (fig. 4) and streamflow data (fig. 5), sound hydrologic judgment should be used. Variability of rainfall intensity and distribution should be considered when making conclusions about hydrologic response to rainfall, especially for small basins. Problems may occur because different reporting periods are used for the normal monthly precipitation data and the mean monthly discharge data in the two figures. Normal monthly precipitation is computed using a 30-year reference period from 1951 to 1980, but mean monthly discharges are computed using data for the period of record at each streamflow-gaging station--1967-91 (25 years), in the case of Bear Den Creek near Mandaree.

The precipitation graphs in figure 4 could lead one to believe that the 1991 water year would not be an unusually small runoff year statewide. However, the monthly mean discharges for all nine streamflow-gaging stations generally are significantly less than the mean monthly discharges (fig. 5).

The Devils Lake basin is a 3,810 square-mile closed basin adjacent to the headwaters of the Sheyenne River. Less than normal runoff in the Devils Lake basin during water years 1988, 1989, 1990, and 1991 has resulted in declining water levels in Devils Lake. Since reaching a record high water level (of this century) of 1,428.89 feet above sea level on August 2, 1987, the water level in Devils Lake has fallen 5.65 feet, to an elevation of 1,423.24 feet, at the end of the 1991 water year.

To further substantiate the extreme deficiency in streamflow caused by the 1988-91 drought, selected streamflow statistics for the nine streamflow-gaging stations shown in figure 5 are summarized in table 2. Annual mean and peak discharges for water years 1988, 1989, 1990, and 1991 for each streamflow-gaging station are ranked against similar data for each year during the period of record. The smallest annual mean discharge for each streamflow-gaging station and the smallest annual peak discharge for each streamflow-gaging station are given a ranking of 1.

Analysis of the rankings of means for water years 1988, 1989, 1990, and 1991 shows that the effect of the drought on streamflow for these nine streamflow-gaging stations was the most severe in 1991, slightly less severe in 1988, less severe in 1990, and the least severe in 1989. Notable exceptions include Apple Creek near Menoken, the Park River at Grafton, and the Wild Rice River near Abercrombie where the effect of the drought on streamflow was more severe in 1990 than in 1988, 1989, and 1991. For Apple Creek near Menoken and the Park River at Grafton, both the mean and peak discharges for the 1990 water year were the lowest for the 46-year and the 60-year periods of record, respectively (table 2). However, regulation at Homme Reservoir on the South Branch of the Park River and other influences of man for both the Park River and Apple Creek probably also contributed to the 1990 water year record low values. Although the discussion about the Palmer Drought Index in the previous section indicates a reduction in severity of the drought during the 1991 water year, the data from table 2 indicate that from a hydrologic standpoint the drought was still greatly affecting streamflow.

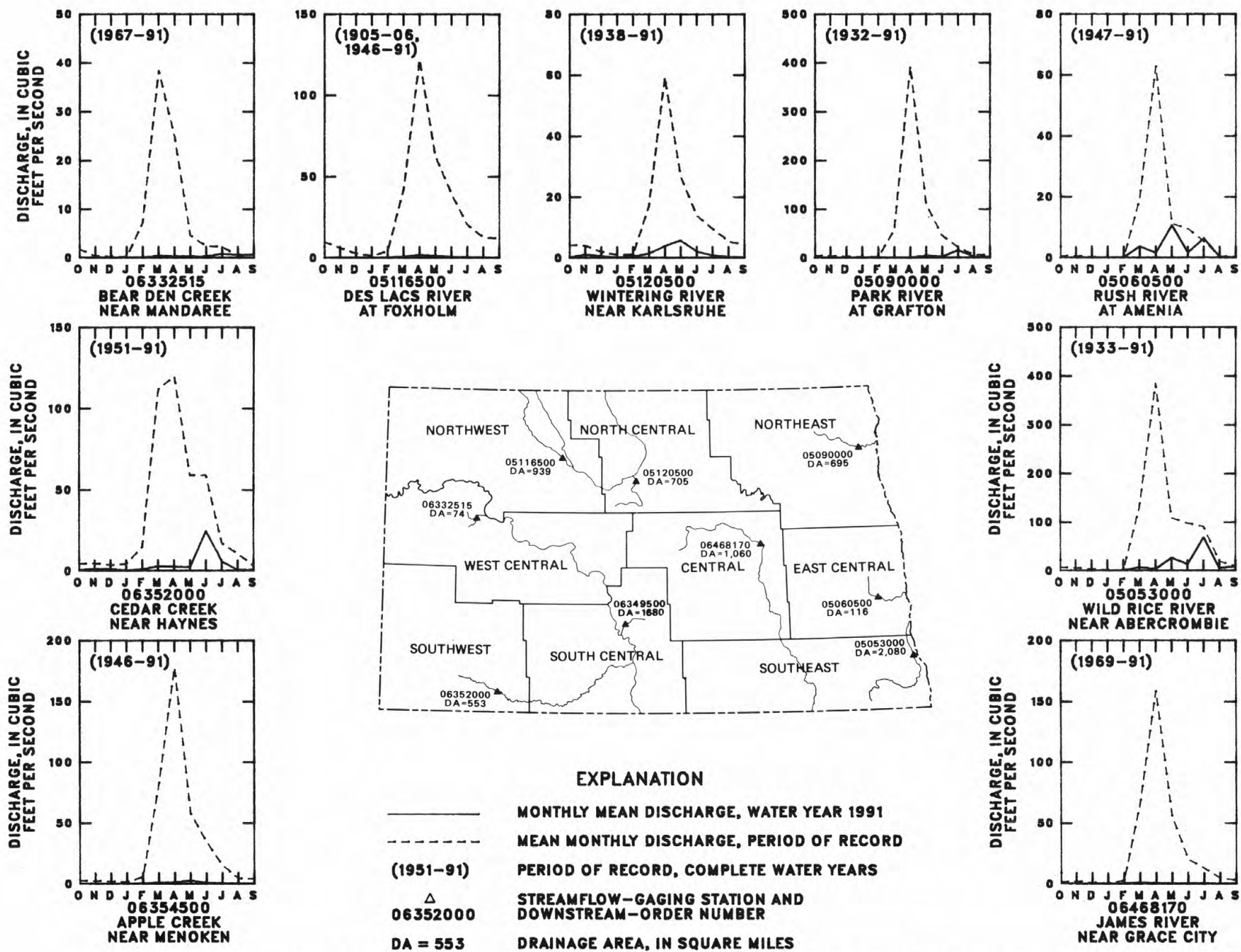


Figure 5.--Comparison of monthly mean discharge during water year 1991 to mean monthly discharge for the period of record.

Table 2.--Period-of-record mean annual and median annual discharges; water years 1988, 1989, 1990, and 1991 mean and peak discharges; and ranking of water years 1988, 1989, and 1990 data versus record low mean and low peak discharges for period of record at selected streamflow-gaging stations

[ft³/s, cubic feet per second]

Streamflow-gaging station	Period of record			Mean discharge (ft ³ /s)				Ranking of mean from lowest annual mean discharge for period of record				Peak discharge (ft ³ /s)				Ranking of peak from lowest annual peak discharge for period of record			
	Number of years	Mean annual discharge (ft ³ /s)	Median annual discharge (ft ³ /s)																
				1988	1989	1990	1991	1988	1989	1990	1991	1988	1989	1990	1991	1988	1989	1990	1991
Apple Creek near Menoken	46	32.3	18	4.92	2.77	0.31	0.64	9	5	1	4	130	97	6.9	7.8	9	7	1	2
Cedar Creek near Haynes	41	34.4	27	3.98	9.99	6.77	3.61	4	12	8	3	28	591	110	345	1	16	4	11
Bear Den Creek near Mandaree	25	6.93	5.6	.27	2.25	.62	.34	1	10	4	2	12	375	190	44	2	11	7	3
Des Lacs River at Foxholm	48	27.8	16	.93	9.34	1.48	.44	3	17	5	1	4.2	240	129	4.7	1	14	9	2
Wintering River near Karlsruhe	54	12.5	10	3.31	3.69	2.45	1.39	12	14	6	1	64	120	41	13	17	24	13	2
Park River at Grafton	60	54.3	38	5.13	3.96	1.38	2.22	10	8	1	3	143	143	24	48	7	7	1	5
Rush River at Amenia	45	9.16	5.9	1.13	9.16	3.04	2.03	4	28	13	9	30	602	64	43	3	34	7	5
Wild Rice River near Abercrombie	59	71.7	36	3.99	158	2.70	11.3	4	51	2	10	105	7,150	74	410	7	58	4	15
James River near Grace City	23	27.4	18	5.01	1.29	2.11	.22	6	4	5	2	150	100	294	6.0	6	5	10	2

Chemical Quality of Streamflow

The chemical quality of streamflow at any particular site is dependent upon many factors, including source of streamflow, composition of rocks over which water flows, location, and time of year; therefore, the quality of streamflow varies considerably across the State. The chemical quality of streamflow also is dependent on the volume of streamflow. During periods of low flow, most of the flow is derived from ground-water inflow, which is mineralized, and the resulting streamflow has large dissolved-solids concentrations. During periods of high flow, most of the flow is derived from snowmelt or rainfall runoff, which is less mineralized, and the resulting streamflow has small dissolved-solids concentrations.

Five stations from around the State were selected to show the variability in stream-water quality among the different river drainages. Specific conductance, an indicator of dissolved solids in water, is used to show the water-quality variability among these stations and among months at a given station. The mean, maximum, and minimum specific conductance for the period of record and the specific conductances measured during the 1991 water year for each station are shown in table 3.

Specific conductance is used as an indicator of the suitability of water for irrigation and other uses. The U.S. Salinity Laboratory (U.S. Salinity Laboratory Staff, 1954, Diagnosis and improvement of saline and alkali soils: U.S. Department of Agriculture Handbook 60, 160 p.) has developed an index using specific conductance as an indicator of salinity hazard for irrigation water. The salinity hazard and corresponding specific conductance are as follow:

Salinity hazard	Specific conductance (microsiemens per centimeter at 25 degrees C)
Low	less than 250
Medium	250 - 750
High	750 - 2,250
Very high	2,250 - 5,000

The Red River of the North drains eastern North Dakota and northwestern Minnesota. Water from the Red River of the North at Grand Forks had the lowest specific conductance values for most months of the five stations listed in table 3. These low values are partly due to more precipitation occurring in the Red River of the North basin than in other parts of North Dakota. Drought conditions, which continued from the 1990 water year into the 1991 water year, resulted in new maximum monthly values for measured specific conductance for February, July, and August. Specific conductances decreased during snowmelt runoff in early April and ranged from 400 to 700 microsiemens per centimeter through the rest of the 1991 water year. The salinity hazard of stream water for irrigation use was medium during the irrigation season (April through October) for months when measurements were made.

The Souris River upstream of Sherwood drains a small part of southeastern Saskatchewan, Canada. Water from the Souris River near Sherwood generally had higher specific conductance values during April, May, and June than water from the other four stations listed in table 3. New maximum monthly specific conductance values were measured during April and May. Normally, specific conductance in the Souris River near Sherwood during April, May, and June is less than 1,000 microsiemens per centimeter due to the influence of snowmelt runoff. Flow in the Souris River during April, May, and June was augmented by releases from reservoirs in Saskatchewan. The high specific conductance values during these months probably were caused by evaporative concentration of water in the river channel and resuspension of minerals flushed ahead of the reservoir releases rather than from the reservoir water. The continued drought also resulted in new maximum monthly values for measured specific conductance in July and September. The salinity hazard of stream water for irrigation use was high during June, July, August, and September when measurements were made and high to very high during April and May.

The Little Missouri River drains parts of southwestern North Dakota, northwestern South Dakota, and southeastern Montana. Water from the Little Missouri River near Watford City generally had the highest specific conductance values, except during May and June, of the five stations listed in table 3. A new maximum specific conductance value for November was measured during water year 1991. The salinity hazard of stream water for irrigation use was very high in October and November and high during the other months when measurements were made.

The Cannonball River drains part of southwestern North Dakota. Measured specific conductances were high during low-flow conditions, and low during rainfall runoff in June. A new minimum specific conductance value for June was measured during water year 1991. The salinity hazard of stream water for irrigation use was high during the irrigation season except in June when one measurement indicated the salinity hazard was medium.

The James River drains east-central North Dakota. Two reservoirs, Jamestown and Pipestem, are used to regulate flow in the James River basin. These reservoirs are filled by snowmelt runoff, so releases from the reservoirs during the summer typically have specific conductance values similar to those measured during periods of snowmelt runoff. Water from the James River at LaMoure generally had lower specific conductance values than water from the Souris, the Little Missouri, and Cannonball Rivers, but higher specific conductance values than water from the Red River of the North. Drought conditions during water year 1991 caused a new maximum specific conductance for January and tied the maximum value for August. High specific conductance values were measured during low flow, and low specific conductance values were measured during snowmelt runoff in March and April and during rainfall runoff in July. The salinity hazard of stream water for irrigation use was medium to high during the irrigation season.

Ground-Water Levels

Water levels measured during water years 1987, 1988, 1989, 1990, and 1991 for well 134-052-06CCD2 completed in the Sheyenne Delta aquifer in Richland County are shown in figure 6. Water levels measured during the same period for well 140-095-08AAA completed in the Sentinel Butte aquifer in Stark County are shown in figure 7. The highest monthly water level, the mean of monthly water levels, and the lowest monthly water level for each of the two wells for the period of record prior to water year 1988 also are shown. Water-level fluctuations in both wells (figs. 6 and 7) appear to follow the typical pattern of rises during the wet spring months and declines during the rest of the year for all 5 water years.

Table 3.--Statistical summary of specific-conductance measurements for the period of record and listing of specific-conductance measurements for water year 1991

[Specific-conductance values are in microsiemens per centimeter at 25 degrees Celsius; --, indicates no data]

	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Water year 1991	Period of record
05082500 Red River of the North at Grand Forks (period of record, water years 1949, 1956-91)														
Mean	516	588	625	595	575	493	460	561	546	500	507	496	640	524
Maximum	700	790	985	1,040	*900	910	747	702	699	*675	*638	674	900	1,040
Minimum	399	440	468	275	400	305	200	325	348	280	360	340	400	200
Number of values	65	37	47	46	42	73	156	88	72	73	55	47	16	801
Measured values for water year 1991	--	640	920	875	*900	790	460 475 560	660 700	--	*675 400	*638 410	640 495	--	--
05114000 Souris River near Sherwood (period of record, water years 1970, 1972-91)														
Mean	1,200	1,300	1,630	1,740	1,630	1,200	755	902	1,030	1,080	1,010	1,090	1,620	1,150
Maximum	2,240	2,160	2,230	2,770	2,200	2,180	*2,510	*2,460	1,340	*1,640	1,700	*1,350	2,510	2,770
Minimum	710	925	1,250	1,280	540	200	277	345	520	540	128	755	1,100	128
Number of values	30	24	14	21	21	31	49	23	28	25	28	18	15	312
Measured values for water year 1991	--	--	--	--	--	--	1,670 2,000 1,100 2,440 *2,510	*2,460 1,770	1,200 1,200	*1,640 1,180 1,240	1,260	1,300 *1,350	--	--
06337000 Little Missouri River near Watford City (period of record, water years 1972-91)														
Mean	2,040	2,140	2,880	2,400	1,220	1,010	1,440	1,710	1,590	1,790	1,710	1,770	1,780	1,730
Maximum	3,100	*4,000	5,000	3,350	2,030	1,760	2,700	3,100	2,780	3,000	2,520	2,390	4,000	5,000
Minimum	720	740	1,730	1,500	640	400	515	780	750	1,080	682	900	960	400
Number of values	19	16	10	8	5	25	20	17	21	16	20	13	9	190
Measured values for water year 1991	2,280	*4,000	--	--	--	1,300 960 1,650	--	1,410	1,100	1,880	1,470	--	--	--
06354000 Cannonball River at Breien (period of record, water years 1950, 1971-91)														
Mean	1,690	2,160	2,580	2,460	1,930	872	1,140	1,760	1,550	1,550	1,460	1,640	1,420	1,650
Maximum	2,400	3,070	3,290	3,800	4,860	3,100	2,260	2,930	3,020	3,000	2,800	2,300	2,750	4,860
Minimum	903	1,600	284	680	190	190	300	481	*288	570	500	730	288	190
Number of values	21	20	19	24	26	40	37	23	23	21	21	22	11	297
Measured values for water year 1991	2,050	--	2,750	--	1,850	1,420	1,350	940	*288 800	1,020	1,400	1,700	--	--
06470500 James River at LaMoure (period of record, water years 1957-91)														
Mean	840	930	1,150	1,460	1,340	620	523	802	807	780	795	870	1,020	864
Maximum	1,130	1,300	1,550	*2,350	1,720	1,350	919	1,210	1,180	1,280	*1,140	1,210	2,350	*2,350
Minimum	480	540	890	340	700	185	160	500	170	170	485	480	510	160
Number of values	31	20	11	29	16	33	42	26	26	21	23	27	9	305
Measured values for water year 1991	--	1,200	--	*2,350	1,270	700	530 660	840	--	510	*1,140	--	--	--

* - New extreme value, maximum or minimum, occurred during water year 1991.

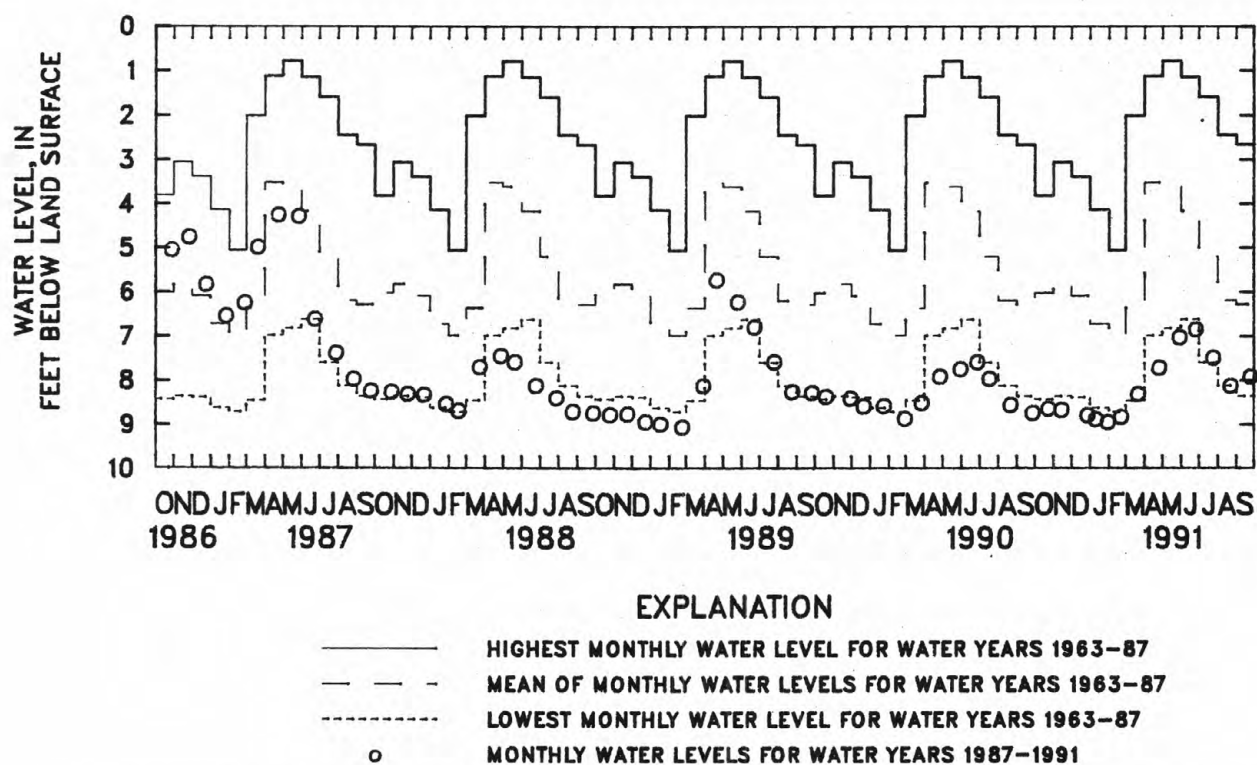


Figure 6.--Water levels for well 134-052-06CCD2 completed in Sheyenne Delta aquifer, Richland County.

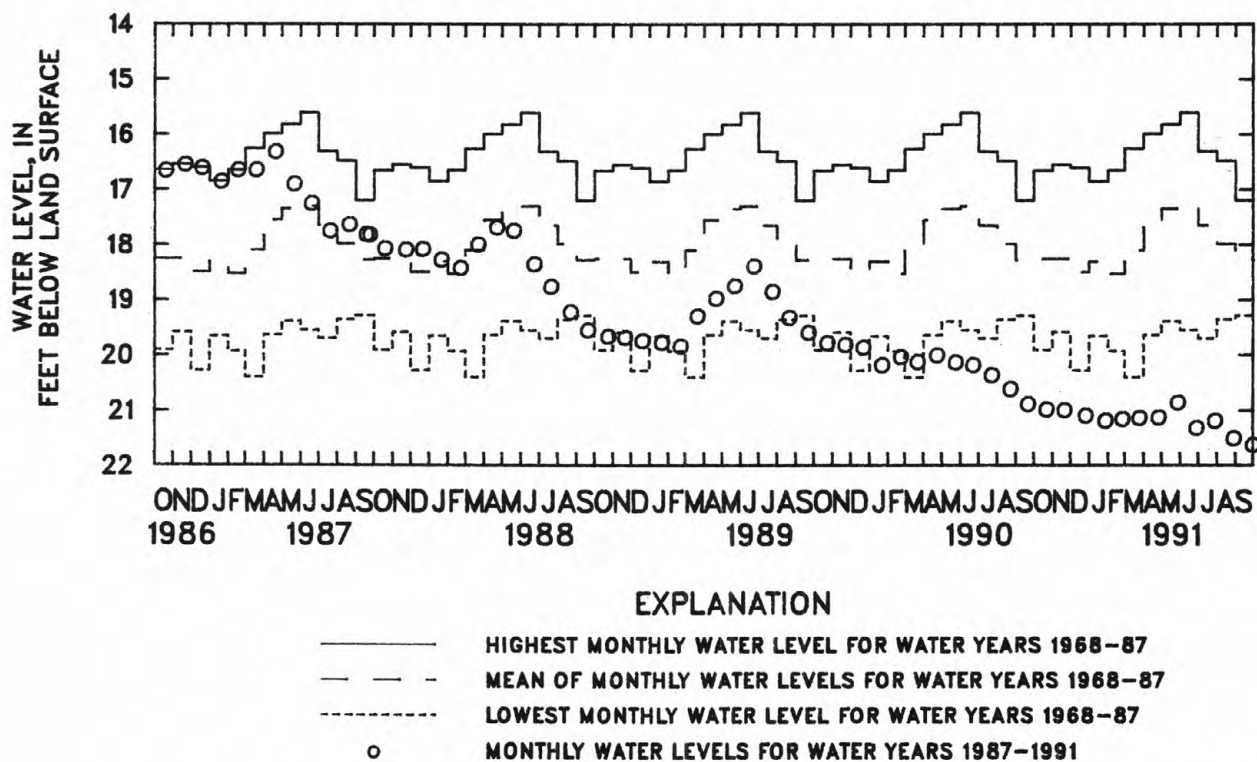


Figure 7.--Water levels for well 140-095-08AAA completed in Sentinel Butte aquifer, Stark County.

The Richland County well is located in an area where no significant ground-water pumping occurs (D. P. Ripley, North Dakota State Water Commission, oral commun., 1990); fluctuations in the water level mainly are a result of climatic conditions. Water levels in the Richland County well were near normal (fig. 6) until June 1987. However, lack of precipitation, especially during April and June 1987, probably caused the near record low water levels by the end of the 1987 water year. Lack of precipitation and the ensuing drought conditions during the spring of 1988 resulted in very little recovery in water level. From April 1988 through February 1989 new record low monthly water levels were measured.

The Richland County well is in the National Weather Service southeast climatological division where flooding occurred during April 1989. The water-level recovery was about 3 feet from the all-time record low set in February 1989 to the maximum in April, but as the drought continued, water levels again declined to near record lows by the end of the 1989 water year. The continued drought conditions in the 1990 water year resulted in monthly water levels similar to those measured during the 1988 water year. Above normal precipitation in April, May, and June 1991 resulted in a greater recovery of water level than during the 1990 water year. Although still well below the mean monthly water levels, the water level measured in September 1991 is the highest measured for that month since 1987.

Water from the Sentinel Butte aquifer generally is used for livestock watering and domestic supplies (Henry Trapp, Jr., and M. G. Croft, 1975, Geology and ground-water resources of Hettinger and Stark Counties, North Dakota: North Dakota State Water Commission, County Ground-Water Studies 16, Part I, 51 p.). Generally low yield and large dissolved-solids concentration of the water make the Sentinel Butte aquifer unsuitable for irrigation. Thus, changes in water levels in the Stark County well generally reflect climatic conditions rather than pumping-induced stresses.

Water levels in the Stark County well remained above or near normal through March of 1988 (fig. 7). The extreme deficiency in precipitation in April 1988, when most locations in the southwest climatological division reported either no precipitation or only a trace for the month (normal precipitation for April in the southwest division is 1.5 inches), contributed to the rapid decline in water level from April through September 1988. In the southwest division during April through September 1988, each month had less than normal precipitation. The total precipitation for April through September 1988 was about 6.5 inches, or only 50 percent of normal. The continued drought conditions resulted in record low or near record low water levels from September 1988 through February 1989. Although the water levels increased from March through June 1989, they remained more than a foot below normal and declined to a new record low for September at the end of the 1989 water year.

Although the precipitation in the southwest division during October 1989 was much greater than normal, it had little apparent effect on the water level in the Stark County well other than perhaps temporarily slowing the decline in the water levels. Precipitation in the division was near normal during November and December. Beginning in January, precipitation was less than normal and averaged only 60 percent of normal for the first 5 months of 1990. Very little, if any, normal spring-time recovery of the water levels occurred in the well. Although June precipitation averaged slightly greater than normal in the division, precipitation during the last 3 months of the water year only averaged 50 percent of normal. During the 1990 water year, 9 of the 12 monthly water-level measurements were new record low values.

Average precipitation in the southwest climatological division during the first 6 months of the 1991 water year was 54 percent of normal. Similar to the previous water year, there was very little, if any, normal springtime recovery of water level. April, June, and September had greater than normal precipitation, but July and August precipitation was less than normal. Although slight increases in water level occurred in May and July, new record low water levels were measured for every month of the 1991 water year. The water level measured in September was a new all-time record low for the 24-year period of record.

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 national or regional water-quality planning and management. The 500 or so sites in NASQAN generally are 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, (2) to aid in the description of the areal variability of water quality in the Nation's rivers, (3) to detect changes or trends with time in the pattern of occurrence of water-quality characteristics, and (4) to provide 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.

EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1991 water year that began October 1, 1990, and ended September 30, 1991. 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 1, 2, and 3. 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 stream site 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 systems 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 North Dakota, for water-quality stations where streamflow or water level are not collected on a regular basis.

Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in U.S. Geological Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream 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 indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation shows 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 06342500, which appears just to the left of the station name, includes the two-digit part number "06" plus the six-digit downstream-order number "342500." 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 LOCATION paragraph of the station description (see fig. 8).

Local Well Numbers

In order to compare data for wells in other publications in North Dakota, such as the county ground-water studies, the wells in this report also are numbered according to a system based on the location in the public-land classification of the U.S. Bureau of Land Management. The system is illustrated in figure 9. The first number denotes the township north of a base line, the second number denotes the range west of the fifth principal meridian, and the third numeral denotes the section in which the well is located. The letters A, B, C, and D designate, respectively, the northeast, northwest, southwest, and southeast quarter section, quarter-quarter section, and quarter-quarter-quarter section (10-acre tract). For example, well 139-049-15ADC is in the SW $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ sec. 15, T. 139 N., R. 049 W. Consecutive terminal numbers are added if more than one well is recorded within a 10-acre tract.

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 and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records. Locations of all complete-record and crest-stage partial-record stations for which data are given in this report are shown in figure 1.

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 relationships 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 relationship 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.

Continuous records of stage are obtained with analog recorders that trace continuous graphs of stage, with digital recorders that punch stage values on paper tapes at selected time intervals, with electronic data loggers that store data on an electronic chip, or with satellite data platforms that store data electronically and transmit the data periodically via satellite to a computer based data processing facility. Measurements of discharge are made with current meters using methods adopted by the U.S. 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.

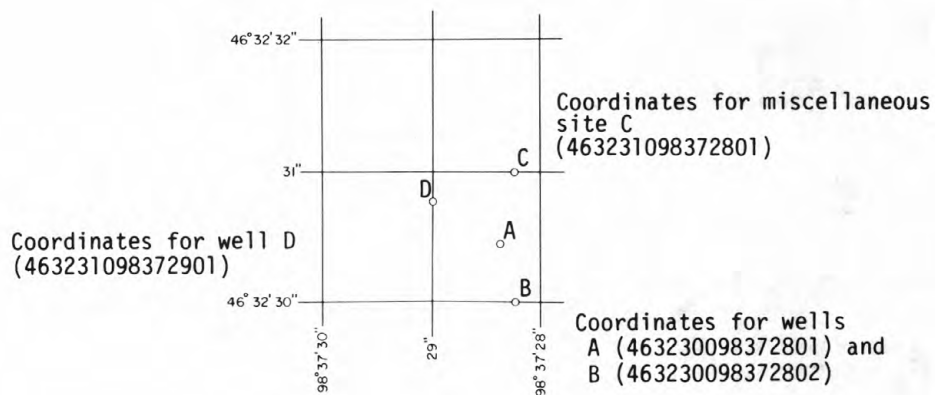


Figure 8.--System for numbering wells and miscellaneous sites (latitude and longitude).

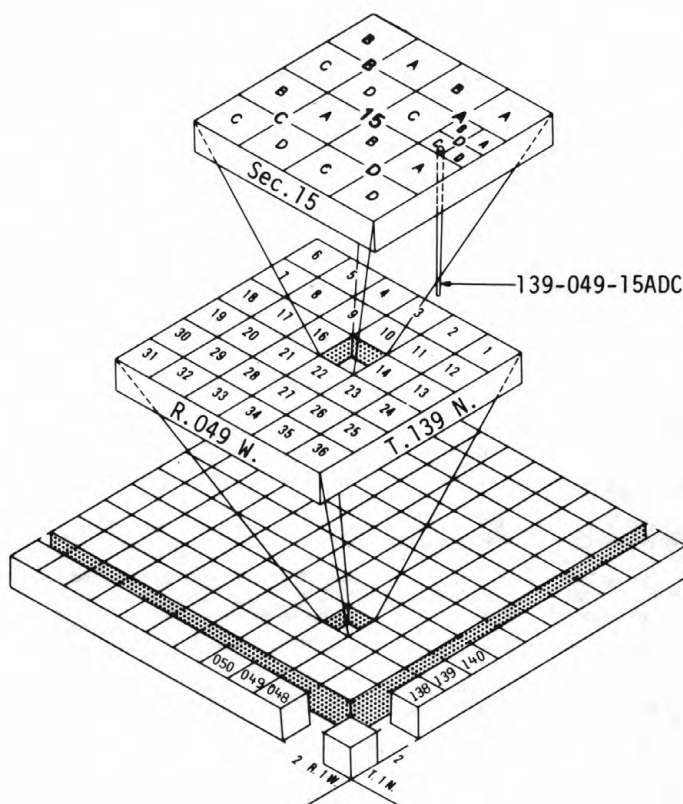


Figure 9.--System for numbering wells and miscellaneous sites (township and range).

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 relationship 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 relationship changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relationship. Even when this is done, the contents computed may become increasingly in error as the lapsed time since the last survey increases. Discharges over lake or reservoir spillways are computed from stage-discharge relationships 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

Streamflow data in this report are presented in a new format that is considerably different from the format in data reports prior to the 1991 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water-data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of four parts, the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and a summary statistics table that includes statistical data of annual, daily, and instantaneous flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration.

Station manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; 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 gaging station 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 records have been published 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 flow at it can reasonably be considered equivalent to flow at the present station.

REVISED RECORDS.--Because of new information, published records 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 will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a REMARKS paragraph 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, and to conditions that

affect natural flow at the station. In addition, information may be presented pertaining to average discharge data for the period of record; to extremes data for the period of record and the current year; 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 U.S. Geological Survey by a cooperating organization are identified here.

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.

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 (address given on the back of the title page of this report) to determine if the published records were ever revised after the station was discontinued. Of course, if the data for a discontinued station 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.

Headings for AVERAGE DISCHARGE, EXTREMES FOR PERIOD OF RECORD, AND EXTREMES FOR CURRENT YEAR have been deleted and the information contained in these paragraphs, except for the listing of secondary instantaneous peak discharges in the EXTREMES FOR CURRENT YEAR paragraph, is now presented in the tabular summaries following the discharge table or in the REMARKS paragraph, as appropriate. No changes have been made to the data presentations of lake contents.

Data table of daily mean values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month; the line headed "MEAN" gives the average flow in cubic feet per second for the month; and the lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for each month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"); or in inches (line headed "IN."); or in acre-feet (line headed "AC FT"). Figures for cubic feet per second per square mile and runoff in inches or in acre-feet may be omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. At some stations monthly and (or) yearly observed discharge are adjusted for reservoir storage or diversion, or diversion data or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEARS _____, BY WATER YEAR (WY)," and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

Summary statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly, daily, and instantaneous flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS _____," will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (See line headings below.), except for the "ANNUAL 7-DAY MINIMUM" statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date and water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily and instantaneous extremes in the designated-period column may not be within the selected water years listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data also are given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily mean values of discharge for the year. At some stations the annual total discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes. At least 5 complete years of record must be available before this statistic is published for the designated period.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

INSTANTANEOUS PEAK FLOW.--The maximum instantaneous discharge occurring for the water year or for the designated period. Note that secondary instantaneous peak discharges above a selected base discharge are stored in District computer files for stations meeting certain criteria. Those discharge values may be obtained by writing to the District Office. (See address on back of title page of this report.)

INSTANTANEOUS PEAK STAGE.--The maximum instantaneous stage occurring for the water year or for the designated period. If the dates of occurrence for the instantaneous peak flow and instantaneous peak stage differ, the REMARKS paragraph in the manuscript or a footnote may be used to provide further information.

INSTANTANEOUS LOW FLOW.--The minimum instantaneous discharge occurring for the water year or for the designated period.

ANNUAL RUNOFF (AC-FT).--Indicates the depth, in acre-feet, to which the drainage area would be covered if all the runoff for the year were uniformly distributed on it.

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

ANNUAL RUNOFF (INCHES).--Indicates that depth to which the drainage area would be covered if all the runoff for the year were uniformly distributed on it.

10 PERCENT EXCEEDS.--The discharge that is exceeded by 10 percent of the flow for the designated period.

50 PERCENT EXCEEDS.--The discharge that is exceeded by 50 percent of the flow for the designated period.

90 PERCENT EXCEEDS.--The discharge that is exceeded by 90 percent of the flow for the designated period.

Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in two tables. The first is a table of annual maximum stage and discharge at crest-stage stations, and the second is a table of discharge measurements at low-flow partial-record stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual State data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e-Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

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 their true values; "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 cubic foot per second; to the nearest tenth between 1.0 and 10 cubic feet per second; to whole numbers between 10 and 1,000 cubic feet per second; and to three significant figures for more than 1,000 cubic feet per second. 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.

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 is on file in the North Dakota District office. Also, most of the daily mean discharges are in computer-readable form and have been analyzed statistically. An example of a computer listing of annual peak discharges for the Knife River at Hazen, N.Dak., gaging station (06340500) is shown in figure 10. An example of the computer generated Log-Pearson Type III annual peak-flow frequency analysis for these data, following the U.S. Water Resources Council guidelines in Bulletin 17B, is shown in tabular form by figure 11 and shown graphically by figure 12.

WATER RESOURCES DATA - NORTH DAKOTA, 1991

STATION		06340500		KNIFE RIVER AT HAZEN, ND			
AGENCY:	USGS	STATION LOCATOR		DRAINAGE AREA:		2240.00	SQ MI
STATE:	38	LAT. LONG.		CONTRIBUTING			
COUNTY:	057	471706 1013726		DRAINAGE		2240.00	SQ MI
DISTRICT:	38			GAGE DATUM:		1712.35	(NGVD)
				BASE DISCHARGE:		1500.00	CFS

WATER YEAR	DATE	PEAK DISCHARGE (CFS)	DISC CODES	GAGE HEIGHT (FT)	GH CODES	MAX GAGE HEIGHT (FT)	DATE	GH CODES
1930	02/21/30	3070.00		23.20	1			
1931	09/22/31	1450.00		11.60				
1932	06/14/32	1300.00		11.10				
1933	03/17/33	2200.00		14.50				
1938	07/05/38	7540.00		23.00				
1939	03/24/39	9300.00		24.47				
1940	07/29/40	1150.00		10.92				
1941	06/09/41	4110.00		20.23				
1942	06/07/42	3120.00		17.10				
1943	03/26/43	26500.00		26.30				
1944	04/03/44	8010.00		23.39				
1945	03/15/45	8690.00		23.99				
1946	03/03/46	3500.00		19.30	1			
1947	06/25/47	6000.00		21.70	2	21.95	03/25/47	1
1948	03/24/48	7070.00		23.62	1			
1949	04/06/49	7760.00		23.30	2	24.10	04/03/49	1
1950	04/17/50	22700.00		25.93				
1951	03/30/51	9000.00		25.36	1			
1952	04/07/52	20200.00		25.83				
1953	06/14/53	3440.00		17.31				
1954	04/08/54	3880.00		18.06				
1955	03/13/55	1400.00	2	11.35				
1956	03/21/56	6630.00		23.76	1			
1957	03/01/57	1590.00		12.49	1			
1958	03/28/58	3500.00	2	19.82	1			
1959	03/24/59	4930.00		20.14				
1960	03/27/60	7230.00		23.13	1			
1961	03/03/61	488.00		9.62	12	9.72	03/02/61	1
1962	05/31/62	3860.00		17.48				
1963	06/10/63	1050.00		9.63				
1964	06/18/64	5170.00		20.17				
1965	04/15/65	3330.00		15.99				
1966	06/24/66	35300.00		27.01				
1967	03/25/67	7980.00		23.88				
1968	03/06/68	1800.00		18.37	1			
1969	04/07/69	11800.00		24.75				
1970	05/11/70	8180.00		23.83				
1971	03/17/71	4320.00		18.79	1			
1972	03/15/72	19000.00		26.17	1			
1973	03/02/73	3900.00		21.44	1			
1974	03/03/74	1350.00		14.28	1			
1975	05/01/75	6600.00		22.60	2	23.37	04/24/75	1
1976	03/19/76	3000.00		18.00	1			
1977	06/19/77	1200.00		9.75	2	11.69	03/11/77	1
1978	03/27/78	11000.00		25.10	1			
1979	04/18/79	5440.00		20.26				
1980	06/15/80	1620.00		10.58				
1981	02/18/81	900.00		9.92	1			
1982	03/31/82	10500.00		25.14	1			
1983	03/13/83	5300.00		23.00	1			
1984	03/21/84	2500.00		14.50	1			
1985	05/13/85	1540.00		10.10				
1986	03/04/86	8800.00		24.00				
1987	03/23/87	8550.00		23.80				
1988	03/24/88	450.00		7.47	1			
1989	03/11/89	1000.00		11.90				
1990	08/25/90	1940.00		10.84				
1991	03/14/91	100.00		3.48		5.24	03/05/91	1

Figure 10.--Example of computer printout of annual peak discharges
for the period of record on the Knife River at Hazen

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

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

RUN-DATE 3/23/92 AT 943 SEQ 1.0001

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

STATION - 06340500 /USGS KNIFE RIVER AT HAZEN, ND 1930-1991 06340500 /USGS

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

-- YEARS OF RECORD -- SYSTEMATIC HISTORIC	HISTORIC PEAKS	GENERALIZED SKEW	STD. ERROR OF GENERAL. SKEW	SKEW OPTION	GAGE BASE DISCHARGE	USER-SET OUTLIER CRITERIA HIGH OUTLIER LOW OUTLIER
58 0	0	-0.400	--	WRC WEIGHTED	0.0	-- --

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

WCF134I-NO SYSTEMATIC PEAKS WERE BELOW GAGE BASE. 0.0
WCF198I-LOW OUTLIERS BELOW FLOOD BASE WERE DROPPED. 1 177.1
WCF163I-NO HIGH OUTLIERS OR HISTORIC PEAKS EXCEEDED HHBASE. 64755.0

ANNUAL FREQUENCY CURVE PARAMETERS -- LOG-PEARSON TYPE III

	FLOOD BASE DISCHARGE	FLOOD BASE EXCEEDANCE PROBABILITY	LOGARITHMIC MEAN	LOGARITHMIC STANDARD DEVIATION	LOGARITHMIC SKEW
SYSTEMATIC RECORD	0.0	1.0000	3.5823	0.4724	-0.606
W R C ESTIMATE	177.1	0.9828	3.5995	0.4317	-0.181

ANNUAL FREQUENCY CURVE ORDINATES -- DISCHARGES AT SELECTED EXCEEDANCE PROBABILITIES

ANNUAL EXCEEDANCE PROBABILITY	W R C ESTIMATE	SYSTEMATIC RECORD	'EXPECTED PROBABILITY' ESTIMATE	95-PCT CONFIDENCE LIMITS FOR W R C ESTIMATES	
				LOWER	UPPER
0.9950	--	125.9	--	--	--
0.9900	--	190.0	--	--	--
0.9500	737.7	540.4	702.8	502.3	998.2
0.9000	1092.8	900.7	1054.4	786.1	1426.6
0.8000	1739.6	1602.8	1709.6	1323.2	2196.9
0.5000	4097.0	4263.6	4097.0	3299.0	5095.6
0.2000	9248.6	9711.9	9391.6	7316.1	12181.6
0.1000	13921.1	14090.8	14344.1	10697.7	19254.2
0.0400	21265.3	20103.1	22319.4	15727.4	31196.5
0.0200	27772.0	24745.6	29813.7	19992.0	42404.8
0.0100	35151.2	29416.1	38462.6	24674.7	55675.6
0.0050	43450.6	34075.0	48909.9	29792.3	71187.1
0.0020	55913.3	40163.3	63822.7	37249.8	95443.4

Figure 11.--Example of computer printout for annual peak flow frequency analysis for the Knife River at Hazen.

STATION - 06340500

/USGS

KNIFE RIVER AT HAZEN, ND

1930-1991

06340500

/USGS

ANNUAL
PEAK
MAGNITUDES
/LOG
SCALE/
/

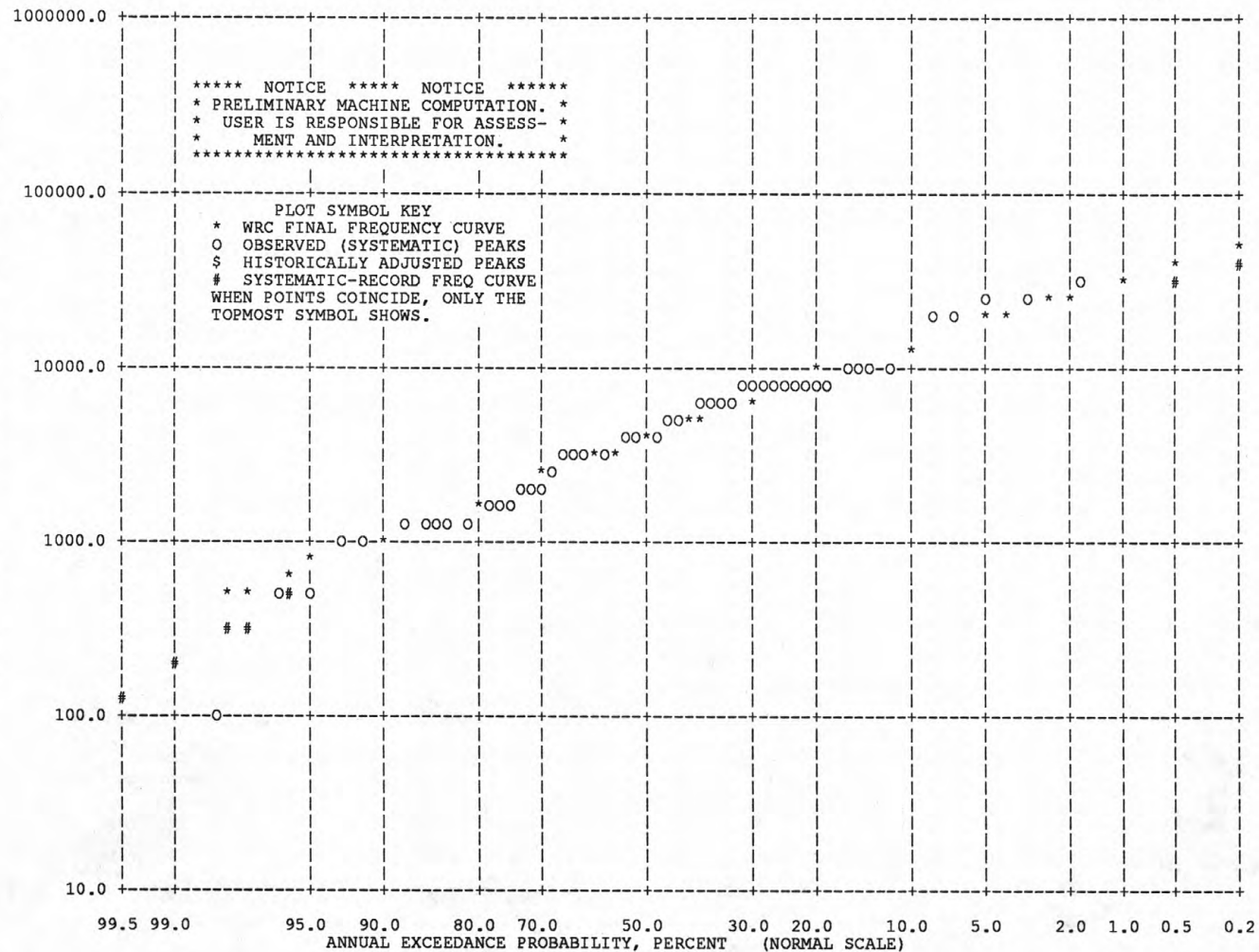


Figure 12.--Example of computer printout for peak flow frequency curve for the Knife River at Hazen

Current flow data at U.S. Geological Survey gaging stations are available upon request, usually within less than one month following retrieval of the recorded data from the field site. After primary analysis the data are available in a computer format that shows hourly water level fluctuations, adjustments required for accurate computation of daily flows, and other details of the record analysis (see fig. 13). In this "primary computation" form, the data are considered provisional and subject to revision until published.

Many other statistics and data formats are available upon request. The information generally is available on a timely basis at no charge to the user; however, large requests or those specifically tailored to individual data-user's needs may be provided at a nominal fee. Information on the availability of the unpublished information or on the results of statistical analyses of the published records may be obtained from the office whose address is given on the back of the title page of this report.

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 one 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, a series of discrete values punched at short intervals on a paper tape, or electronically stored data from a data logger or satellite data platform. 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 on the quality of surface water appear in this report are shown in figure 2.

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.

On-Site Measurements and Sample Collection

In obtaining water-quality data, a major concern needs to be assuring that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, specific conductance, pH, and dissolved oxygen, need to be made on-site 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 under "PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS" which appears at the end of the introductory text. Also, detailed information on collecting, treating, and shipping samples may be obtained from the U.S. Geological Survey North Dakota 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 (see definitions) 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 digital 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. More detailed records (hourly values) may be obtained from the U.S. Geological Survey North Dakota 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. 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, minimum, and mean temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are published with the water-quality records for each surface-water station in this report.

06340500
 KNIFE RIVER AT HAZEN, ND
 OUTPUT PARAMETER 00060 STORE STATISTIC(S) 00003
 PROVISIONAL DATA FOR WATER YEAR ENDING SEPT. 30, 1991

UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY - WATER RESOURCES DIVISION
 PRIMARY COMPUTATIONS OF GAGE HEIGHT AND DISCHARGE
 DATE PROCESSED: 03-27-1992 @ 10:15 BY HARKNESS
 INPUT DD: FROM DCP

STATE 38 DIST 380
 RATINGS USED --
 STNRD 17.0 09/30/90 (2400)

TEST DIFF:***** PUNCH INTERVAL: 90 MIN

DATE	MAX GH /DISCH <TIME>	MIN GH /DISCH <TIME>	MEAN GH	MEAN DISCH	SHIFT ADJ	DATUM CORR	STAGE, IN HUNDREDTHS OF FEET, AT INDICATED HOURS															
-----							0100 1300	0200 1400	0300 1500	0400 1600	0500 1700	0600 1800	0700 1900	0800 2000	0900 2100	1000 2200	1100 2300	1200 2400				
06/28/91	1.64 39 <1500>	1.54 33 <0100>	1.59	36	0.01W	-0.01	154 162	154 163	155 164	155 164	155 164	156 163	158 162	158 162	158 162	158 161	159 161	160 161				
06/29/91	1.83 52 <2300>	1.58 35 <0500>	1.68	42	0.01W	-0.01	160 168	160 171	159 176	159 179	158 179	158 179	158 179	158 181	158 181	159 181	162 183	164 183				
06/30/91	1.87 55 <1000>	1.83 52 <0100>	1.86	54	0.01W	-0.01	183 187	184 187	184 187	184 187	184 187	185 187	185 187	185 187	186 186	186 186	187 186	187 186				
07/01/91	1.86 54 <0100>	1.76 47 <2000>	1.81	50	0.01W	-0.01	186 180	186 180	186 179	186 178	185 178	185 177	184 177	184 176	183 176	182 176	180 176	180 176				
07/02/91	1.76 47 <0100>	1.66 40 <2100>	1.71	43	0.01W	-0.01	176 170	176 169	175 168	175 168	175 168	174 167	174 167	173 166	172 166	171 166	170 166					
07/03/91	1.65 39 <0100>	1.58 35 <2200>	1.62	38	0.01W	-0.01	165 162	164 162	164 161	164 161	164 160	164 160	164 159	164 159	164 159	164 158	163 158	163 158				
07/04/91	1.57 35 <0100>	1.50 31 <2100>	1.53	33	0.01W	-0.01	157 153	157 153	156 153	156 152	156 152	155 152	155 151	155 151	154 150	154 150	154 150	154 150				
07/05/91	1.49 30 <0100>	1.44 28 <2300>	1.47	29	0.01W	-0.02	149 147	149 147	149 147	149 147	149 147	148 146	148 146	148 145	148 145	148 145	148 144	148 144				
07/06/91	1.44 28 <0100>	1.39 25 <2100>	1.41	26	0.01W	-0.02	144 141	143 141	143 140	143 140	142 140	142 140	141 140	141 140	141 139	141 139	141 139	141 139				
07/07/91	1.38 25 <0100>	1.32 22 <2200>	1.35	24	0.01W	-0.02	138 135	138 135	138 134	138 134	137 134	137 133	136 133	136 133	136 133	136 132	135 132	135 132				
07/08/91	1.32 22 <0100>	1.28 20 <2200>	1.30	21	0.01W	-0.02	132 130	132 130	131 130	131 130	131 129	131 129	131 129	130 129	130 129	130 128	130 128	130 128				
PERIOD	1.87 55	1.28 20					TIME CORRECTION 0.0															

NOTE. SYMBOLS USED ABOVE HAVE THE FOLLOWING MEANINGS --
 W - SHIFT VARIES BY TIME AND VALUE - V SHIFT

Figure 13.--Example of "primary computation" computer printout for the Knife River at Hazen.

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. 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

Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter ($\mu\text{g/L}$) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter (ng/L). Present data above the $\mu\text{g/L}$ level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey will begin using new trace-element protocols in the near future.

Samples for biochemical-oxygen demand (BOD) and samples for indicator bacteria are analyzed locally. Sediment samples are analyzed in the U.S. Geological Survey laboratory in Iowa City, Iowa or Rolla, Mo. All other samples are analyzed in the U.S. Geological Survey laboratory in Arvada, Colo., or the North Dakota State Water Commission laboratory in Bismarck, N.Dak. Methods used in analyzing sediment samples and computing sediment records are given in TWRI, Book 5, Chap. C1. Methods used by the U.S. Geological Survey laboratory are given in TWRI, Book 1, Chap. D2; Book 3, Chap. C2; Book 5, Chap. A1, A3, and A4.

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, and dissolved oxygen 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.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor temperature recorder, sediment pumping sampler, or other sampling device is in operation at a station.

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 U.S. 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.

When the water-quality data for this report was prepared for publication, not all of the parameter values requested from the analyzing laboratories were available. As these data values are received the computer files will be updated, but no attempt to publish these data will be made.

As part of the quality assurance procedures for the samples analyzed at the North Dakota State Water Commission laboratory, about 5 percent of the samples include a "split" sample which is sent to the U.S. Geological Survey laboratory in Arvada. The "split" samples analyzed in Arvada are not included in this report, but can be obtained upon request from the U.S. Geological Survey North Dakota District office.

Remark Codes

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

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
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)
ND	Not detected. No colonies were present on the least dilute sample prepared.

NOTE: 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.

Records of Ground-Water Levels

Only water-level data from a network of selected observation wells are given in this report. These data are intended to provide a sampling and historical record of water-level changes in the most important aquifers. Locations of the observation wells in this selected network in North Dakota are shown in figure 3.

The complete statewide network included more than 800 wells during 1991. About one-half of these wells were measured annually and the others at a variety of frequencies. Forty wells were equipped with continuous water-level recorders.

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 township-range 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. 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 or a larger unit.

Data Presentation

Each well record consists of two parts, the station description and the data table of water levels measured 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 measurement 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 feet 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.

REMARKS.--This entry describes factors that may influence the water level in a well or the measurement of the water level. It should identify wells that also are water-quality observation wells, and may be used to acknowledge the assistance of local (non-Survey) observers.

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 U.S. Geological Survey, may be noted.

EXTREMES FOR PERIOD OF RECORD.--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurrence.

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 levels are listed. For wells equipped with recorders, only abbreviated tables are published; only water-level lows are listed for every fifth day and at the end of the month (EOM). The highest and lowest 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. Taped measurements are not published for wells equipped with continuous recorders. Missing records are indicated by dashes in place of the water level.

Availability of Data

All water-level measurements and recorder data are stored in computer as well as office files and are available in a tabular listing similar to those published in this report. However, ground-water data usually are more easily analyzed when displayed graphically. Examples of computer-generated hydrographs for water levels in three wells published in this report are presented in figures 14a-16.

The hydrograph for well 139-078-27CBB in the McKenzie aquifer in Burleigh County is shown in figures 14a and 14b, and the reported water use for irrigation from the McKenzie aquifer (J. A. Paczkowski, North Dakota State Water Commission, oral commun., 1992) is shown in table 4. Very little fluctuation in water level occurred from 1963 until about 1972 (fig. 14a), and water-use data for the McKenzie aquifer (table 4) indicate that irrigation was insignificant until about 1972. Only annual water-level measurements at the end of the year were made during 1972-74 and the effect of irrigation withdrawals on the aquifer during the irrigation season cannot be detected on the hydrograph. Beginning in 1975, the frequency of water-level measurements was increased, and the annual declines in water level during the irrigation season and the recovery during the winter and spring can be seen in figure 14b. The largest annual decline in the water level, more than 7 feet, during the period of record for this well occurred during 1977. This decline corresponds to the largest reported water use for irrigation from the McKenzie aquifer (table 4).

Due to above normal precipitation during the 1986 irrigation season, reported water use for irrigation from the McKenzie aquifer (table 4) was the lowest since 1969. Reported water use also was less in 1987 than any year since 1970. The section of hydrograph for the 1986 through 1987 period for well 139-078-27CBB (see fig. 14b) does not show the decline in water level, during the irrigation season, that has become typical in recent years of larger withdrawals. Due to the drought of 1988, irrigation withdrawals increased to about 600 acre-feet in the McKenzie aquifer. With this increase in ground-water withdrawal from the aquifer, well 139-078-27CBB again experienced a significant decline during the 1988 irrigation season and a subsequent water-level recovery. Although the drought continued in 1989, it was not as severe as during 1988, reported water was not as great, and there was less drawdown. During the 1990 and 1991 water years, the continued drought resulted in lower water levels following the typical post-irrigation recovery than has been recorded in the last ten years.

Table 4.--Reported water use, by year, for irrigation from the McKenzie aquifer, in acre-feet

Year	Water use	Year	Water use	Year	Water use	Year	Water use
1969	0	1975	182	1981	230	1987	118
1970	75	1976	338	1982	348	1988	600
1971	150	1977	781	1983	486	1989	412
1972	436	1978	183	1984	624	1990	302
1973	416	1979	314	1985	477	1991	e342
1974	400	1980	475	1986	20		

e Estimated.

The 1987 and 1991 water year hydrographs of water levels in well 134-052-06CCD2 completed in the Sheyenne Delta aquifer in Richland County and equipped with a continuous recorder is shown in figure 15. The recorded daily maximum depth to water and the periodic water-level measurements are shown. The periodic measurements were made with a steel tape. A dotted line was drawn between the periodic measurements to illustrate the definition of changes indicated by periodic taped measurements as compared to definition of changes in water level that is provided when continuous recorder data are available. Although the general trend in water-level changes is provided by the periodic measurements (fig. 15), the water level in this well may fluctuate more than 2 feet between measurements. Straight-line interpolation between measurements would have been in error by more than one foot at this site at times during the 1987 water year. During the 1991 water year, when there was less change in water level, straight-line interpolation between periodic measurements approximates the water level between measurements better than during a year of greater fluctuations, such as the 1987 water year.

Ground-water data are recorded and stored as water levels in feet below land surface. Because the elevation of land surface is determined for all well sites, it is possible to relate water level below land surface to elevation above National Geodetic Vertical Datum of 1929. Both vertical scales are used on the hydrographs, water level below land surface on the right margin and water-level elevation above National Geodetic Vertical Datum of 1929 on the left margin (figs. 14a-16). Gage datum at lake and reservoir sites also can be directly related to National Geodetic Vertical Datum; therefore, both ground-water and surface-water elevation data can be plotted on one hydrograph to show the relationship that exists between the ground-water level, and the level of water in nearby lakes and reservoirs. The hydrographs for well 153-063-30CBC in Benson County and Devils Lake are shown in figure 16. Such comparison hydrographs are useful tools for analysis of ground-water/surface-water relationships.

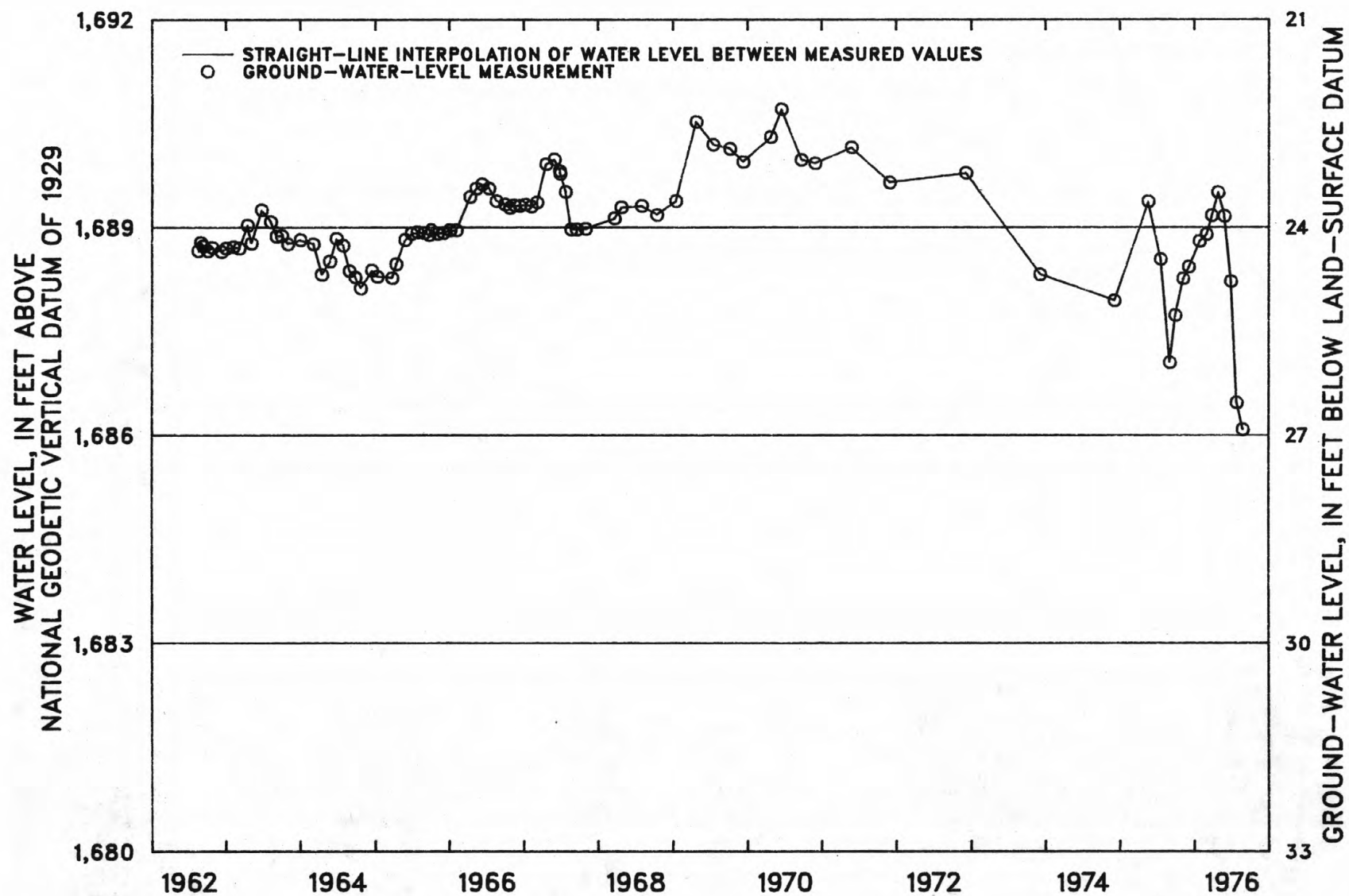


Figure 14a.--Water levels for well 139-078-27CBB completed in McKenzie aquifer, Burleigh County, 1962-76.

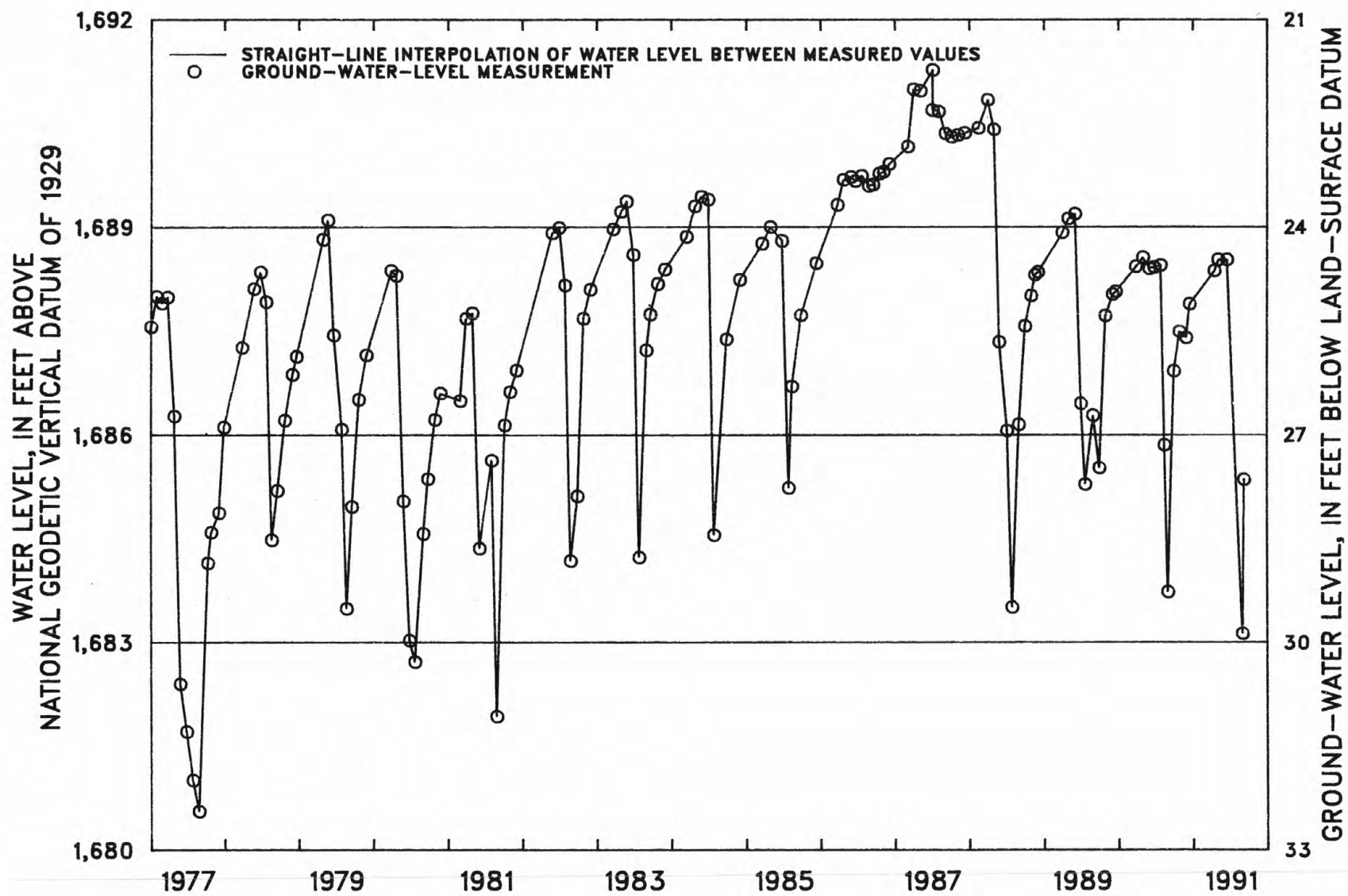


Figure 14b.--Water levels for well 139-078-27CBB completed in McKenzie aquifer, Burleigh County, 1977-91.

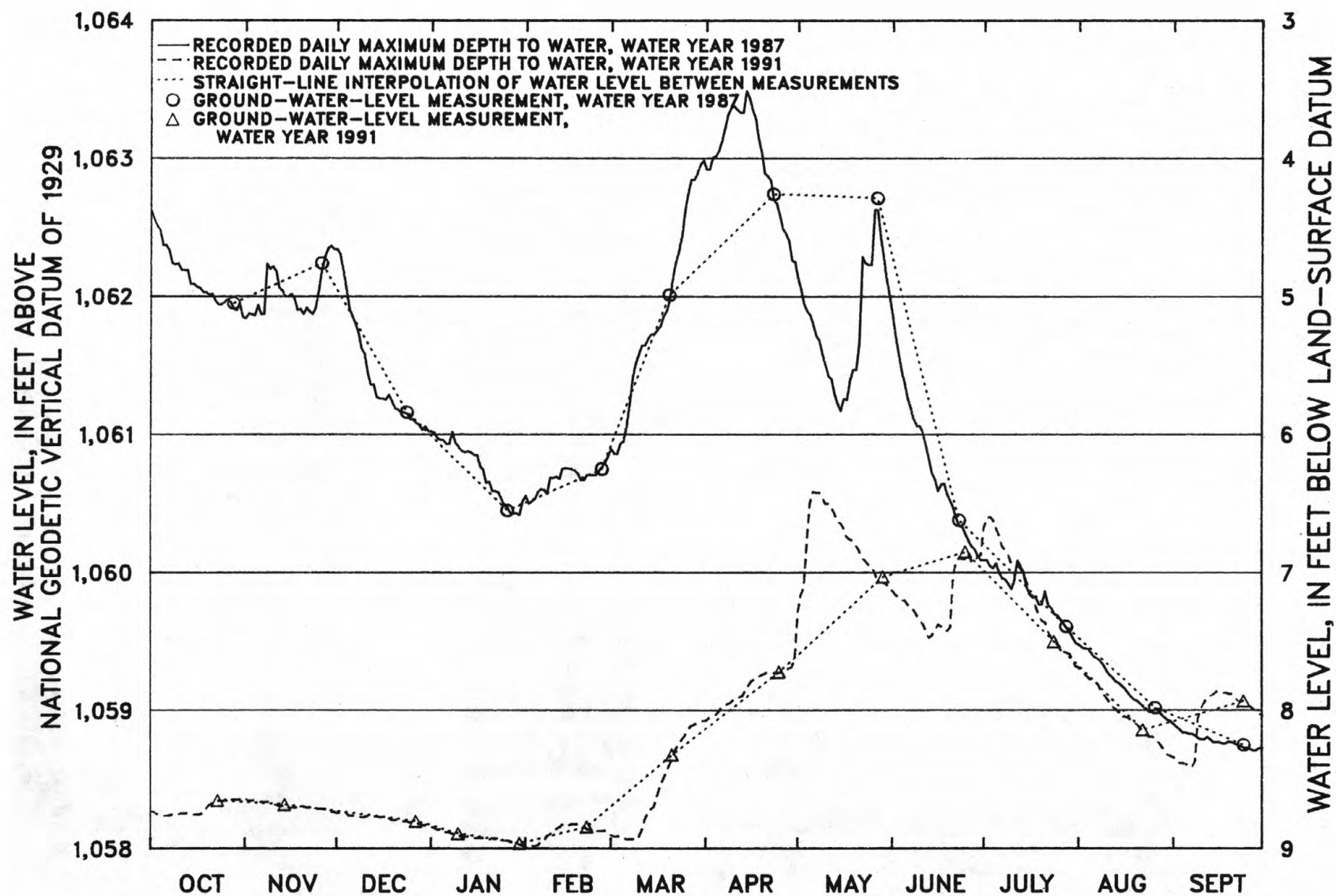


Figure 15.--Water levels for recorder well 134-052-06CCD2 completed in Sheyenne Delta aquifer, Richland County, water years 1987 and 1991.

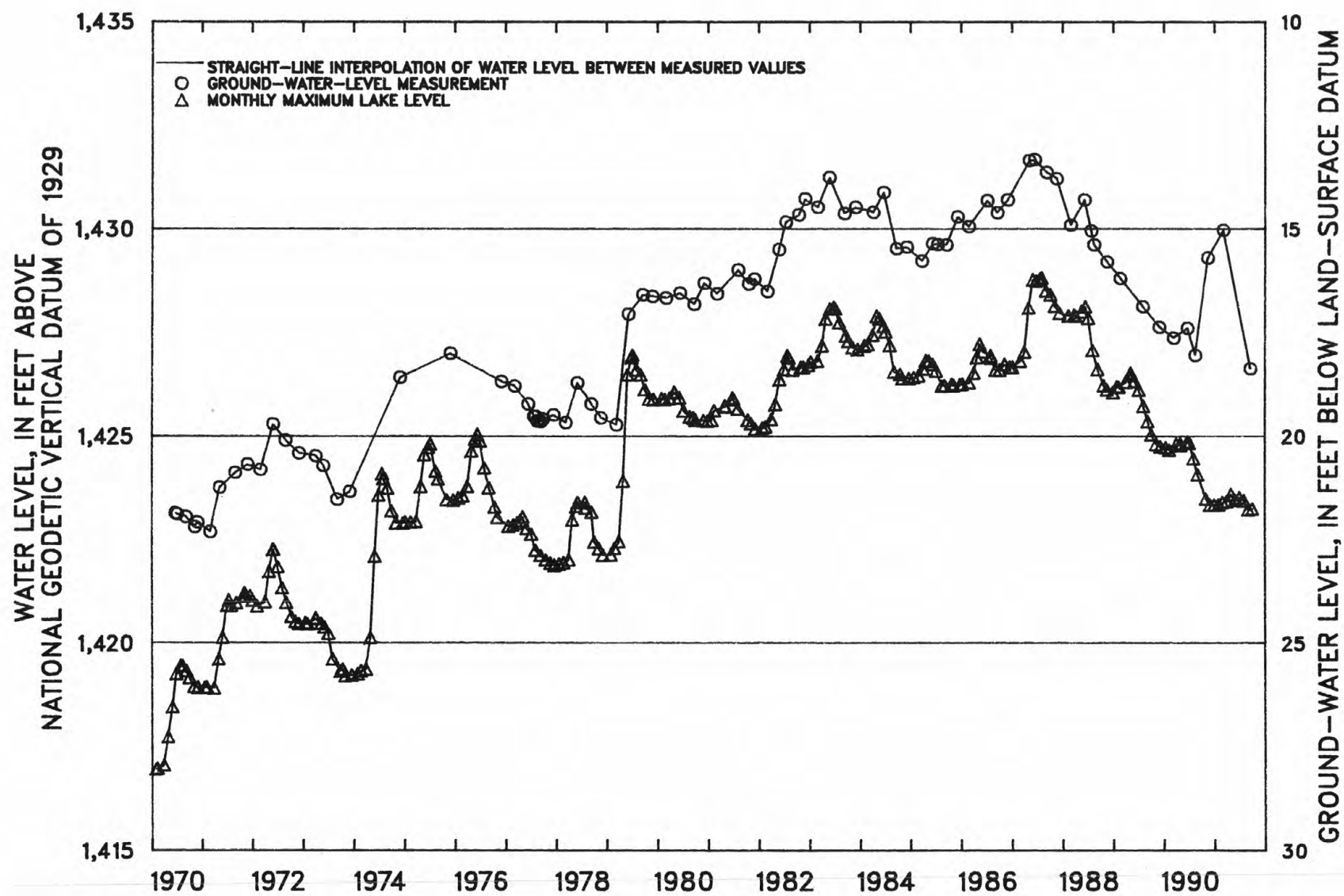


Figure 16.--Water levels for well 153-063-30CBC completed in Spiritwood aquifer, Benson County, and monthly maximum water levels for Devils Lake, 1970-91.

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 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 mostly as a part of special studies in specific areas. Consequently, a number of chemical analyses are presented for some counties but none are presented for others. 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 at the end of the introductory text. The values 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 casing.

Data Presentation

The records of ground-water quality are published in a section titled QUALITY OF GROUND WATER immediately following the ground-water-level records. Data for quality of ground water are listed alphabetically by County and 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, depth of well, 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 U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by numerous State, local, private, and other Federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National Water Data Storage and Retrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

- * Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.
- * Daily Values File - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.
- * Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.
- * Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.
- * Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey
National Water Data Exchange
421 USGS National Center
Reston, VA 22092

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk; and, as noted in the introduction, on CD-ROM discs. Beginning with the 1991 water year, all water-data reports will also be available on CD-ROM discs. All data reports published for the current water year for the entire Nation, including Puerto Rico and the Trust Territories, will be reproduced on a single CD-ROM disc. Information about the availability of specific types of data or products, and user charges, can be obtained locally from each of the Water Resources Division's District offices. (See address on the back of the title page.) A limited number of CD-ROM discs will be available for sale by the Books and Open-File Reports Section, U.S. Geological Survey, Federal Center, Box 25425, Denver, CO 80225.

DEFINITION OF TERMS

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

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

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

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

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

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warmblooded 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 °C plus or minus 0.2 °C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine 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 °C plus or minus 1.0 °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 (or bottom material) is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

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

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).

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

Color unit 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.

Contents 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.

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

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

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

Cubic foot per second-day (ft³/s) is the volume of water represented by a 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 2,445 cubic meters.

Cubic foot per second per square mile [(ft³/s)/mi²] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

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

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.

Annual 7-day minimum is the lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1-March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

Dissolved refers to that material in a representative water sample which passes through a 0.45 µm 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.

Dissolved-solids concentration 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.

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

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

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

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

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate (CaCO_3).

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

Micrograms per gram ($\mu\text{g/g}$) 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 (MG/L, $\mu\text{g/L}$) 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 represents 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 of 1929) 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.

Normal as related to meteorological data published by the National Weather Service are computed as the average value of a meteorological element over a time period. Effective January 1, 1983, the averaging period is 1951 to 1980.

Parameter code 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.

Partial-record station 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.

Particle size 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).

Particle-size classification used in this report agrees with the 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.....	.004 - .062	Sedimentation
Sand.....	.062 - 2.0	Sedimentation or sieve
Gravel.....	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic 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.

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

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

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

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

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.

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

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

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed and very close to it. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

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

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

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) \times discharge (ft^3/s) \times 0.0027.

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

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

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

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

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

Suspended (as used in tables of chemical analyses) refers to the 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 the part of a representative water-suspended sediment sample that is retained on a 0.45 um 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) dissolved and (2) total recoverable 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 μ 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) dissolved and (2) total concentrations of the constituent.

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.

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

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

Tons per day (t/day) is the quantity of a 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.)

Total discharge 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 water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" 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.

Water year in U.S. 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, 1985, is called the "1985 water year."

WDR 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 reference to previously published reports.

PUBLICATIONS OF 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. *Applications of seismic-refraction techniques to hydrologic studies*, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.
- 2-E1. *Applications of borehole geophysics to water-resources investigations*, by W. S. Keys and L. M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.
- 2-E2. *Borehole geophysics applied to ground-water investigations*, by W. Scott Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.
- 2-F1. *Applications 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-A1. *General field and office procedures for indirect discharge measurements*, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.
- 3-A2. *Measurement of peak discharge by the slope-area method*, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.
- 3-A3. *Measurements 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 procedures for gaging streams*, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.
- 3-A7. *Stage measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.
- 3-A8. *Discharge measurements at gaging stations*, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.
- 3-A9. *Measurement of time of travel 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-A11. *Measurement of discharge by moving-boat method*, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.

PUBLICATIONS OF TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 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 pages.
- 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.
- 3-A18. *Determination of stream reaeration coefficients by use of tracers*, by F. A. Kilpatrick, R. E. Rathbun, N. Yotsukura, G. W. Parker, and L. L. DeLong: USGS--TWRI Book 3, Chapter A18. 1989. 52 pages.
- 3-A19. *Levels of streamflow gaging stations*, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 27 pages.
- 3-B1. *Aquifer-test design, observation, and data analysis*, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.
- 3-B2. *Introduction to ground-water hydraulics, a 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-B4. *Regression modeling of ground-water flow*, by Richard L. Cooley and Richard L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 Pages.
- 3-B5. *Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction*, by O. L. Franke, and 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-A1. *Some statistical tools in hydrology*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. *Frequency curves*, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. *Low-flow investigations*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. *Storage analyses for water supply*, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. *Regional analyses of streamflow characteristics*, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. *Computation of rate and volume of stream depletion by wells*, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. *Methods for determination of inorganic substances in water and fluvial sediments*, by M. J. Fishman and L. C. Friedman: USGS--TWRI Book 5, Chapter A1. 1989. 545 pages.

PUBLICATIONS OF TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS--Continued

- 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-C1. *Laboratory theory and methods for sediment analysis*, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. *A modular three-dimensional finite-difference ground-water flow model*, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 7-C1. *Finite difference model for aquifer simulation in two dimensions with results of numerical experiments*, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.
- 7-C2. *Computer model of two-dimensional solute transport and dispersion in ground water*, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.
- 7-C3. *A model for simulation of flow in singular and interconnected channels*, R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.
- 8-A1. *Methods of measuring water levels in deep wells*, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.
- 8-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

05051500 RED RIVER OF THE NORTH AT WAHPETON, ND

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

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

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1942 to October 1942, March 1943 to current year. Gage-height records collected in this vicinity since 1917 are contained in reports of the U.S. Weather Bureau.

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	113	95	e82	e66	e84	e130	580	776	1050	1860	768	398
2	116	94	e86	e68	e90	e130	528	805	1600	2610	714	394
3	102	94	e90	e70	e94	e120	496	819	1530	2960	654	395
4	99	94	e98	e76	e98	e125	486	890	1220	2870	663	366
5	98	94	101	e80	e100	e130	462	920	1040	2460	678	302
6	109	91	102	e82	e100	e135	421	932	945	2030	693	311
7	109	65	102	e84	e100	e140	403	866	874	1740	731	344
8	109	68	105	e86	e100	e150	390	821	812	1620	695	638
9	109	96	105	e88	e98	e160	384	778	752	1560	657	1880
10	109	72	105	e88	e96	e175	393	718	734	1500	587	2500
11	108	74	106	e90	e94	e190	385	709	706	1450	566	2570
12	108	66	105	e90	e92	e200	361	708	670	1560	560	2220
13	109	64	103	e90	e90	e210	340	706	656	1680	541	1540
14	107	80	84	e92	e90	e240	334	690	687	1630	516	1060
15	105	81	123	e92	e90	e260	341	671	790	1540	511	932
16	108	84	137	e96	e90	e280	379	691	954	1440	688	878
17	128	85	117	e98	e90	e290	536	736	996	1350	516	687
18	119	96	e90	e96	e90	e300	609	736	881	1300	507	513
19	109	100	e80	e90	e90	e320	536	729	788	1290	504	442
20	114	103	e70	e82	e90	e360	516	724	806	1280	488	395
21	118	102	e65	e78	e92	e400	508	705	993	1210	448	437
22	131	102	e60	e76	e94	e440	500	679	1550	1180	374	532
23	149	91	e55	e76	e96	e450	495	678	1670	1120	298	542
24	134	89	e60	e74	e100	e460	490	693	1390	1050	332	507
25	143	e65	e62	e74	e105	e520	480	705	1120	1020	411	468
26	125	e60	e64	e74	e115	e600	457	702	985	968	407	474
27	122	e50	e66	e74	e125	e640	458	699	960	881	395	534
28	115	e70	e68	e74	e130	e680	443	699	914	834	393	601
29	116	e78	e66	e76	---	e720	450	725	1180	815	389	606
30	109	e80	e64	e78	---	e680	632	771	1500	805	410	600
31	97	---	e65	e80	---	623	---	830	---	794	401	---
TOTAL	3547	2483	2686	2538	2723	10258	13793	23311	30753	46407	16495	24066
MEAN	114	82.8	86.6	81.9	97.2	331	460	752	1025	1497	532	802
MAX	149	103	137	98	130	720	632	932	1670	2960	768	2570
MIN	97	50	55	66	84	120	334	671	656	794	298	302
AC-FT	7040	4930	5330	5030	5400	20350	27360	46240	61000	92050	32720	47730

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1991, BY WATER YEAR (WY)

	MEAN	298	289	269	255	263	570	1203	1008	1021	727	373	298
MAX	1247	952	820	678	687	1679	4436	3085	2675	2756	1983	1434	
(WY)	1987	1987	1987	1986	1987	1986	1969	1986	1962	1962	1962	1986	
MIN	5.72	7.40	6.60	8.81	18.0	84.3	138	22.5	90.0	65.6	53.5	2.18	
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1976	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1942 - 1991

ANNUAL TOTAL	100755	179060	
ANNUAL MEAN	276	491	542
HIGHEST ANNUAL MEAN			1477
LOWEST ANNUAL MEAN			54.0
HIGHEST DAILY MEAN	880	Mar 18	8940
LOWEST DAILY MEAN	50	Nov 27	1.7
ANNUAL SEVEN-DAY MINIMUM	62	Dec 21	1.7
INSTANTANEOUS PEAK FLOW			9200
INSTANTANEOUS PEAK STAGE			17.95
ANNUAL RUNOFF (AC-FT)	199800	355200	392600
10 PERCENT EXCEEDS	532	1120	1240
50 PERCENT EXCEEDS	198	379	350
90 PERCENT EXCEEDS	91	78	100

e Estimated.

RED RIVER OF THE NORTH BASIN

41

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT- ANCE	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	OXYGEN, DIS- SOLVED (MG/L)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	HARD- NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)
		(00061)	(00095)	(00400)	(00020)	(00010)	(00300)	(00301)	(00900)	(00915)	(00925)	(00930)
DEC 17...	1015	109	598	--	-12.5	0.0	--	--	--	--	--	--
JAN 08...	0940	86	600	--	-7.0	0.0	--	--	--	--	--	--
FEB 27...	1245	128	683	--	-4.5	1.0	--	--	--	--	--	--
MAR a11...	1630	188	535	8.1	7.0	0.5	13.6	93	250	48	32	16
APR 03...	1210	500	514	8.1	10.5	2.5	--	--	230	45	28	13
MAY 03...	0850	803	767	--	5.0	5.5	--	--	--	--	--	--
JUN 05...	0810	1060	543	--	9.5	19.0	--	--	--	--	--	--
JUL 03...	1330	2960	355	--	18.0	22.0	--	--	--	--	--	--
JUL 12...	0835	1520	623	--	20.0	23.0	--	--	--	--	--	--
AUG 22...	1000	401	498	8.5	23.0	22.5	--	--	230	41	32	14
DATE	SODIUM AD-SORP- TION RATIO	POTAS- SIUM, DIS- SOLVED (MG/L AS K)	BICAR- BONATE, FET-LAB (MG/L AS HCO3)	CAR- BONATE, FET-LAB (MG/L AS CO3)	ALKA- LINITY LAB (MG/L AS CACO3)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3)	BICAR- BONATE DIS IT FIELD (MG/L AS HCO3)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3)	SULFATE DIS- SOLVED AS SO4	CHLO- RIDE, DIS- SOLVED AS CL	FLUO- RIDE, DIS- SOLVED AS F	
	(00932)	(00931)	(00935)	(95440)	(95445)	(90410)	(39086)	(00453)	(00452)	(00945)	(00940)	(00950)
MAR a11...	12	0.4	7.1	--	--	--	238	290	0	34	22	0.10
APR 03...	11	0.4	6.5	220	0	180	--	--	--	64	13	0.10
AUG 22...	11	0.4	4.9	250	3	210	--	--	--	44	12	0.10
DATE	SILICA, DIS- SOLVED (MG/L AS SIO2)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L)	SOLIDS, DIS- SOLVED (TONS PER AC-FT)	SOLIDS, DIS- SOLVED (TONS PER DAY)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N)	PHOS- PHORUS DIS- SOLVED (MG/L AS P)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P)
	(00955)	(70300)	(70301)	(70303)	(70302)	(00618)	(00613)	(00631)	(00608)	(00623)	(00666)	(00671)
MAR a11...	16	304	321	0.41	154	0.410	0.020	0.430	0.210	1.1	0.060	0.060
APR 03...	14	317	292	0.43	428	--	--	--	--	--	--	--
AUG 22...	19	319	295	0.43	345	--	--	--	--	--	--	--
DATE	ARSENIC DIS- SOLVED (UG/L AS AS)	BARIUM, DIS- SOLVED (UG/L AS BA)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE)	BORON, DIS- SOLVED (UG/L AS B)	CADMIUM DIS- SOLVED (UG/L AS CD)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR)	COBALT, DIS- SOLVED (UG/L AS CO)	COPPER, DIS- SOLVED (UG/L AS CU)	IRON, DIS- SOLVED (UG/L AS FE)	LEAD, DIS- SOLVED (UG/L AS PB)	LITHIUM DIS- SOLVED (UG/L AS LI)	
	(01000)	(01005)	(01010)	(01020)	(01025)	(01030)	(01035)	(01040)	(01046)	(01049)	(01130)	
MAR a11...	1	76	<0.5	60	<1.0	<5	<3	<10	13	<10	18	
APR 03...	3	--	--	60	--	--	--	--	20	<1	20	
AUG 22...	4	--	--	10	--	--	--	--	10	<1	20	

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)
MAR all...	17	0.2	<10	<10	<1	<1.0	160	<6	8	8.8	0.8
APR 03...	20	0.1	<1	--	<1	--	210	--	--	--	--
AUG 22...	20	0.1	<1	--	<1	--	210	--	--	--	--

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

43

05051522 RED RIVER OF THE NORTH AT HICKSON, ND

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

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

WATER-DISCHARGE RECORDS

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	135	123	65	e60	e66	e115	950	685	880	1650	830	409
2	130	104	66	e60	e68	e120	1010	964	949	1890	815	406
3	122	96	76	e60	e72	e125	950	997	1310	e2400	779	410
4	122	93	79	e60	e76	e140	663	994	1560	e2600	723	407
5	126	91	79	e60	e78	e150	587	1030	1420	e2800	672	398
6	114	90	76	e60	e80	173	547	1050	1200	e2700	683	364
7	113	82	73	e62	e82	186	499	1060	1060	e2500	702	328
8	119	55	69	e64	e84	203	458	1010	963	2370	719	355
9	127	59	70	67	e86	207	435	963	905	1990	717	469
10	127	69	72	65	e90	207	417	930	849	1800	703	1160
11	123	80	72	64	e94	207	411	869	807	1700	636	2070
12	125	77	72	66	e96	202	414	827	789	1620	579	2580
13	126	55	66	84	e96	211	415	814	756	1610	561	2660
14	121	50	63	74	e96	218	396	798	738	1750	546	2190
15	122	67	57	71	e96	226	379	786	745	1790	526	1440
16	118	71	56	69	e94	245	376	770	790	1700	512	1090
17	125	58	55	e66	e92	266	392	758	893	1580	505	978
18	138	53	e54	e64	e90	288	467	790	1010	1450	497	836
19	141	55	e52	e62	e88	314	629	814	990	1380	489	636
20	132	64	e52	e60	e88	329	634	815	924	1340	483	485
21	122	69	e52	e60	e86	369	589	813	880	1330	481	430
22	122	70	e52	e58	e86	442	567	804	920	1290	468	402
23	124	66	e54	e58	e86	498	550	777	1230	1240	430	459
24	132	49	e56	e58	e90	513	545	759	1630	1200	373	510
25	148	42	e58	e58	e95	502	544	758	1610	1120	343	512
26	141	25	e60	e60	e100	542	532	773	1340	1080	387	466
27	145	37	e60	e60	e105	624	532	779	1110	1050	415	447
28	137	45	e60	e60	e110	738	519	766	1040	987	410	460
29	130	50	e60	e60	---	789	508	767	1050	911	396	536
30	125	58	e61	e62	---	858	541	834	1110	873	400	585
31	127	---	e61	e64	---	951	---	936	---	853	404	---
TOTAL	3959	2003	1958	1956	2470	10958	16456	26490	31458	50554	17184	24478
MEAN	128	66.8	63.2	63.1	88.2	353	549	855	1049	1631	554	816
MAX	148	123	79	84	110	951	1010	1060	1630	2800	830	2660
MIN	113	25	52	58	66	115	376	685	738	853	343	328
AC-FT	7850	3970	3880	3880	4900	21740	32640	52540	62400	100300	34080	48550

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1991, BY WATER YEAR (WY)

MEAN	330	296	272	257	288	704	1627	957	907	698	372	357
MAX	1312	900	817	747	745	1543	4165	3394	2485	1784	1073	1496
(WY)	1987	1987	1986	1986	1987	1986	1978	1986	1986	1986	1985	1986
MIN	2.02	.000	.000	4.95	14.0	75.9	165	22.0	86.4	73.4	35.6	12.6
(WY)	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1977	1976

SUMMARY STATISTICS	FOR 1990 CALENDAR YEAR	FOR 1991 WATER YEAR	WATER YEARS 1975 - 1991
ANNUAL TOTAL	98198	189924	
ANNUAL MEAN	269	520	589
HIGHEST ANNUAL MEAN			1604
LOWEST ANNUAL MEAN			53.1
HIGHEST DAILY MEAN	829	Apr 2	12000
LOWEST DAILY MEAN	25	Nov 26	.00
ANNUAL SEVEN-DAY MINIMUM	44	Nov 24	.00
INSTANTANEOUS PEAK FLOW			12900
INSTANTANEOUS PEAK STAGE			35.81
ANNUAL RUNOFF (AC-FT)	194800	376700	426500
10 PERCENT EXCEEDS	566	1200	1260
50 PERCENT EXCEEDS	179	396	336
90 PERCENT EXCEEDS	66	60	70

e Estimated.

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
JAN 09...	0940	66	552	--	4.0	0.5	--	--	--	--	--	--
MAR 11...	1615	213	725	8.1	7.0	0.0	12.5	86	280	51	36	19
APR 03...	1500	898	594	8.1	16.5	3.0	--	--	210	40	26	16
MAY 07...	1040	1060	673	--	7.5	8.5	--	--	--	--	--	--
JUN 10...	0940	865	488	--	15.0	16.5	--	--	--	--	--	--
JUL 05...	1130	2790	373	--	20.0	20.5	--	--	--	--	--	--
JUL 17...	0955	1580	587	--	26.5	25.5	--	--	--	--	--	--
AUG 21...	0830	492	518	8.5	23.5	21.5	--	--	240	43	32	18
DATE	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	
MAR 11...	13	0.5	7.9	--	--	--	208	254	0	33	21	
APR 03...	14	0.5	6.4	200	0	160	--	--	--	68	13	
AUG 21...	14	0.5	6.3	260	0	210	--	--	--	54	12	
DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT DAY) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	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, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	
MAR 11...	0.20	16	336	312	0.46	193	0.510	0.010	0.520	0.150	1.0	
APR 03...	0.10	13	290	280	0.39	703	--	--	--	--	--	
AUG 21...	0.10	20	332	314	0.45	441	--	--	--	--	--	
DATE	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	
MAR 11...	0.030	0.020	--	82	<0.5	--	<1.0	<5	<3	<10	17	
APR 03...	--	--	2	--	--	70	--	--	--	--	20	
AUG 21...	--	--	4	--	--	20	--	--	--	--	10	
DATE	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	
MAR 11...	<10	19	12	--	<10	<10	--	<1.0	170	<6	10	
APR 03...	<1	20	20	<0.1	2	--	1	--	200	--	--	
AUG 21...	<1	20	10	<0.1	<1	--	<1	--	210	--	--	

05051600 WILD RICE RIVER NEAR RUTLAND, ND

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

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

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year (seasonal records only since 1982).

REVISED RECORDS.--WSP 1728: Drainage area.

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

REMARKS.--Records good except those for period July 21 to Aug. 25, which are poor.

EXTREMES FOR CURRENT YEAR.-- Maximum discharge, 25 ft³/s, July 3, gage height, 3.29 ft; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	.00	.00	.00	.00	16	1.1	.00
2	---	---	---	---	---	.00	.00	.00	.00	22	1.1	.00
3	---	---	---	---	---	.00	.00	.00	.00	25	1.1	.00
4	---	---	---	---	---	.00	.00	.00	.00	23	2.3	.00
5	---	---	---	---	---	.00	.00	.00	.00	21	4.2	.00
6	---	---	---	---	---	.00	.00	.00	.00	20	5.7	.00
7	---	---	---	---	---	.00	.00	.00	.00	19	6.3	.00
8	---	---	---	---	---	.00	.00	.00	.00	17	6.3	.00
9	---	---	---	---	---	.00	.00	.00	.00	14	6.3	.00
10	---	---	---	---	---	.00	.00	.00	.00	11	5.6	.00
11	---	---	---	---	---	.00	.00	.00	.00	11	4.4	.00
12	---	---	---	---	---	.00	.00	.00	.00	10	3.5	.00
13	---	---	---	---	---	.00	.00	.00	.00	9.5	2.8	.00
14	---	---	---	---	---	.00	.00	.00	.00	8.7	1.9	.00
15	---	---	---	---	---	.00	.00	.00	.00	7.6	1.3	.00
16	---	---	---	---	---	.00	.00	.00	.00	6.6	.69	.00
17	---	---	---	---	---	.00	.00	.00	.00	5.6	.22	.00
18	---	---	---	---	---	.00	.00	.00	.00	4.5	.08	.00
19	---	---	---	---	---	.00	.00	.00	.00	4.0	.02	.00
20	---	---	---	---	---	.00	.00	.00	.00	3.6	.00	.00
21	---	---	---	---	---	.00	.00	.00	.00	e3.0	.00	.00
22	---	---	---	---	---	.00	.00	.00	.00	e2.7	.00	.00
23	---	---	---	---	---	.00	.00	.00	.00	e2.3	.00	.00
24	---	---	---	---	---	.00	.00	.00	.00	e2.4	.00	.00
25	---	---	---	---	---	.00	.00	.00	.00	e2.7	.00	.00
26	---	---	---	---	---	.00	.00	.00	6.5	e3.0	.00	.00
27	---	---	---	---	---	.00	.00	.00	8.5	e3.2	.00	.00
28	---	---	---	---	---	.00	.00	.00	10	e1.8	.00	.00
29	---	---	---	---	---	.00	.00	.00	10	e1.6	.00	.00
30	---	---	---	---	---	.00	.00	.00	14	e1.2	.00	.00
31	---	---	---	---	---	.00	---	.00	---	e1.1	.00	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	49.00	284.1	54.91	0.00
MEAN	---	---	---	---	---	.000	.000	.000	1.63	9.16	1.77	.000
MAX	---	---	---	---	---	.00	.00	.00	14	25	6.3	.00
MIN	---	---	---	---	---	.00	.00	.00	.00	1.1	.00	.00
AC-FT	---	---	---	---	---	.00	.00	.00	97	564	109	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1991, BY WATER YEAR (WY)

	MEAN	.54	.36	.14	.004	.068	15.8	39.5	13.0	9.41	11.0	2.16	.94
MAX	4.81	5.87	2.90	.10	1.00	138	347	69.3	61.4	78.0	24.7	9.07	
(WY)	1963	1963	1963	1963	1976	1966	1969	1986	1967	1978	1969	1969	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
(WY)	1960	1960	1960	1960	1960	1965	1977	1977	1973	1961	1960	1960	

SUMMARY STATISTICS

WATER YEARS 1960 - 1991

ANNUAL MEAN	a8.43	
HIGHEST ANNUAL MEAN	a44.8	1969
LOWEST ANNUAL MEAN	.000	1977
HIGHEST DAILY MEAN	1130	Apr 9 1969
LOWEST DAILY MEAN	.00	Oct 1 1959
ANNUAL SEVEN-DAY MINIMUM	.00	Oct 1 1959
INSTANTANEOUS PEAK FLOW	1270	Apr 8 1969
INSTANTANEOUS PEAK STAGE	8.78	Apr 8 1969
ANNUAL RUNOFF (AC-FT)	a6110	
10 PERCENT EXCEEDS	18	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

e Estimated.

a Based on complete water years only (1960-82).

RED RIVER OF THE NORTH BASIN
05051600 WILD RICE RIVER NEAR RUTLAND, ND--CONTINUED
WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
JUL												
11...	1635	11	1370	--	25.5	24.0	--	--	--	--	--	--
16...	1245	6.6	1600	7.5	26.0	29.5	590	98	84	130	32	2
18...	0850	3.9	1520	--	25.5	27.5	--	--	--	--	--	--
31...	1050	1.1	1740	8.1	25.5	23.5	670	110	95	150	32	3
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
JUL												
16...	19	410	0	340	500	53	0.20	42	1160	1130	1.58	
31...	22	450	0	370	560	61	0.20	35	1330	1260	1.81	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
JUL												
16...	20.7	<1	100	40	1	120	1700	0.1	3	<1	980	
31...	3.95	6	180	10	<1	130	70	0.1	2	1	940	

RED RIVER OF THE NORTH BASIN

47

05053000 WILD RICE RIVER NEAR ABERCROMBIE, ND

LOCATION.--Lat 46°28'05", long 96°47'00", in NE¹/₄, NE¹/₄, sec.36, T.135 N., R.49 W., Richland County, Hydrologic Unit 09020105, on right bank 420 ft upstream from bridge on county highway, 0.75 mi upstream from rubble masonry dam which serves as control, 3.2 mi northwest of Abercrombie, and 7 mi downstream from Antelope Creek.

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

WATER-DISCHARGE RECORDS

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

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

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

REMARKS.--Records good except those for period of estimated daily discharges, which are fair. Some regulation by Fish and Wildlife Service reservoirs, of which Lake Tewaukon is the largest. Some small diversions for irrigation.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	21	30	.00	19	1.6	.03
2	.00	.00	.00	.00	.00	.00	14	45	.00	28	1.1	.01
3	.00	.00	.00	.00	.00	.00	11	32	.00	63	.90	.03
4	.00	.00	.00	.00	.00	.00	8.0	92	.00	276	1.4	.01
5	.00	.00	.00	.00	.00	.00	5.8	149	.00	397	4.3	.00
6	.00	.00	.00	.00	.00	.00	4.4	122	21	336	6.8	.00
7	.00	.00	.00	.00	.00	.00	2.8	105	51	231	7.6	.00
8	.00	.00	.00	.00	.00	.00	1.5	86	39	147	8.2	.01
9	.00	.00	.00	.00	.00	.00	.79	56	26	100	8.4	.22
10	.00	.00	.00	.00	.00	.00	.26	37	17	73	9.4	3.4
11	.00	.00	.00	.00	.00	.00	.06	26	9.9	59	10	17
12	.00	.00	.00	.00	.00	.00	.05	19	5.8	58	11	26
13	.00	.00	.00	.00	.00	.00	.11	13	3.3	48	9.6	19
14	.00	.00	.00	.00	.00	.00	.18	8.5	2.0	38	7.6	13
15	.00	.00	.00	.00	.00	.00	.27	6.0	1.8	30	6.2	22
16	.00	.00	.00	.00	.00	.00	.42	4.4	1.2	26	6.3	40
17	.00	.00	.00	.00	.00	.00	.37	3.2	.65	22	6.1	44
18	.00	.00	.00	.00	.00	.04	.31	2.3	.30	20	5.6	37
19	.00	.00	.00	.00	.00	.44	1.0	1.6	2.6	19	4.8	27
20	.00	.00	.00	.00	.00	2.6	.96	1.1	8.8	20	4.0	19
21	.00	.00	.00	.00	.00	9.4	.46	.82	7.3	20	3.1	11
22	.00	.00	.00	.00	.00	e10	.37	.64	4.4	20	2.4	5.3
23	.00	.00	.00	.00	.00	e13	.74	.51	3.0	19	1.9	1.9
24	.00	.00	.00	.00	.00	e16	.80	.27	13	17	1.4	.69
25	.00	.00	.00	.00	.00	e18	.66	.11	48	15	1.4	.30
26	.00	.00	.00	.00	.00	e22	.35	.05	42	12	1.7	.14
27	.00	.00	.00	.00	.00	e24	.31	.01	29	10	1.7	.07
28	.00	.00	.00	.00	.00	e28	.17	.00	20	8.9	.98	.04
29	.00	.00	.00	.00	---	32	.24	.00	15	5.8	.45	.02
30	.00	.00	.00	.00	---	33	6.8	.00	9.2	3.8	.17	.00
31	.00	---	.00	.00	---	30	---	.00	---	2.7	.07	---
TOTAL	0.00	0.00	0.00	0.00	0.00	238.48	84.18	841.51	381.25	2144.2	136.17	287.17
MEAN	.000	.000	.000	.000	.000	7.69	2.81	27.1	12.7	69.2	4.39	9.57
MAX	.00	.00	.00	.00	.00	33	21	149	51	397	11	44
MIN	.00	.00	.00	.00	.00	.00	.05	.00	.00	2.7	.07	.00
AC-FT	.00	.00	.00	.00	.00	473	167	1670	756	4250	270	570

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1991, BY WATER YEAR (WY)

	MEAN	6.24	5.14	2.58	.79	1.57	130	385	108	97.2	90.3	18.5	9.79
MAX	111	60.4	19.2	6.94	37.6	1006	3077	728	929	1787	325	159	
(WY)	1943	1943	1943	1987	1984	1945	1969	1962	1962	1962	1962	1986	
MIN	.000	.000	.000	.000	.000	.000	2.81	.11	.085	.000	.000	.000	
(WY)	1933	1933	1933	1933	1934	1937	1991	1934	1988	1933	1932	1932	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1932 - 1991

ANNUAL TOTAL	984.58	4112.96	
ANNUAL MEAN	2.70	11.3	71.7
HIGHEST ANNUAL MEAN			372
LOWEST ANNUAL MEAN			.48
HIGHEST DAILY MEAN	61	397	9360
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		410	9540
INSTANTANEOUS PEAK STAGE		3.72	24.58
ANNUAL RUNOFF (AC-FT)	1950	8160	51910
10 PERCENT EXCEEDS	9.2	27	117
50 PERCENT EXCEEDS	.00	.01	1.4
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

05053000 WILD RICE RIVER NEAR ABERCROMBIE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAR												
20...	1305	2.8	364	--	6.5	1.5	--	--	--	--	--	--
21...	1145	8.4	1020	--	2.5	0.5	--	--	--	--	--	--
27...	0750	24	944	7.8	-8.5	1.0	250	57	27	57	32	2
MAY												
03...	1125	30	1010	--	5.5	6.5	--	--	--	--	--	--
JUN												
06...	1105	7.7	989	--	12.5	18.0	--	--	--	--	--	--
JUL												
08...	1345	147	--	--	23.5	21.0	--	--	--	--	--	--
12...	1225	60	742	--	23.5	19.5	--	--	--	--	--	--
AUG												
a21...	1120	2.7	1300	8.4	25.5	21.5	450	95	51	120	36	2
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CaCO3) (90410)	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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
27...	10	220	0	180	160	35	0.20	14	515	469	0.70	
AUG												
a21...	18	520	0	430	250	46	0.30	34	918	873	1.25	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
27...	33.1	4	110	50	<1	40	370	0.1	5	<1	300	
AUG												
a21...	6.69	18	290	20	<1	90	330	<0.1	<1	<1	540	

a Replicate sample also collected for quality-assurance purposes.

05054000 RED RIVER OF THE NORTH AT FARGO, ND

LOCATION.--Lat 46°51'40", long 96°47'00", in NW $\frac{1}{4}$, NE $\frac{1}{4}$, sec.18, T.139 N., R.48 W., Cass County, Hydrologic Unit 09020104, at waterplant on 4th St. S. in Fargo, 25 mi upstream from mouth of Sheyenne River, and at mi 453.

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

WATER-DISCHARGE RECORDS

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

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

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	135	144	65	e65	e72	e110	e950	613	925	e1800	956	363
2	132	134	71	e65	e74	e125	e1000	872	953	e1950	943	408
3	123	123	75	e65	e76	e125	1250	1070	e1050	2100	1010	385
4	117	116	83	e65	e80	e135	1080	1190	e1530	2350	878	380
5	115	108	88	e65	e82	e140	806	1180	e1700	2530	777	369
6	118	98	89	e70	e84	e160	622	1220	e1600	2600	727	363
7	113	101	89	e70	e88	e165	563	1270	e1450	2550	745	316
8	113	97	89	e75	e90	e190	499	1260	e1200	2310	762	342
9	115	74	86	e78	e90	e210	453	1210	e1050	2020	776	348
10	123	64	85	e80	e90	e230	425	1170	e945	1840	777	578
11	122	72	82	e75	e90	e230	396	1070	890	1760	748	1410
12	123	84	82	e80	e88	e200	388	1040	854	1650	654	1880
13	128	88	80	e80	e88	e205	395	952	831	1580	596	2070
14	122	74	72	e80	e88	e200	407	875	e825	1610	572	2010
15	122	66	72	e85	e88	e205	373	860	e820	1660	551	1690
16	126	74	69	e85	e86	e220	357	852	825	1640	529	1300
17	177	76	66	e80	e86	e225	350	786	850	1580	531	1060
18	147	75	63	e80	e86	e250	366	776	1010	1500	515	952
19	146	66	e62	e80	e86	e280	464	790	1050	1430	505	798
20	143	73	e60	e75	e84	e305	581	807	970	1360	494	623
21	136	77	e60	e75	e82	e335	580	821	907	1340	478	510
22	129	79	e60	e70	e80	e365	549	821	923	1330	477	428
23	126	82	e60	e68	e84	e395	525	818	1000	1370	431	422
24	124	84	e60	e66	e88	e460	515	794	1340	1460	348	496
25	135	69	e55	e66	e90	524	506	768	1640	1380	337	527
26	148	55	e70	e66	e95	535	503	769	1540	1290	306	518
27	145	45	e70	e66	e100	582	530	785	e1300	1250	348	470
28	149	44	e70	e68	e104	658	494	790	e1150	1200	369	454
29	152	53	e70	e68	---	e840	489	784	e1050	1100	363	480
30	148	58	e70	e70	---	e860	620	809	e1300	1010	358	549
31	142	---	e70	e70	---	e900	---	929	---	972	353	---
TOTAL	4094	2453	2243	2251	2419	10364	17036	28751	33478	51522	18214	22499
MEAN	132	81.8	72.4	72.6	86.4	334	568	927	1116	1662	588	750
MAX	177	144	89	85	104	900	1250	1270	1700	2600	1010	2070
MIN	113	44	55	65	72	110	350	613	820	972	306	316
AC-FT	8120	4870	4450	4460	4800	20560	33790	57030	66400	102200	36130	44630
(+)	1258	1117	1155	1126	1002	1097	1141	1265	1313	1286	1598	1265
AC-FT*	9380	5990	5610	5590	5800	21660	34930	58300	67710	103490	37730	45900

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1901 - 1991, BY WATER YEAR (WY)

MEAN	291	262	218	198	195	636	1650	977	991	796	374	294
MAX	1435	942	800	740	778	3756	9924	4589	5122	5692	2691	1707
(WY)	1987	1907	1987	1986	1987	1966	1969	1986	1962	1962	1962	1986
MIN	.000	.000	.000	.000	.18	26.8	102	8.12	2.87	.000	.000	.000
(WY)	1935	1937	1938	1933	1933	1937	1934	1934	1936	1934	1932	1934

SUMMARY STATISTICS	FOR 1990 CALENDAR YEAR	FOR 1991 WATER YEAR	WATER YEARS 1901 - 1991
ANNUAL TOTAL	100158	195324	
ANNUAL MEAN	274	535	574
HIGHEST ANNUAL MEAN			1928
LOWEST ANNUAL MEAN			17.5
HIGHEST DAILY MEAN	877	2600	24800
LOWEST DAILY MEAN	44	44	.00
ANNUAL SEVEN-DAY MINIMUM	56	56	.00
INSTANTANEOUS PEAK FLOW		2630	25300
INSTANTANEOUS PEAK STAGE		16.99	.00
INSTANTANEOUS LOW FLOW			.00
ANNUAL RUNOFF (AC-FT)	198700	387400	416200
10 PERCENT EXCEEDS	565	1330	1250
50 PERCENT EXCEEDS	180	358	290
90 PERCENT EXCEEDS	72	70	37

e Estimated.

+ Diversions in acre-feet to cities of Fargo and Moorhead.

* Adjusted for diversions to cities of Fargo and Moorhead.

005054000 RED RIVER OF THE NORTH AT FARGO, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	
DEC 13...	1010	90	543	--	-4.5	0.0	--	--	--	--	--	--	
JAN 09...	1220	78	505	--	-15.5	0.5	--	--	--	--	--	--	
FEB 22...	0800	80	600	--	-10.0	1.0	--	--	--	--	--	--	
MAR 12...	0905	193	620	8.0	4.0	0.5	13.1	89	K77	3200	270	50	
APR 02...	0920	980	474	8.1	3.0	1.5	--	--	--	--	200	41	
MAY 07...	1325	1300	686	--	6.5	9.0	--	--	--	--	--	--	
JUN 10...	1155	945	536	--	18.5	16.5	--	--	--	--	--	--	
JUL 03...	1410	2090	415	--	18.5	22.5	--	--	--	--	--	--	
19...	1400	1430	592	--	32.5	27.5	--	--	--	--	--	--	
AUG 19...	1330	500	569	8.3	25.5	22.5	--	--	--	--	250	45	
DATE		MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT RATIO (00932)	SODIUM AD-SORP-TION (MG/L AS K) (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
MAR 12...	34	20	14	0.5	7.4	--	--	--	--	248	303	0	36
APR 02...	24	16	14	0.5	6.8	190	0	150	--	--	--	--	68
AUG 19...	33	19	14	0.5	5.8	270	0	220	--	--	--	--	61
DATE		CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	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, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)
MAR 12...	25	0.20	15	332	340	0.45	173	0.510	0.020	0.530	0.140	1.0	
APR 02...	12	0.10	13	283	274	0.38	749	--	--	--	--	--	
AUG 19...	12	0.10	21	354	328	0.48	478	--	--	--	--	--	
DATE		PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)
MAR 12...	0.060	0.060	<1	76	<0.5	60	<1.0	<5	<3	<10	13	<10	
APR 02...	--	--	2	--	--	60	--	--	--	--	30	2	
AUG 19...	--	--	5	--	--	20	--	--	--	--	10	<1	
DATE		LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	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)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)
MAR 12...	17	14	<0.1	<10	<10	<1	1.0	170	<6	9	8.4	0.6	
APR 02...	20	40	0.1	2	--	<1	--	210	--	--	--	--	
AUG 19...	20	10	<0.1	1	--	<1	--	240	--	--	--	--	

RED RIVER OF THE NORTH BASIN

51

05054500 SHEYENNE RIVER ABOVE HARVEY, ND

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

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.59	.46	e.95	e.80	e.90	e1.0	e2.6	2.2	1.3	1.3	1.0	1.1
2	.40	.51	e.90	e.82	e1.0	e1.2	e2.2	2.2	1.7	1.2	.99	1.4
3	.42	.41	e.90	e.84	e1.5	e1.5	e2.0	2.6	.99	1.2	.97	1.0
4	.37	.41	e.80	e.85	e2.0	e1.6	e2.0	4.9	1.1	1.2	.98	1.0
5	.29	.45	e.80	e.86	e3.0	e1.8	e1.9	6.3	1.3	1.2	.98	1.0
6	.30	.51	e.90	e.88	e3.0	e1.5	e1.9	4.6	1.1	1.2	1.3	1.2
7	.32	.50	e1.0	e.90	e3.0	e1.5	e1.9	3.9	1.1	1.1	1.0	1.8
8	.24	.55	e1.4	e.95	e2.0	e1.5	e1.8	3.7	1.2	1.1	.93	1.3
9	.37	.56	e1.8	e1.0	e1.6	e1.6	e1.8	3.8	1.1	1.0	.97	1.3
10	.62	.56	e2.0	e1.0	e1.5	e1.7	1.9	3.5	1.1	1.0	1.0	1.0
11	.46	.55	e2.0	e1.0	e1.4	e2.0	1.8	3.1	1.1	1.0	1.0	1.2
12	.42	.53	e2.0	e1.0	e1.5	e4.0	1.9	3.0	1.2	.98	1.1	.96
13	.32	.58	e1.5	e1.1	e1.8	e6.0	2.4	2.9	1.1	1.1	1.1	1.0
14	.37	.59	e1.3	e1.2	e1.7	e7.0	2.6	2.3	1.1	.99	1.1	1.9
15	.62	.56	e1.2	e1.2	e1.6	e6.5	2.9	3.2	1.4	.91	1.1	3.5
16	.40	.57	e1.1	e1.3	e1.6	e6.3	2.2	2.9	1.0	.92	1.8	3.5
17	.76	.55	e1.0	e1.3	e1.5	e6.0	1.9	3.9	1.1	.99	1.3	1.6
18	.53	.54	e.90	e1.3	e1.5	e5.5	1.7	4.5	1.1	1.0	1.3	1.3
19	.50	.57	e.70	e1.2	e1.5	e5.0	1.7	3.8	1.1	.94	1.1	.99
20	.56	.51	e.60	e1.2	e1.5	e4.5	1.5	3.0	1.2	.97	1.1	.95
21	.44	.63	e.65	e1.2	e1.4	e4.3	1.5	1.5	1.1	.95	1.2	.99
22	.42	.61	e.70	e1.2	e1.4	e4.1	1.4	.83	.96	1.0	.98	3.3
23	.42	.63	e.70	e1.2	e1.3	e3.9	1.4	1.2	1.0	.92	1.1	9.3
24	.37	.73	e.60	e1.1	e1.3	e3.8	1.4	.99	.95	.92	1.1	9.4
25	.42	.77	e.70	e1.1	e1.2	e3.7	1.2	1.2	.95	.96	1.1	8.4
26	.46	e1.1	e.74	e1.1	e1.2	e3.6	1.7	1.1	1.1	.98	e1.0	5.2
27	.40	e1.1	e.78	e1.1	e1.1	e3.0	7.3	.96	.94	1.0	e.95	3.7
28	.37	e1.0	e.80	e1.0	e1.1	e2.5	2.8	.90	.94	.92	e.90	2.1
29	.41	e1.0	e.80	e1.0	---	e2.0	2.1	1.0	1.1	.94	1.1	1.2
30	.40	e.95	e.80	e.90	---	e2.1	2.4	1.0	1.1	.94	.97	1.3
31	.43	---	e.80	e.80	---	e2.5	---	1.1	---	1.0	1.0	---
TOTAL	13.40	18.99	31.82	32.40	45.10	103.2	63.8	82.08	33.53	31.83	33.52	73.89
MEAN	.43	.63	1.03	1.05	1.61	3.33	2.13	2.65	1.12	1.03	1.08	2.46
MAX	.76	1.1	2.0	1.3	3.0	7.0	7.3	6.3	1.7	1.3	1.8	9.4
MIN	.24	.41	.60	.80	.90	1.0	1.2	.83	.94	.91	.90	.95
AC-FT	27	38	63	64	89	205	127	163	67	63	66	147

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1991, BY WATER YEAR (WY)

	MEAN	2.46	2.09	.91	.49	2.70	25.3	29.5	14.0	7.46	5.79	2.21	1.61
MAX	11.8	10.4	6.27	4.10	26.7	123	101	62.1	54.0	43.4	25.6	4.79	
(WY)	1983	1983	1983	1983	1983	1982	1969	1984	1971	1982	1985	1977	
MIN	.43	.26	.090	.000	.000	.000	2.13	1.59	.30	.071	.000	.061	
(WY)	1991	1977	1962	1959	1956	1969	1991	1977	1961	1961	1959	1976	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1956 - 1991

ANNUAL TOTAL	793.73	563.56	7.90	
ANNUAL MEAN	2.17	1.54	28.3	1982
HIGHEST ANNUAL MEAN			.76	1961
LOWEST ANNUAL MEAN			690	Apr 20 1979
HIGHEST DAILY MEAN	17 Jul 7	9.4 Sep 24	.00	Jan 21 1956
LOWEST DAILY MEAN	.17 Aug 24	.24 Oct 8	.00	Jan 21 1956
ANNUAL SEVEN-DAY MINIMUM	.24 Aug 18	.33 Oct 3	1000	Apr 20 1979
INSTANTANEOUS PEAK FLOW		10 Sep 23	a10.30	Apr 1 1971
INSTANTANEOUS PEAK STAGE		a7.64 Mar 14	5720	
ANNUAL RUNOFF (AC-FT)	1570	1120	19	
10 PERCENT EXCEEDS	4.7	3.0	1.4	
50 PERCENT EXCEEDS	1.3	1.1	.00	
90 PERCENT EXCEEDS	.44	.55		

e Estimated.

a Backwater from ice.

RED RIVER OF THE NORTH BASIN

05054500 SHEYENNE RIVER ABOVE HARVEY, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CaCO3) (00900)
NOV 28...	1525	1.0	1880	8.2	-4.5	0.0	65	8.9	61	130
JAN 10...	1438	1.0	1430	8.0	-6.5	0.0	30	0.9	6	100
FEB 19...	1426	1.5	1610	8.1	2.5	0.0	34	4.8	33	150
MAR 26...	1138	3.6	1200	8.6	2.5	0.0	50	8.8	61	100
JUN 05...	1348	1.2	1420	8.3	22.0	18.5	75	11.7	124	100
JUL 08...	1030	0.97	1410	8.0	20.0	18.0	55	8.5	89	110
AUG 28...	0955	0.89	1580	8.2	29.0	21.5	60	0	0	77
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)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 28...	28	14	430	87	17	6.8	770	290	26	0.40
JAN 10...	25	10	310	86	13	5.1	590	220	19	0.40
FEB 19...	29	18	370	84	13	7.8	672	320	29	0.40
MAR 26...	20	13	250	83	11	5.5	466	200	17	0.30
JUN 05...	23	11	340	87	15	4.4	560	180	18	0.40
JUL 08...	26	12	320	85	13	4.6	604	180	20	0.40
AUG 28...	18	7.9	380	91	19	6.2	649	200	27	0.50
DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 28...	49	1270	1310	1.73	3.57	0.290	0.010	0.300	0.350	0.220
JAN 10...	49	962	994	1.31	2.60	--	<0.010	<0.100	0.670	0.290
FEB 19...	39	1150	1220	1.56	4.72	--	--	--	--	--
MAR 26...	23	804	810	1.09	7.75	--	0.010	<0.050	0.040	0.100
JUN 05...	17	936	931	1.27	3.06	--	<0.010	<0.050	0.030	0.190
JUL 08...	23	934	950	1.27	2.45	--	<0.010	<0.050	<0.010	0.160
AUG 28...	35	1020	1070	1.39	2.45	--	0.010	<0.050	0.070	0.100

RED RIVER OF THE NORTH BASIN

53

05054500 SHEYENNE RIVER ABOVE HARVEY, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
NOV 28...	--	--	--	1200	--	--	--	--	--	--
JAN 10...	--	--	--	90	--	--	--	--	--	--
FEB 19...	--	--	--	960	--	--	--	--	--	--
MAR 26...	<10	2	40	680	<1.0	<1	1	<1	120	<1
JUN 05...	--	--	--	960	--	--	--	--	--	--
JUL 08...	--	--	--	880	--	--	--	--	--	--
AUG 28...	--	--	--	960	--	--	--	--	--	--
DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
MAR 26...	100	81	0.2	1	<1	<1	140	5	7	<0.010

RED RIVER OF THE NORTH BASIN

05056000 SHEYENNE RIVER NEAR WARWICK, ND

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

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

WATER-DISCHARGE RECORDS

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

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

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

REMARKS.--Records good except those for Nov. 23 to Mar. 6, which are fair.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	9.4	e6.3	e1.3	e1.4	e.90	17	37	17	86	5.4	6.5
2	.87	9.8	e5.5	e1.2	e2.0	e.90	21	35	16	112	6.6	6.5
3	.81	9.5	e5.0	e1.1	e3.0	e.80	21	39	13	81	11	6.4
4	.67	9.4	e5.0	e.90	e4.0	e.70	19	35	12	32	12	5.8
5	.50	9.9	e5.4	e.85	e4.2	e1.2	19	26	13	32	13	5.4
6	.50	11	e5.1	e.80	e4.5	e1.8	19	31	12	36	15	5.7
7	.51	11	e5.5	e.75	e5.5	1.2	17	44	9.2	42	15	6.0
8	.59	13	e6.0	e.70	e6.0	1.3	13	42	13	43	13	7.0
9	.71	16	e5.9	e.90	e5.5	2.4	13	36	22	34	13	6.8
10	.98	20	e5.8	e1.1	e5.0	5.1	13	32	29	24	12	5.5
11	1.1	23	e5.7	e1.3	e4.7	5.0	13	29	50	39	7.9	5.1
12	1.1	25	e5.6	e1.8	e4.5	4.9	13	32	35	39	5.4	5.3
13	1.3	25	e5.6	e1.5	e3.5	6.5	14	32	18	35	4.5	5.3
14	1.5	18	e4.5	e1.9	e2.7	9.4	13	29	16	31	4.3	6.9
15	1.4	12	e4.2	e1.6	e2.0	10	11	41	17	35	4.1	14
16	1.4	9.6	e3.5	e1.8	e1.4	11	14	47	13	30	52	50
17	1.8	8.8	e3.2	e2.2	e1.2	10	18	48	14	27	65	22
18	1.6	8.0	e3.0	e1.8	e1.1	12	16	41	23	22	33	48
19	1.3	7.8	e2.8	e2.3	e1.0	14	14	40	19	20	24	78
20	1.5	6.7	e2.6	e2.4	e1.5	17	12	39	17	32	21	60
21	1.5	7.3	e2.2	e2.4	e1.4	19	11	37	16	46	21	40
22	1.8	7.2	e2.2	e2.6	e1.3	21	9.9	43	14	32	19	30
23	2.8	e7.2	e2.2	e2.5	e1.2	22	10	46	16	16	19	19
24	3.1	e7.2	e2.0	e2.5	e1.2	20	11	47	18	12	11	14
25	4.2	e7.2	e2.0	e2.3	e1.1	19	11	41	20	10	4.4	43
26	5.3	e7.1	e2.0	e2.1	e1.1	20	11	27	23	9.1	5.3	51
27	5.4	e7.1	e1.8	e1.9	e1.0	17	19	22	47	8.2	7.5	39
28	5.2	e7.1	e1.8	e1.7	e1.0	19	28	20	69	7.0	8.4	31
29	6.3	e7.0	e1.6	e1.6	---	18	40	20	51	5.7	6.7	23
30	8.0	e7.1	e1.5	e1.5	---	17	50	15	63	5.4	6.5	18
31	8.6	---	e1.4	e1.4	---	16	---	17	---	6.1	6.5	---
TOTAL	73.64	334.4	116.9	50.70	74.0	324.10	510.9	1070	715.2	989.5	452.5	664.2
MEAN	2.38	11.1	3.77	1.64	2.64	10.5	17.0	34.5	23.8	31.9	14.6	22.1
MAX	8.6	25	6.3	2.6	6.0	22	50	48	69	112	65	78
MIN	.50	6.7	1.4	.70	1.0	.70	9.9	15	9.2	5.4	4.1	5.1
AC-FT	146	663	232	101	147	643	1010	2120	1420	1960	898	1320

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1991, BY WATER YEAR (WY)

	MEAN	12.9	11.5	6.83	4.61	9.84	108	277	102	52.7	35.2	15.2	11.2
MAX	73.2	50.3	29.6	26.3	154	793	1421	854	326	170	80.3	63.0	
(WY)	1983	1981	1983	1983	1981	1983	1950	1950	1954	1954	1985	1957	
MIN	1.16	1.28	.76	.47	.75	1.46	15.8	10.4	1.75	.36	.090	.71	
(WY)	1953	1961	1961	1990	1990	1964	1977	1990	1961	1989	1961	1961	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1950 - 1991

ANNUAL TOTAL	3040.17	5376.04	
ANNUAL MEAN	8.33	14.7	53.9
HIGHEST ANNUAL MEAN			204
LOWEST ANNUAL MEAN			5.31
HIGHEST DAILY MEAN	60	Jun 5	4370
LOWEST DAILY MEAN	.35	Jan 5	.00
ANNUAL SEVEN-DAY MINIMUM	.39	Jan 3	.00
INSTANTANEOUS PEAK FLOW			119
INSTANTANEOUS PEAK STAGE			2.71
ANNUAL RUNOFF (AC-FT)	6030	10660	39020
10 PERCENT EXCEEDS	22	39	98
50 PERCENT EXCEEDS	5.4	9.2	8.4
90 PERCENT EXCEEDS	.53	1.3	1.4

e Estimated.

RED RIVER OF THE NORTH BASIN

55

05056000 SHEYENNE RIVER NEAR WARWICK, ND---CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 16...	1140	2.1	628	--	9.0	7.0	--	--	--	--	--	--
DEC 13...	1035	6.0	1260	--	-9.0	3.0	--	--	--	--	--	--
JAN 25...	1210	2.3	1360	--	-9.5	0.5	--	--	--	--	--	--
MAR 06...	1025	2.4	1390	--	-10.5	0.5	--	--	--	--	--	--
a28...	1255	17	491	7.6	1.5	2.5	190	45	18	23	21	0.7
MAY 01...	1055	41	896	--	2.0	7.5	--	--	--	--	--	--
JUN 18...	1530	22	922	--	22.0	23.5	--	--	--	--	--	--
JUL 30...	1230	4.8	691	7.5	19.5	20.0	--	--	--	--	--	--
SEP 24...	1045	12	666	--	11.0	11.0	--	--	--	--	--	--

DATE	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
MAR a28...	4.6	230	0	190	50	7.6	0.20	13	260	274	0.35

DATE	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)
MAR a28...	11.6	1	80	40	<1	20	40	0.1	3	<1	220

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05056060 MAUVAIS COULEE TRIBUTARY NO. 3 NEAR CANDO, ND

LOCATION.--Lat 48°27'28", long 99°14'06", in NW¹/₄NW¹/₄ sec.6, T.157 N., R.66 W., Towner County, Hydrologic Unit 09020201, at bridge 2.1 mi south of Cando

DRAINAGE AREA.--60.2 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--1955-71 (annual maximum discharges only), 1986-88 (discharge measurements only), March 1989 to current year (seasonal records only since 1989).

GAGE.--Nonrecording gage. Elevation of gage is 1,460 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records poor.

EXTREMES FOR CURRENT PERIOD.--Maximum discharge about 7.0 ft³/s, June 30, gage height, unknown; no flow much of the time.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	.00	.00	.00	.00	e6.0	e1.1	e.10
2	---	---	---	---	---	.00	.00	.00	.00	e5.5	e1.0	e.08
3	---	---	---	---	---	.00	.00	.00	.00	e5.0	e1.2	e.06
4	---	---	---	---	---	.00	.00	.00	.00	e5.0	e1.1	e.05
5	---	---	---	---	---	.00	.00	.00	e.00	e5.4	e1.2	e.05
6	---	---	---	---	---	.00	.00	.00	e.00	e5.3	e1.3	e.04
7	---	---	---	---	---	.00	.00	.00	e.00	e5.1	e1.1	e.03
8	---	---	---	---	---	.00	.00	.00	e.00	e4.9	e1.0	e.02
9	---	---	---	---	---	.00	.00	.00	e.00	e4.8	e.95	e.01
10	---	---	---	---	---	.00	.00	.00	e3.0	e4.6	e.88	e.00
11	---	---	---	---	---	.00	.00	.00	e3.9	e4.4	e.82	e.00
12	---	---	---	---	---	.00	.00	.00	e3.7	e4.3	e.77	e.00
13	---	---	---	---	---	.00	.00	.00	e3.3	e4.2	e.65	e.00
14	---	---	---	---	---	.00	.00	.00	e3.0	e4.0	e.58	e.00
15	---	---	---	---	---	.00	.00	.00	e5.0	e3.9	e.50	e.00
16	---	---	---	---	---	.00	.00	.00	e4.2	e3.8	e1.2	e.00
17	---	---	---	---	---	.00	.00	.00	e3.5	e3.6	e1.1	e.00
18	---	---	---	---	---	.00	.00	.00	e2.9	e3.3	e.93	.00
19	---	---	---	---	---	.00	.00	.00	e2.4	e3.2	e.82	.00
20	---	---	---	---	---	.00	.00	.00	e2.0	e2.9	e.72	.00
21	---	---	---	---	---	.00	.00	.00	e2.4	e2.7	e.64	.00
22	---	---	---	---	---	.00	.00	.00	e3.0	e2.5	e.56	.00
23	---	---	---	---	---	.00	.00	.00	e2.8	e2.3	e.50	.00
24	---	---	---	---	---	.00	.00	.00	e2.8	e2.1	e.50	.00
25	---	---	---	---	---	.00	.00	.00	e3.0	e1.9	e.40	.00
26	---	---	---	---	---	.00	.00	.00	e3.1	e1.8	e.33	.00
27	---	---	---	---	---	.00	.00	.00	e3.0	e1.7	e.28	.00
28	---	---	---	---	---	.00	.00	.00	e2.3	e1.5	e.22	.00
29	---	---	---	---	---	.00	.00	.00	e2.0	e1.4	e.18	.00
30	---	---	---	---	---	.00	.00	.00	e6.5	e1.3	e.14	.00
31	---	---	---	---	---	.00	---	.00	---	e1.2	e.12	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	67.80	109.6	22.79	0.44
MEAN	---	---	---	---	---	.000	.000	.000	2.26	3.54	.74	.015
MAX	---	---	---	---	---	.00	.00	.00	6.5	6.0	1.3	.10
MIN	---	---	---	---	---	.00	.00	.00	.00	1.2	.12	.00
AC-FT	---	---	---	---	---	.00	.00	.00	134	217	45	.9

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1986	8.40	41.9	1986	.000	1989
1987	13.6	36.7	1987	.000	1990
1988	1.85	9.16	1988	.000	1988
1989	.53	2.26	1989	.000	1988
1990	.84	3.54	1990	.000	1988
1991	.85	3.50	1991	.000	1988
1992	.003	.015	1992	.000	1988

SUMMARY STATISTICS

WATER YEARS 1986 - 1991

HIGHEST DAILY MEAN	210	Mar 28 1986
LOWEST DAILY MEAN	.00	Mar 1 1986
ANNUAL SEVEN-DAY MINIMUM	.00	Mar 1 1986
INSTANTANEOUS PEAK FLOW	2300	Apr 14 1969
INSTANTANEOUS PEAK STAGE	9.35	Apr 14 1969
10 PERCENT EXCEEDS	3.9	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

e Estimated.

RED RIVER OF THE NORTH BASIN

57

05056060 MAUVAIS COULEE TRIB NO. 3 NEAR CANDO, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1986 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT- ANCE	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR (DEG C)	TEMPER- ATURE WATER (DEG C)	HARD- NESS TOTAL (MG/L AS CACO3)	CALCIUM DIS- SOLVED (MG/L AS CA)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG)	SODIUM, DIS- SOLVED (MG/L AS NA)	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
		(00061)	(00095)	(00400)	(00020)	(00010)	(00900)	(00915)	(00925)	(00930)	(00932)	(00931)
JUN												
11...	1610	3.9	395	7.7	27.0	24.5	170	44	14	7.0	8	0.2
21...	1200	2.4	489	7.3	18.0	20.0	230	59	19	8.0	7	0.2
JUL												
02...	1345	5.5	400	--	19.0	18.0	--	--	--	--	--	--
17...	1510	3.6	570	--	29.5	26.5	--	--	--	--	--	--
AUG												
06...	1205	1.3	615	--	17.0	18.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
JUN												
11...	12	170	0	140	46	3.6	0.10	45	284	255	0.39	
21...	13	260	0	210	38	5.8	0.10	56	334	326	0.45	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
JUN												
11...	3.01	7	40	40	<1	10	10	<0.1	3	<1	190	
21...	2.12	7	30	70	<1	20	100	<0.1	2	<1	250	

RED RIVER OF THE NORTH BASIN

05056100 MAUVAIS COULEE NEAR CANDO, ND

LOCATION.--Lat 48°26'53", long 99°06'08", in SE¹/₄NE¹/₄SE¹/₄, sec.1, T.157 N., R.66 W., Towner County, Hydrologic Unit 09020201, on left bank 0.3 mi upstream from highway bridge, about 4 mi upstream from West Fork, 5.5 mi southeast of Cando, and 7 mi northeast of Maza.

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

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1956 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Elevation of gage is 1,445 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 2, 1957, nonrecording gage at present site and datum.

REMARKS.--No flow for entire period. Records fair.

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

EXTREMES FOR CURRENT YEAR.--No flow for entire period.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

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	.00	.00	.00	.00	.00	.00
4	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
5	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
6	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
7	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
8	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
9	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
10	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
11	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
12	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
13	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
14	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
15	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
16	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
17	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
18	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
19	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
20	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
21	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
22	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
23	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
24	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
25	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
26	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
27	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
28	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
29	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
30	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
31	---	---	---	---	---	.00	---	.00	---	.00	.00	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	---	---	---	---	---	.000	.000	.000	.000	.000	.000	.000
MAX	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
MIN	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1991, BY WATER YEAR (WY)

MEAN	1.78	.96	.25	.018	.19	14.1	120	38.7	7.93	5.88	3.68	3.25
MAX	27.1	10.4	3.86	.34	5.01	160	656	281	69.3	80.5	71.3	62.3
(WY)	1966	1981	1981	1981	1981	1972	1969	1974	1974	1971	1965	1965
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1959	1960	1957	1957	1957	1958	1991	1961	1961	1959	1959	1959

SUMMARY STATISTICS

WATER YEARS 1956 - 1991

ANNUAL MEAN	a19.1
HIGHEST ANNUAL MEAN	a71.7
LOWEST ANNUAL MEAN	a.004
HIGHEST DAILY MEAN	2580
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	2660
INSTANTANEOUS PEAK STAGE	11.18
ANNUAL RUNOFF (AC-FT)	a13870
10 PERCENT EXCEEDS	23
50 PERCENT EXCEEDS	.06
90 PERCENT EXCEEDS	.00

a Based on complete water years only (1957-82).

05056200 EDMORE COULEE NEAR EDMORE, ND

LOCATION.--Lat 48°20'14", long 98°39'33", in NW¹/₄, NW¹/₄ sec.17, T.156 N., R.62 W., Ramsey County, Hydrologic Unit 09020201, on right bank 50 ft upstream from bridge on county highway, 11 mi southwest of Edmore, and about 13 mi upstream from Sweetwater Lake.

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

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to June 1956, June 1957 to current year (seasonal records only since 1982).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above National Geodetic Vertical Datum of 1929. June 26, 1957, to Sept. 30, 1985, water-stage recorder at same site at a datum of 1,479.79 ft above National Geodetic Vertical Datum of 1929. Prior to June 26, 1957, nonrecording gage at same site and datum.

REMARKS.--Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 4.5 ft³/s, Aug. 6, gage height, 82.00 ft; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
2	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
3	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
4	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
5	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
6	---	---	---	---	---	.00	.00	.00	.00	.00	1.8	e.00
7	---	---	---	---	---	.00	.00	.00	.00	.00	1.8	e.00
8	---	---	---	---	---	.00	.00	.00	.00	.00	.31	e.00
9	---	---	---	---	---	.00	.00	.00	.00	.00	.01	e.00
10	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
11	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
12	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
13	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
14	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
15	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
16	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
17	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
18	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
19	---	---	---	---	---	.00	.00	.00	.00	.00	.00	e.00
20	---	---	---	---	---	e.00	.00	.00	.00	.00	.00	e.00
21	---	---	---	---	---	e.00	.00	.00	.00	.00	e.00	e.00
22	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
23	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
24	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
25	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
26	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
27	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
28	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
29	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
30	---	---	---	---	---	.00	.00	.00	.00	.00	e.00	e.00
31	---	---	---	---	---	.00	---	.00	---	.00	e.00	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	3.92	0.00
MEAN	---	---	---	---	---	.000	.000	.000	.000	.000	.13	.000
MAX	---	---	---	---	---	.00	.00	.00	.00	.00	1.8	.00
MIN	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	---	.00	.00	.00	.00	.00	7.8	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1991, BY WATER YEAR (WY)

	MEAN	.77	.31	.057	.000	.46	14.9	88.9	23.8	5.28	7.35	4.51	.56
MAX	9.79	5.73	.98	.000	11.6	117	314	205	66.5	112	34.6	8.05	
(WY)	1986	1981	1981	1958	1981	1972	1974	1974	1963	1986	1966	1962	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
(WY)	1959	1959	1958	1958	1958	1959	1960	1991	1958	1958	1958	1958	

SUMMARY STATISTICS

WATER YEARS 1957 - 1991

ANNUAL MEAN	a13.3	
HIGHEST ANNUAL MEAN	a47.7	1974
LOWEST ANNUAL MEAN	a.028	1958
HIGHEST DAILY MEAN	1090	Apr 25 1979
LOWEST DAILY MEAN	.00	Jul 1 1957
ANNUAL SEVEN-DAY MINIMUM	.00	Jul 1 1957
INSTANTANEOUS PEAK FLOW	1110	Apr 25 1979
INSTANTANEOUS PEAK STAGE	87.10	Apr 25 1979
ANNUAL RUNOFF (AC-FT)	a9640	
10 PERCENT EXCEEDS	19	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

e Estimated.

a Based on complete water years only (1958-82).

RED RIVER OF THE NORTH BASIN

05056200 EDMORE COULEE NEAR EDMORE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED 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)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
AUG 06...	1430	4.1	169	7.2	17.0	18.0	6.4	68	64	18	4.5	5.0
DATE	SODIUM PERCENT (00932)	SODIUM RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)
AUG 06...	13	0.3	5.0	120	0	96	17	1.5	0.10	19	135	131
DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	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, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)
AUG 06...	0.18	1.50	0.120	<0.010	0.020	0.130	0.140	0.020	0.150	2.2	0.610	0.280
DATE	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	
AUG 06...	0.260	1	20	1200	2	9	70	0.3	<1	<1	130	

RED RIVER OF THE NORTH BASIN

61

05056215 EDMORE COULEE TRIBUTARY NEAR WEBSTER, ND

LOCATION.--Lat 48°15'59", long 98°40'50", in NW¹/₄, NW¹/₄, sec.7, T.155 N., R.62 W., Ramsey County, Hydrologic Unit 09020201, on upstream side of bridge on county road, 9 mi east and 1.1 mi south of Webster.

DRAINAGE AREA.--148 mi², approximately, of which about 44 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1986 to current year (seasonal records only). Discharge record available for 1986 water year in files of the District office.

GAGE.--Water-stage recorder. Datum of gage is 1400.00 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to October 1986 nonrecording gage at present site and datum.

REMARKS.--Records poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in spring of 1959 reached a stage of about 75.00 ft, from conversation with local residents.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 0.80 ft³/s, July 13, gage height, unknown; no flow most of the time.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	.00	.00	.00	.00	e.00	.00	e.00
2	---	---	---	---	---	.00	.00	.00	.00	e.00	.00	e.00
3	---	---	---	---	---	.00	.00	.00	.00	e.00	.00	e.00
4	---	---	---	---	---	.00	.00	.00	.00	e.00	.00	e.00
5	---	---	---	---	---	.00	.00	.00	.00	e.00	.00	e.00
6	---	---	---	---	---	.00	.00	.00	.00	e.10	.00	e.00
7	---	---	---	---	---	.00	.00	.00	.00	e.25	e.00	e.00
8	---	---	---	---	---	.00	.00	.00	.00	e.22	e.00	e.00
9	---	---	---	---	---	.00	.00	.00	.00	e.15	e.00	e.00
10	---	---	---	---	---	.00	.00	.00	.00	e.05	e.00	e.00
11	---	---	---	---	---	.00	.00	.00	.00	e.25	e.00	.00
12	---	---	---	---	---	.00	.00	.00	.00	e.50	e.00	e.00
13	---	---	---	---	---	.00	.00	.00	.00	e.75	e.00	e.00
14	---	---	---	---	---	.00	.00	.00	.00	e.45	e.00	e.00
15	---	---	---	---	---	.00	.00	.00	.00	e.30	e.00	e.00
16	---	---	---	---	---	.00	.00	.00	.00	e.20	e.25	e.25
17	---	---	---	---	---	.00	.00	.00	.00	e.10	e.35	e.15
18	---	---	---	---	---	.00	.00	.00	.00	.14	e.28	e.15
19	---	---	---	---	---	.00	.00	.00	.00	.14	e.22	e.10
20	---	---	---	---	---	.00	.00	.00	.00	.24	e.15	e.06
21	---	---	---	---	---	.00	.00	.00	.00	.27	e.08	e.02
22	---	---	---	---	---	.00	.00	.00	.00	.25	e.02	e.15
23	---	---	---	---	---	.00	.00	.00	.00	.19	e.20	e.11
24	---	---	---	---	---	.00	.00	.00	e.00	.09	e.12	e.07
25	---	---	---	---	---	.00	.00	.00	e.00	.01	e.02	e.03
26	---	---	---	---	---	.00	.00	.00	e.00	.00	e.07	e.00
27	---	---	---	---	---	.00	.00	.00	e.00	.00	e.03	e.00
28	---	---	---	---	---	.00	.00	.00	e.00	.00	e.00	e.00
29	---	---	---	---	---	.00	.00	.00	e.00	.00	e.00	e.00
30	---	---	---	---	---	.00	.00	.00	e.00	.00	e.00	e.00
31	---	---	---	---	---	.00	---	.00	---	.00	e.00	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	0.00	4.65	1.79	1.09
MEAN	---	---	---	---	---	.000	.000	.000	.000	.15	.058	.036
MAX	---	---	---	---	---	.00	.00	.00	.00	.75	.35	.25
MIN	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	---	.00	.00	.00	.00	9.2	3.6	2.2

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1986	3.21	18.6	1986	.000	1989
1987	63.9	324	1987	.000	1990
1988	4.30	19.5	1988	.000	1990
1989	.48	1.16	1989	.000	1988
1990	11.2	66.2	1990	.000	1988
1991	4.17	24.4	1991	.000	1988
1992	.045	.23	1992	.000	1987

SUMMARY STATISTICS

WATER YEARS 1986 - 1991

HIGHEST DAILY MEAN	724	Apr 9 1987
LOWEST DAILY MEAN	.00	Mar 1 1986
ANNUAL SEVEN-DAY MINIMUM	.00	Mar 1 1986
INSTANTANEOUS PEAK FLOW	739	Apr 9 1987
INSTANTANEOUS PEAK STAGE	72.48	Apr 9 1987
10 PERCENT EXCEEDS	17	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

e Estimated.

LOCATION.--Lat 48°15'35", long 98°50'48", in NW¹/₄ sec.11, T.155 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, on northwest shoreline of Morrison Lake.

GAGE-HEIGHT RECORDS

REMARKS.--Stage frequently affected by wind.

EXTREMES FOR CURRENT YEAR.--Maximum gage height recorded, 55.30 ft, Oct. 21, affected by wind; minimum recorded, 53.35 ft, Sept. 17.

[illegible]

RED RIVER OF THE NORTH BASIN

63

05056239 STARKWEATHER COULEE NEAR WEBSTER, ND

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

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

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1979 to current year (seasonal records only since 1988).

GAGE.--Water-stage recorder. Elevation of gage is 1,448.00 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 23, 1986, nonrecording gage 100 ft downstream at same datum.

REMARKS.--Records poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 70 ft³/s, Aug. 8, gage height, 5.56 ft; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e.00	11	.02	.00	1.4	1.4	e.50
2	---	---	---	---	---	e.00	8.5	.00	.00	1.3	1.2	e.40
3	---	---	---	---	---	e.00	5.6	.01	.00	1.3	1.3	e.30
4	---	---	---	---	---	e.00	4.1	.10	.00	1.3	1.2	e.25
5	---	---	---	---	---	e.00	3.3	.21	.00	1.5	1.1	e.20
6	---	---	---	---	---	e.00	3.5	.31	.00	2.9	9.4	e.17
7	---	---	---	---	---	e.00	4.3	.46	.00	5.1	53	e.16
8	---	---	---	---	---	e.00	4.9	.46	.98	4.7	69	e.20
9	---	---	---	---	---	e.00	4.4	.17	3.0	3.7	53	e.25
10	---	---	---	---	---	e.02	3.5	.11	12	3.0	36	e.17
11	---	---	---	---	---	e.05	2.6	.06	14	11	24	e.14
12	---	---	---	---	---	e.08	1.9	.04	11	29	17	e.08
13	---	---	---	---	---	e.10	1.3	.02	9.6	24	13	e.05
14	---	---	---	---	---	e.30	.98	.02	7.7	18	10	e.03
15	---	---	---	---	---	e.50	.72	.06	9.1	12	9.1	e.10
16	---	---	---	---	---	e1.0	.43	.15	6.8	9.8	7.9	e2.0
17	---	---	---	---	---	e1.5	.28	.33	5.2	7.9	6.4	e1.5
18	---	---	---	---	---	e3.0	.20	.30	4.6	6.4	5.1	e1.0
19	---	---	---	---	---	e7.0	.13	.25	4.2	6.0	3.8	e1.3
20	---	---	---	---	---	e10	.12	.24	4.2	6.4	2.7	e.70
21	---	---	---	---	---	16	.08	.24	4.4	7.1	e2.2	e.50
22	---	---	---	---	---	9.4	.03	.19	3.8	7.9	e1.7	e2.0
23	---	---	---	---	---	8.4	.01	.14	3.1	7.3	e5.0	e1.2
24	---	---	---	---	---	4.9	.00	.13	2.5	6.2	e4.0	e.60
25	---	---	---	---	---	3.8	.00	.07	2.2	5.8	e2.5	e.30
26	---	---	---	---	---	2.5	.00	.05	1.9	5.3	e3.5	e.20
27	---	---	---	---	---	4.5	.01	.05	1.6	5.0	e2.5	e.10
28	---	---	---	---	---	16	.02	.02	1.5	4.6	e1.5	e.06
29	---	---	---	---	---	16	.04	.02	1.3	3.9	e1.0	e.04
30	---	---	---	---	---	13	.06	.01	1.3	3.1	e.70	e.02
31	---	---	---	---	---	13	---	.00	---	2.0	e.60	---
TOTAL	---	---	---	---	---	131.05	62.01	4.24	115.98	214.9	350.80	14.52
MEAN	---	---	---	---	---	4.23	2.07	.14	3.87	6.93	11.3	.48
MAX	---	---	---	---	---	16	11	.46	14	29	69	2.0
MIN	---	---	---	---	---	.00	.00	.00	.00	1.3	.60	.02
AC-FT	---	---	---	---	---	260	123	8.4	230	426	696	29

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1980 - 1991, BY WATER YEAR (WY)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.27	.14	.011	.000	.82	17.2	57.1	4.67	4.24	11.5	5.14	.65
MAX	5.53	1.09	.092	.000	6.61	81.4	265	34.3	22.2	74.3	32.7	4.98
(WY)	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1983
MIN	.000	.000	.000	.000	.000	.000	2.07	.000	.000	.000	.000	.000
(WY)	1980	1980	1980	1980	1980	1980	1991	1980	1980	1980	1980	1981

SUMMARY STATISTICS

WATER YEARS 1980 - 1991

ANNUAL MEAN	a11.1
HIGHEST ANNUAL MEAN	a24.5
LOWEST ANNUAL MEAN	a.88
HIGHEST DAILY MEAN	569
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	570
INSTANTANEOUS PEAK STAGE	10.05
ANNUAL RUNOFF (AC-FT)	a8030
10 PERCENT EXCEEDS	20
50 PERCENT EXCEEDS	.00
90 PERCENT EXCEEDS	.00

e Estimated.

a Based on complete water years only (1980-87).

RED RIVER OF THE NORTH BASIN

05056239 STARKWEATHER COULEE NEAR WEBSTER, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
MAR 19...	1200	5.5	154	7.0	12.0	1.0	7.4	53	61	17	4.5	3.5
MAR 26...	1100	2.6	285	7.0	1.0	1.0	11.0	80	110	30	9.0	5.0
APR 03...	1350	5.6	397	--	24.5	11.5	--	--	--	--	--	--
MAY 10...	1135	0.12	--	--	10.5	9.0	--	--	--	--	--	--
JUN 18...	1045	4.7	342	7.4	21.0	20.5	5.0	57	150	42	12	8.0
JUL 18...	1140	6.3	492	--	16.0	23.0	--	--	--	--	--	--
AUG 01...	1005	1.3	551	--	22.0	20.0	--	--	--	--	--	--
SEP 11...	0920	0.14	478	--	11.5	14.0	--	--	--	--	--	--
DATE	SODIUM PERCENT (00932)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)
MAR 19...	11	0.2	3.0	57	0	47	20	2.1	0.10	7.8	107	90
MAR 26...	8	0.2	6.4	120	0	100	25	4.5	0.10	15	151	159
JUN 18...	10	0.3	6.6	170	0	140	30	3.8	0.10	28	232	218
DATE	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	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 + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)
MAR 19...	0.15	1.59	0.650	0.050	0.050	0.620	0.700	0.160	0.160	1.2	0.260	0.160
MAR 26...	0.21	1.08	0.560	0.060	0.050	0.590	0.610	0.050	0.050	1.2	0.360	0.300
JUN 18...	0.32	2.93	0.068	<0.010	0.020	<0.050	0.088	0.040	0.090	0.70	0.350	0.290
DATE	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	
MAR 19...	0.171	2	20	90	1	5	60	<0.1	2	<1	100	
MAR 26...	0.280	2	30	50	<1	8	10	0.2	3	<1	140	
JUN 18...	0.290	6	10	40	<1	10	20	<0.1	<1	<1	180	

RED RIVER OF THE NORTH BASIN

65

05056241 DRY LAKE NEAR PENN, ND

LOCATION.--Lat 48°13'52", long 98°58'59", in NW¹/₄, NW¹/₄, SW¹/₄, sec.23, T.155 N., R.65 W., Ramsey County, Hydrologic Unit 09020201, on west shoreline of Dry Lake, 6 mi east of Penn.

DRAINAGE AREA.--920 mi², approximately.

GAGE-HEIGHT RECORDS

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

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

REMARKS.--Stage affected by wind.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height recorded, 50.32 ft, Apr. 20, 1987, affected by wind; minimum recorded, 41.80 ft, Sept. 14, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum gage height recorded, 43.77 ft, July 13, affected by wind; minimum recorded, 41.80 ft, Sept. 14.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	42.84	42.54	42.29	---	---	---	---	41.83	41.83	42.40	42.14	41.87
2	42.84	42.53	42.26	---	---	---	---	41.83	41.83	42.41	42.05	41.84
3	42.83	42.51	42.70	---	---	---	---	41.83	41.83	42.41	42.00	41.83
4	42.81	42.50	42.25	---	---	---	---	41.83	41.83	42.41	41.98	41.83
5	42.80	42.49	42.15	---	---	---	---	41.83	41.83	42.42	41.97	41.83
6	42.78	42.49	42.16	---	---	---	---	41.83	41.83	42.44	42.07	41.83
7	42.76	42.48	42.16	---	---	---	---	41.83	41.83	43.17	42.44	41.83
8	42.76	42.47	42.17	---	---	---	---	41.83	41.83	43.50	42.55	41.83
9	42.75	42.46	42.20	---	---	---	---	41.83	41.83	43.37	42.58	41.83
10	42.74	42.45	42.23	---	---	---	---	41.83	41.98	43.19	42.58	41.83
11	42.73	42.44	42.23	---	---	---	41.84	41.83	42.17	43.11	42.54	41.83
12	42.72	42.43	42.23	---	---	---	41.83	41.83	42.24	43.54	42.49	41.83
13	42.71	42.42	42.22	---	---	---	41.83	41.83	42.26	43.77	42.43	41.83
14	42.71	42.41	42.21	---	---	---	41.83	41.83	42.26	43.73	42.38	41.80
15	42.69	42.40	42.20	---	---	---	41.83	41.83	42.38	43.58	42.31	41.80
16	42.68	42.38	42.19	---	---	---	41.83	41.83	42.45	43.45	42.29	41.80
17	42.68	42.38	42.17	---	---	---	41.83	41.83	42.47	43.34	42.29	41.80
18	42.67	42.37	---	---	---	---	41.83	41.83	42.44	43.27	42.29	41.80
19	42.67	42.36	---	---	---	---	41.83	41.83	42.41	43.17	42.28	41.80
20	42.66	42.36	---	---	---	---	41.83	41.83	42.41	43.09	42.27	41.80
21	42.65	42.36	---	---	---	---	41.83	41.83	42.42	43.05	42.24	41.80
22	42.64	42.35	---	---	---	---	41.83	41.83	42.43	42.99	42.19	41.80
23	42.63	42.33	---	---	---	---	41.83	41.83	42.43	42.91	42.17	41.80
24	42.61	42.32	---	---	---	---	41.83	41.83	42.42	42.82	42.17	41.80
25	42.60	42.31	---	---	---	---	41.83	41.83	42.42	42.73	42.16	41.80
26	42.60	42.31	---	---	---	---	41.83	41.83	42.42	42.66	42.14	41.80
27	42.59	42.31	---	---	---	---	41.83	41.83	42.41	42.57	42.11	41.80
28	42.57	42.32	---	---	---	---	41.83	41.83	42.39	42.48	42.08	41.80
29	42.57	42.30	---	---	---	---	41.83	41.83	42.39	42.40	42.02	41.80
30	42.55	42.30	---	---	---	---	41.83	41.83	42.39	42.33	41.97	41.80
31	42.55	---	---	---	---	---	---	41.83	---	42.24	41.93	---
MEAN	42.69	42.40	---	---	---	---	---	41.83	42.20	42.93	42.23	41.81
MAX	42.84	42.54	---	---	---	---	---	41.83	42.47	43.77	42.58	41.87
MIN	42.55	42.30	---	---	---	---	---	41.83	41.83	42.24	41.93	41.80

RED RIVER OF THE NORTH BASIN

05056390 LITTLE COULEE NEAR BRINSMADE, ND

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

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

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 1,435 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--No flow for entire period. Records fair.

EXTREMES FOR CURRENT YEAR.--No flow for entire period.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

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	.00	.00	.00	.00	.00	.00
4	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
5	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
6	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
7	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
8	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
9	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
10	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
11	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
12	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
13	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
14	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
15	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
16	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
17	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
18	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
19	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
20	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
21	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
22	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
23	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
24	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
25	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
26	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
27	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
28	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
29	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
30	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
31	---	---	---	---	---	.00	---	.00	---	.00	.00	---
TOTAL	---	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	---	---	---	---	---	.000	.000	.000	.000	.000	.000	.000
MAX	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
MIN	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1991, BY WATER YEAR (WY)

	MEAN	.003	.000	.000	.000	.018	3.82	16.6	18.2	4.81	1.93	.48	.038
MAX	.018	.001	.000	.000	.000	.13	23.2	91.9	231	68.1	27.9	7.48	.57
(WY)	1981	1981	1976	1976	1981	1976	1979	1979	1979	1979	1979	1979	1979
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1976	1976	1976	1976	1976	1979	1977	1977	1977	1977	1977	1976	1976

SUMMARY STATISTICS

WATER YEARS 1975 - 1991

ANNUAL MEAN	a7.02
HIGHEST ANNUAL MEAN	a35.8 1979
LOWEST ANNUAL MEAN	a.006 1977
HIGHEST DAILY MEAN	375 May 4 1979
LOWEST DAILY MEAN	.00 Aug 27 1975
ANNUAL SEVEN-DAY MINIMUM	.00 Sep 7 1975
INSTANTANEOUS PEAK FLOW	425 May 1 1979
INSTANTANEOUS PEAK STAGE	10.43 May 1 1979
ANNUAL RUNOFF (AC-FT)	a5090
10 PERCENT EXCEEDS	6.4
50 PERCENT EXCEEDS	.00
90 PERCENT EXCEEDS	.00

a Based on complete water years only (1976-82).

a Average discharge for the 12 water years (1979-91) since the completion of Channel A, 34.1 ft³/s.

RED RIVER OF THE NORTH BASIN

05056410 CHANNEL A NEAR PENN, ND

LOCATION.--Lat 48°10'00", long 98°58'47", in SE¹/₄, SW¹/₄, SW¹/₄, sec.11, T.154 N., R.65 W., Ramsey County, Hydrologic Unit 09020201, on right bank 200 ft upstream from U.S. Highway 2, 9 mi northwest of Devils Lake and 7 mi southeast of Penn.

DRAINAGE AREA.--930 mi², approximately.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1985, water-stage recorder at same site at datum of 1,437.31 ft.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow regulated by gate control on Dry Lake (station 05056241) 3 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.01	.04	e.01	e.01	e.00	e.00	.03	.01	e.02	e.01	e.01	e.01
2	e.01	.02	e.01	e.01	e.00	e.00	.08	.01	e.05	e.01	e.02	e.01
3	e.01	.01	e.01	e.01	e.00	e.00	.22	.08	e.05	e.01	.17	e.01
4	e.01	.01	e.01	e.01	e.00	e.00	.10	.26	e.03	e.01	.01	e.01
5	e.01	.01	e.01	e.01	e.00	e.00	.15	.26	e.02	e.01	.01	e.01
6	e.01	.01	e.01	e.01	e.00	e.00	.25	.05	.21	e.01	.02	e.01
7	e.01	.01	e.01	e.01	e.00	e.00	.19	.01	.28	.02	e.01	e.01
8	e.01	.01	e.01	e.01	e.00	e.00	.17	.02	.22	.01	e.01	e.01
9	e.01	.01	e.01	e.00	e.00	e.01	.08	.03	.39	.01	e.01	e.01
10	e.01	.01	e.01	e.00	e.00	e.02	.04	.08	.21	.01	e.01	e.01
11	e.01	.01	e.01	e.00	e.00	e.03	.05	1.2	.19	.13	e.01	e.01
12	e.01	.01	e.01	e.00	e.00	e.04	.05	1.2	.05	.38	e.01	e.01
13	e.01	.01	e.01	e.00	e.00	e.05	.11	.16	.05	.31	e.01	e.01
14	e.01	.01	e.01	e.00	e.00	e.06	.20	.19	.11	.12	e.01	.03
15	e.01	.01	e.01	e.00	e.00	e.07	.16	.19	.34	.08	e.01	.05
16	e.01	.01	e.01	e.00	e.00	e.08	.05	.19	.07	.07	e.01	.08
17	.05	.01	e.01	e.00	e.00	e.10	.05	.05	.05	.05	e.01	e.01
18	.01	.01	e.01	e.00	e.00	e.15	.05	.05	.12	.07	e.01	e.01
19	.01	.01	e.01	e.00	e.00	e.20	.05	.02	.05	.05	e.01	e.01
20	.01	.01	e.01	e.00	e.00	e.15	.05	.02	.09	.09	e.01	e.01
21	.01	.03	e.01	e.00	e.00	e.15	.08	.06	.01	.06	e.01	.02
22	.07	.01	e.01	e.00	e.00	e.15	.05	.10	.01	.12	e.01	.15
23	.03	.01	e.01	e.00	e.00	e.20	.01	.19	e.01	.03	.03	.01
24	.01	.01	e.01	e.00	e.00	e.25	.02	.19	e.01	.03	.01	.01
25	.05	e.01	e.01	e.00	e.00	e.30	.03	.07	e.01	e.01	.01	.02
26	.12	e.01	e.01	e.00	e.00	e.25	.09	.08	e.01	e.01	.03	e.01
27	.05	e.01	e.01	e.00	e.00	e.20	.29	e.02	e.01	e.01	e.01	e.01
28	.01	e.01	e.01	e.00	e.00	e.15	.11	e.01	e.01	e.01	e.01	e.01
29	.05	e.01	e.01	e.00	---	.10	.09	e.01	e.01	e.01	e.01	e.02
30	.03	e.01	e.01	e.00	---	.01	.03	e.01	e.01	e.01	e.01	e.02
31	.05	---	e.01	e.00	---	.02	---	e.01	---	e.01	e.01	---
TOTAL	0.72	0.36	0.31	0.08	0.00	2.74	2.93	4.83	2.70	1.77	0.53	0.61
MEAN	.023	.012	.010	.003	.000	.088	.098	.16	.090	.057	.017	.020
MAX	.12	.04	.01	.01	.00	.30	.29	1.2	.39	.38	.17	.15
MIN	.01	.01	.01	.00	.00	.00	.01	.01	.01	.01	.01	.01
AC-FT	1.4	.7	.6	.2	.00	5.4	5.8	9.6	5.4	3.5	1.1	1.2

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1991, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	7.27	9.50	2.21	.012	.36	4.40	102	59.3
MAX	22.4	43.0	10.7	.047	2.80	17.0	568	351
(WY)	1987	1987	1987	1984	1984	1985	1987	1987
MIN	.000	.010	.005	.000	.000	.000	.098	.049
(WY)	1984	1990	1990	1985	1986	1990	1991	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1984 - 1991

ANNUAL TOTAL	25.41	17.58	17.0
ANNUAL MEAN	.070	.048	.048
HIGHEST ANNUAL MEAN			91.5
LOWEST ANNUAL MEAN			.048
HIGHEST DAILY MEAN	1.7 Jun 3	1.2 May 11	1050 Apr 20 1987
LOWEST DAILY MEAN	.00 Jan 1	.00 Jan 9	.00 Oct 1 1983
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Jan 9	.00 Oct 1 1983
INSTANTANEOUS PEAK FLOW		7.2 May 11	1090 Apr 20 1987
INSTANTANEOUS PEAK STAGE		38.29 May 11	42.87 Apr 20 1987
ANNUAL RUNOFF (AC-FT)	50	35	12320
10 PERCENT EXCEEDS	.20	.15	23
50 PERCENT EXCEEDS	.01	.01	.05
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

69

05056410 CHANNEL A NEAR PENN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1984 to current year.

PERIOD OF DAILY RECORDS.--

WATER TEMPERATURE: October 1983 to June 1989 and June 1991 to September 1991 (discontinued).

INSTRUMENTATION.--Water-quality monitor from October 1983 to June 1989. Data micrologger with thermistor from June 1991 to September 1991.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 32.6°C, Aug. 1, 1987; minimum recorded, 0.0°C on many days.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE- CIFIC CON- DUCT- ANCE	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR	TEMPER- ATURE WATER	OXYGEN, DIS- SOLVED	OXYGEN, DIS- SOLVED	HARD- NESS TOTAL	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED
		(00061)	(US/CM) (00095)	(00400)	(DEG C) (00020)	(DEG C) (00010)	(MG/L) (00300)	(PER- CENT SATUR- ATION) (00301)	(MG/L AS CACO3) (00900)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)
OCT 23...	1200	0.04	2110	--	2.5	4.0	--	--	--	--	--	--
MAR 20...	0740	0.11	1290	6.7	1.0	1.5	10.8	79	310	56	40	140
26...	1340	0.26	1770	7.9	2.0	1.5	14.0	103	510	120	51	180
APR 03...	1240	0.30	1590	--	23.5	7.0	--	--	--	--	--	--
MAY 14...	1045	0.20	1890	--	20.0	16.0	--	--	--	--	--	--
JUN 04...	1300	0.02	2450	--	13.0	18.5	--	--	--	--	--	--
18...	1235	0.21	2030	--	20.0	22.0	--	--	--	--	--	--
SEP 10...	1045	0.02	2980	--	10.5	15.5	--	--	--	--	--	--
DATE	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB AS HCO3) (95440)	CAR- BONATE, FET-LAB AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)
MAR 20...	49	3	8.4	140	0	110	440	43	0.10	9.4	841	807
26...	43	3	13	290	0	240	650	36	0.10	14	1220	1210
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, 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,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	
MAR 20...	1.14	0.25	0.010	<0.010	<0.050	<0.050	0.040	0.040	1.4	0.130	0.050	
26...	1.66	0.86	<0.010	<0.010	<0.050	0.065	0.020	0.100	1.1	0.070	0.030	
DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR 20...	0.040	2	200	30	<1	80	500	0.1	7	1	400	
26...	<0.010	2	300	70	<1	140	400	<0.1	6	<1	750	

RED RIVER OF THE NORTH BASIN

05056410 CHANNEL A NEAR PENN, ND--CONTINUED

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	21.1	18.4	19.8	24.6	19.6	21.8	22.8	18.1	20.3
2	---	---	---	19.5	17.5	18.2	21.2	18.6	19.6	21.5	19.3	20.2
3	---	---	---	20.4	16.7	18.2	21.0	17.5	19.0	20.6	16.7	18.6
4	---	---	---	23.0	17.6	20.0	23.6	17.2	20.0	20.5	15.5	17.8
5	18.7	16.8	17.8	25.6	19.6	22.3	20.6	18.1	19.0	19.4	16.2	17.6
6	20.6	17.2	19.0	24.9	20.0	22.5	21.6	17.4	19.0	19.7	14.4	17.0
7	24.4	19.0	21.6	23.0	19.9	21.5	20.2	17.8	19.0	22.6	16.2	18.9
8	22.3	20.1	21.1	25.0	18.9	21.9	23.4	17.3	20.0	20.6	18.9	19.5
9	23.6	18.6	20.7	26.3	20.3	23.1	25.2	18.4	21.4	19.6	17.3	18.8
10	26.0	19.6	22.6	27.3	21.3	24.0	25.4	19.5	22.3	18.2	14.9	16.5
11	27.3	21.0	24.0	24.4	22.0	23.3	26.3	19.7	22.6	18.7	15.1	16.8
12	28.2	21.4	24.8	22.5	19.8	21.2	26.2	20.1	22.9	21.1	16.8	18.6
13	28.5	23.2	25.6	26.5	18.7	22.1	26.2	19.9	22.8	21.3	16.6	18.9
14	27.1	22.8	24.8	27.4	20.6	23.8	26.4	20.2	23.2	21.5	17.8	19.6
15	24.6	20.8	22.8	29.1	22.5	25.6	26.9	21.4	24.0	19.5	17.1	18.2
16	25.9	19.6	22.6	30.9	24.5	27.3	23.7	21.0	21.8	17.4	14.8	16.0
17	27.2	20.5	23.6	29.4	24.4	26.9	23.4	19.1	21.0	15.4	11.1	13.8
18	25.2	21.0	23.2	26.8	23.7	25.2	24.1	19.0	21.4	10.7	7.8	8.6
19	23.8	20.7	22.3	27.2	21.5	24.2	24.2	18.8	21.4	11.6	6.8	8.9
20	21.8	19.1	20.3	28.3	22.3	24.8	25.5	19.7	22.5	13.5	7.3	10.2
21	24.1	16.8	20.2	26.0	22.6	24.2	25.2	20.9	23.1	15.2	10.5	12.5
22	24.1	19.0	21.3	25.1	21.5	23.2	25.7	20.5	22.5	12.0	9.7	10.6
23	21.2	18.8	20.0	24.6	19.7	22.0	24.4	19.6	21.6	12.0	7.9	9.8
24	23.0	18.5	20.6	23.7	19.9	21.5	25.1	19.9	22.4	13.3	8.0	10.7
25	23.3	20.5	22.0	24.6	18.4	21.0	26.9	21.1	23.8	12.8	9.9	11.3
26	26.8	21.1	23.7	24.8	18.7	21.5	25.5	22.0	23.8	11.0	8.4	9.7
27	27.5	21.8	24.3	23.5	19.1	21.0	26.3	21.5	23.9	12.7	8.4	10.0
28	24.0	19.5	21.0	25.5	19.3	21.8	26.7	21.7	24.0	13.4	8.5	10.9
29	23.4	18.7	20.5	25.4	19.8	22.2	26.0	21.4	23.7	11.5	9.8	10.6
30	21.2	19.1	19.9	25.9	19.7	22.3	24.9	20.4	22.5	12.3	8.4	10.4
31	---	---	---	24.5	19.2	21.7	23.2	18.8	21.1	---	---	---
MONTH	---	---	---	30.9	16.7	22.5	26.9	17.2	21.8	22.8	6.8	14.7

RED RIVER OF THE NORTH BASIN

71

05056500 DEVILS LAKE NEAR DEVILS LAKE, ND

LOCATION.--Lat 48°04'00", long 98°56'07", in SW¹/₄, sec.18, T.153 N., R.64 W., Ramsey County, Hydrologic Unit 09020201, at Lakewood, on east bank of Creel Bay, 4.5 mi southwest of city of Devils Lake. Creel Bay, which is 0.5 mi wide, is an arm of Devils Lake and extends 2 mi to the north of the lake.

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

GAGE-HEIGHT RECORDS

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

REVISED RECORDS.--WSP 1913: Drainage area.

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

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

EXTREMES OUTSIDE PERIOD OF RECORD.--The lake level was at an elevation of about 1,441 ft around 1830 and lower thereafter. Reference is Geological Survey monograph, volume XXV, the Glacial History of Lake Agassiz by Warren Upham.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,423.84 ft, Oct. 3; minimum, 1,423.03 ft, Sept. 8.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23.74	23.48	23.31	23.33	23.35	23.40	23.41	23.51	23.47	23.67	23.38	23.22
2	23.71	23.52	23.30	23.33	23.36	23.39	23.41	23.41	23.45	23.68	23.33	23.21
3	23.77	23.46	23.33	23.32	23.37	23.39	23.42	23.39	23.42	23.57	23.44	23.20
4	23.73	23.40	23.31	23.33	23.37	23.42	23.41	23.54	23.36	23.57	23.44	23.14
5	23.64	23.41	23.34	23.33	23.36	23.41	23.41	23.54	23.39	23.62	23.41	23.10
6	23.62	23.42	23.33	23.32	23.37	23.40	23.41	23.51	23.43	23.62	23.43	23.09
7	23.61	23.40	23.34	23.33	23.36	23.40	23.40	23.50	23.43	23.64	23.43	23.07
8	23.61	23.39	23.34	23.33	23.37	23.41	23.40	23.51	23.48	23.63	23.44	23.07
9	23.61	23.40	23.34	23.33	23.36	23.41	23.40	23.52	23.67	23.63	23.42	23.12
10	23.61	23.38	23.33	23.33	23.35	23.41	23.39	23.56	23.66	23.61	23.41	23.08
11	23.61	23.37	23.33	23.34	23.34	23.40	23.36	23.55	23.63	23.65	23.39	23.07
12	23.55	23.37	23.33	23.34	23.35	23.41	23.35	23.55	23.60	23.68	23.38	23.09
13	23.57	23.39	23.33	23.35	23.35	23.42	23.36	23.58	23.59	23.68	23.38	23.06
14	23.58	23.39	23.33	23.35	23.35	23.42	23.40	23.56	23.59	23.68	23.37	23.08
15	23.53	23.37	23.33	23.37	23.34	23.41	23.41	23.56	23.74	23.70	23.35	23.07
16	23.51	23.38	23.32	23.36	23.36	23.42	23.41	23.55	23.66	23.68	23.37	23.22
17	23.51	23.38	23.32	23.35	23.36	23.42	23.41	23.51	23.62	23.67	23.39	23.27
18	23.54	23.38	23.31	23.36	23.36	23.42	23.40	23.51	23.63	23.66	23.37	23.20
19	23.53	23.37	23.32	23.35	23.36	23.43	23.41	23.50	23.56	23.65	23.36	23.16
20	23.57	23.36	23.32	23.34	23.37	23.43	23.40	23.52	23.52	23.61	23.36	23.16
21	23.54	23.45	23.31	23.34	23.37	23.43	23.40	23.50	23.57	23.60	23.35	23.17
22	23.54	23.42	23.32	23.35	23.36	23.42	23.40	23.52	23.56	23.65	23.31	23.27
23	23.54	23.56	23.33	23.34	23.38	23.42	23.39	23.56	23.55	23.57	23.31	23.22
24	23.49	23.38	23.33	23.34	23.38	23.42	23.39	23.54	23.55	23.51	23.32	23.24
25	23.49	23.27	23.33	23.34	23.39	23.42	23.42	23.52	23.53	23.49	23.33	23.24
26	23.55	23.29	23.32	23.34	23.39	23.41	23.37	23.53	23.59	23.48	23.32	23.17
27	23.55	23.30	23.33	23.35	23.40	23.41	23.44	23.51	23.55	23.46	23.33	23.18
28	23.46	23.30	23.32	23.34	23.40	23.41	23.57	23.49	23.48	23.47	23.32	23.18
29	23.47	23.32	23.32	23.33	---	23.40	23.52	23.50	23.51	23.45	23.31	23.18
30	23.48	23.33	23.31	23.34	---	23.41	23.59	23.47	23.51	23.45	23.26	23.24
31	23.48	---	23.33	23.34	---	23.42	---	23.45	---	23.44	23.22	---
MEAN	23.57	23.39	23.32	23.34	23.37	23.41	23.42	23.52	23.54	23.60	23.36	23.16
MAX	23.77	23.56	23.34	23.37	23.40	23.43	23.59	23.58	23.74	23.70	23.44	23.27
MIN	23.46	23.27	23.30	23.32	23.34	23.39	23.35	23.39	23.36	23.44	23.22	23.06

RED RIVER OF THE NORTH BASIN

05057000 SHEYENNE RIVER NEAR COOPERSTOWN, ND

LOCATION.--Lat 47°25'58", long 98°01'38", in NW¹/₄NW¹/₄SW¹/₄ sec.26, T.146 N., R.58 W., Griggs County, Hydrologic Unit 09020203, on right bank at Ueland Dam, 0.7 mi downstream from State Highway 200, and 5 mi east of Cooperstown.

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

WATER-DISCHARGE RECORDS

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

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

GAGE.--Water-stage recorder and artificial control. Datum of gage is 1,271.76 ft above National Geodetic Vertical Datum of 1929, Coast and Geodetic Survey benchmark. Aug. 31, 1950, to Oct. 22, 1985, gage located on right bank 300 ft downstream of present site and datum. Prior to Aug. 3, 1950, nonrecording gage at site 150 ft downstream of present site at same datum.

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor. Flow regulated by Lake Ashtabula (station 05057500) 108.5 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	2.4	e7.5	e2.8	e4.2	e7.8	e51	53	47	32	21	15
2	.72	4.4	e6.5	e2.5	5.1	e7.6	e54	60	45	33	20	14
3	.67	e6.5	e6.0	e2.2	5.5	e7.5	e57	65	42	55	19	12
4	.58	e8.5	e5.5	e2.0	6.2	8.0	60	73	39	64	17	11
5	.83	e9.0	e7.0	e1.8	7.1	8.0	67	78	35	58	16	9.6
6	2.8	e9.5	8.0	e1.7	9.1	8.4	61	81	33	50	16	7.6
7	2.2	e9.7	8.1	e1.5	10	8.0	57	80	30	45	15	5.4
8	1.3	e9.9	8.0	e1.3	11	8.4	55	76	27	42	14	5.9
9	1.2	e10	8.3	e1.0	11	8.0	52	75	24	42	12	5.8
10	.98	e10	8.9	e.75	10	8.7	46	73	23	42	11	7.1
11	.93	e11	9.5	e.80	10	9.4	42	69	23	43	10	7.0
12	.78	e12	9.8	e.90	10	9.8	41	64	20	43	9.6	6.7
13	1.0	e15	9.4	e1.5	11	10	40	59	19	45	8.8	5.6
14	2.0	e19	9.2	e2.0	e9.5	12	38	61	19	45	8.1	5.9
15	2.1	e21	9.0	e2.5	e9.0	14	38	63	22	46	8.0	5.2
16	2.0	e23	8.7	e3.0	e9.0	15	36	67	21	51	9.5	4.9
17	2.4	e22	8.4	e3.0	e8.8	17	35	65	22	56	9.5	3.5
18	2.2	e19	e7.8	e4.5	e8.6	19	34	65	22	57	8.8	1.7
19	4.4	e16	e7.6	e6.0	e8.5	23	33	58	24	56	7.7	15
20	3.8	e13	e7.4	e5.8	e9.4	26	33	53	30	57	6.7	23
21	2.9	e12	e7.0	e5.6	e9.7	32	32	49	35	55	5.2	20
22	3.2	e11	e6.5	e6.0	e9.5	40	32	49	38	55	3.8	17
23	4.4	e10	e6.0	e5.8	e9.3	42	31	59	37	54	4.0	28
24	4.3	e9.5	e5.8	e5.5	e9.0	43	31	64	35	52	4.4	27
25	4.1	e9.0	e5.5	e4.5	e8.0	45	33	59	35	46	12	26
26	3.9	e8.8	e5.0	e4.3	e8.0	45	32	54	34	41	11	28
27	3.5	e8.6	e4.5	e4.2	e8.0	35	33	52	31	36	6.6	31
28	6.7	e8.4	e4.0	e4.2	e8.0	39	37	49	29	31	3.5	32
29	6.0	e8.0	e3.5	e4.2	---	45	37	47	28	28	1.5	33
30	3.7	e8.0	e3.2	e4.0	---	47	45	48	32	25	9.0	36
31	2.6	---	e3.0	e3.8	---	48	---	49	---	23	15	---
TOTAL	79.29	344.2	214.6	99.65	242.5	696.6	1273	1917	901	1408	323.7	449.9
MEAN	2.56	11.5	6.92	3.21	8.66	22.5	42.4	61.8	30.0	45.4	10.4	15.0
MAX	6.7	23	9.8	6.0	11	48	67	81	47	64	21	36
MIN	.58	2.4	3.0	.75	4.2	7.5	31	47	19	23	1.5	1.7
AC-FT	157	683	426	198	481	1380	2520	3800	1790	2790	642	892

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1991, BY WATER YEAR (WY)

	MEAN	25.0	24.8	16.0	10.2	10.8	156	559	215	112	67.3	30.4	22.0
MAX	114	71.0	61.0	28.9	74.7	1094	2293	1953	435	229	214	155	
(WY)	1983	1986	1983	1983	1981	1983	1950	1950	1974	1987	1987	1957	
MIN	.83	2.83	3.14	1.94	.000	2.14	42.4	37.3	6.66	3.84	.68	.000	
(WY)	1964	1977	1977	1964	1963	1964	1991	1961	1961	1961	1961	1959	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1945 - 1991

ANNUAL TOTAL	8685.99	7949.44	
ANNUAL MEAN	23.8	21.8	104
HIGHEST ANNUAL MEAN			399
LOWEST ANNUAL MEAN			13.2
HIGHEST DAILY MEAN	154	Jun 30	7410
LOWEST DAILY MEAN	.58	Oct 4	.00
ANNUAL SEVEN-DAY MINIMUM	1.0	Sep 29	.00
INSTANTANEOUS PEAK FLOW			7830
INSTANTANEOUS PEAK STAGE			18.69
ANNUAL RUNOFF (AC-FT)	17230	15770	75220
10 PERCENT EXCEEDS	71	54	210
50 PERCENT EXCEEDS	11	11	21
90 PERCENT EXCEEDS	2.8	2.8	3.6

e Estimated.

RED RIVER OF THE NORTH BASIN

73

05057000 SHEYENNE RIVER NEAR COOPERSTOWN, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
24...	1335	4.3	965	--	5.0	6.0	--	--	--	--	--	--
NOV												
28...	1050	8.2	1120	--	-7.5	1.5	--	--	--	--	--	--
JAN												
24...	1130	5.4	1370	--	-17.0	0.0	--	--	--	--	--	--
MAR												
05...	1110	8.1	1110	--	-6.0	1.0	--	--	--	--	--	--
28...	1010	36	638	7.0	-0.5	1.0	200	45	20	41	31	1
APR												
04...	1255	62	485	--	20.0	3.0	--	--	--	--	--	--
MAY												
02...	1220	58	943	--	7.0	5.5	--	--	--	--	--	--
JUN												
26...	1110	35	860	--	18.5	22.0	--	--	--	--	--	--
JUL												
29...	1440	28	702	7.4	24.0	22.5	240	50	29	60	34	2
SEP												
23...	1505	34	788	--	10.5	12.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
28...	6.4	240	0	200	84	12	0.20	11	329	337	0.45	
JUL												
29...	8.4	350	0	290	81	11	0.20	23	465	436	0.63	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
28...	32.0	<1	90	90	<1	30	270	0.1	2	<1	240	
JUL												
29...	35.2	5	110	20	<1	50	50	<0.1	5	<1	330	

RED RIVER OF THE NORTH BASIN

05057200 BALDHILL CREEK NEAR DAZEY, ND

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

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.1	1.1	e.00	e.00	e.00	3.4	5.3	4.0	1.9	e.22	e.01
2	.76	1.0	1.1	e.00	e.01	e.00	3.6	4.6	3.6	1.9	e.20	e.01
3	.43	.96	1.0	e.00	e.05	e.00	4.3	4.4	3.0	1.5	e.20	e.01
4	.28	.85	1.1	e.00	e.10	e.01	5.1	6.6	2.7	1.3	e.20	e.01
5	.20	.80	1.1	e.00	e.20	e.05	4.9	5.9	2.5	1.3	e.20	e.01
6	.69	.77	1.2	e.00	e.30	e.05	3.3	4.9	1.8	1.3	e.20	e.01
7	1.4	.77	1.2	e.00	e.35	e.15	3.6	4.3	1.6	1.3	e.20	e.01
8	.99	.82	1.3	e.00	e.40	e.50	3.4	3.5	1.8	1.1	e.20	e.01
9	.73	.89	1.3	e.00	e.30	e.10	3.2	3.6	2.1	.98	e.20	e.05
10	.54	1.0	1.3	e.00	e.20	1.5	2.4	5.6	2.0	.80	e.20	e.10
11	.47	1.0	1.3	e.00	e.10	1.7	2.0	8.0	1.5	.66	e.20	e.15
12	.39	1.1	1.3	e.00	e.05	1.7	2.2	7.8	1.3	.79	e.20	e.20
13	.34	1.2	1.2	e.00	e.00	1.8	2.5	7.4	1.5	.90	e.20	e.22
14	.85	1.2	1.2	e.00	e.00	2.2	2.8	6.7	1.9	.78	e.20	e.24
15	.87	1.2	1.2	e.00	e.00	2.8	2.8	11	6.0	.68	e.18	e.26
16	.81	1.2	1.2	e.00	e.00	2.4	2.9	11	9.7	.68	e.16	e.28
17	1.0	1.2	1.1	e.00	e.00	2.7	2.8	9.0	6.8	.67	e.14	e.30
18	1.1	1.4	1.0	e.00	e.00	3.5	2.6	6.7	4.2	.65	e.12	e.32
19	1.2	1.4	e.90	e.00	e.00	3.9	3.0	6.0	2.5	.63	e.10	e.34
20	1.2	1.4	e.80	e.00	e.00	4.7	2.3	5.0	1.8	.52	e.09	e.34
21	1.2	1.4	e.60	e.00	e.00	5.4	1.9	4.4	1.9	e.45	e.08	e.34
22	1.3	1.2	e.40	e.00	e.00	5.2	1.9	4.4	1.7	e.40	e.07	e.34
23	1.2	1.3	e.30	e.00	e.00	4.2	1.9	24	1.5	e.38	e.06	1.7
24	1.2	1.4	e.20	e.00	e.00	4.1	1.8	16	1.6	e.36	e.05	1.8
25	1.2	1.2	e.10	e.00	e.00	4.1	1.6	9.4	1.6	e.32	e.04	.58
26	1.6	1.2	e.05	e.00	e.00	4.1	2.3	9.2	1.2	e.30	e.03	.36
27	1.4	1.1	e.02	e.00	e.00	3.1	4.5	10	.93	e.28	e.02	e.20
28	1.2	1.1	e.01	e.00	e.00	3.4	4.5	7.3	.87	e.26	e.02	e.16
29	1.4	1.0	e.00	e.00	---	2.9	5.0	5.7	1.1	1.1	e.02	e.14
30	1.2	1.1	e.00	e.00	---	2.9	6.2	4.5	1.4	.42	e.02	1.3
31	1.2	---	e.00	e.00	---	3.2	---	3.8	---	e.24	e.02	---
TOTAL	29.65	33.26	24.58	0.00	2.06	73.26	94.7	226.0	76.10	24.85	4.04	9.80
MEAN	.96	1.11	.79	.000	.074	2.36	3.16	7.29	2.54	.80	.13	.33
MAX	1.6	1.4	1.3	.00	.40	5.4	6.2	24	9.7	1.9	.22	1.8
MIN	.20	.77	.00	.00	.00	.00	1.6	3.5	.87	.24	.02	.01
AC-FT	59	66	49	.00	4.1	145	188	448	151	49	8.0	19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1991, BY WATER YEAR (WY)

	4.20	3.79	2.08	.81	1.16	41.9	87.2	16.7	11.0	6.64	2.34	3.96
MEAN	4.20	3.79	2.08	.81	1.16	41.9	87.2	16.7	11.0	6.64	2.34	3.96
MAX	29.8	20.5	7.42	3.05	5.37	270	654	82.0	50.6	35.7	6.80	58.5
(WY)	1958	1958	1958	1987	1983	1987	1979	1979	1970	1975	1965	1957
MIN	.94	.38	.15	.000	.000	.59	2.44	1.71	.91	.021	.076	.094
(WY)	1989	1960	1959	1959	1957	1964	1981	1981	1961	1989	1984	1984

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1956 - 1991

ANNUAL TOTAL	1230.13	598.30	
ANNUAL MEAN	3.37	1.64	15.1
HIGHEST ANNUAL MEAN			62.4
LOWEST ANNUAL MEAN			1.52
HIGHEST DAILY MEAN	24 Jun 13	24 May 23	4500 Apr 19 1979
LOWEST DAILY MEAN	.00 Jan 1	.00 Dec 29	.00 Jan 25 1957
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Dec 29	.00 Jan 25 1957
INSTANTANEOUS PEAK FLOW		50 May 23	a9000 Apr 19 1979
INSTANTANEOUS PEAK STAGE		6.74 May 23	b17.78 Apr 19 1979
ANNUAL RUNOFF (AC-FT)	2440	1190	10930
10 PERCENT EXCEEDS	12	4.4	22
50 PERCENT EXCEEDS	1.2	.99	2.6
90 PERCENT EXCEEDS	.00	.00	.20

e Estimated.

a About, based on indirect measurement of peak flow at site 4.5 mi downstream.

b From floodmark.

RED RIVER OF THE NORTH BASIN

75

05057200 BALDHILL CREEK NEAR DAZEY, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
24...	1115	1.2	970	--	4.0	5.0	--	--	--	--	--	--
NOV												
28...	1225	1.1	1000	--	-5.0	2.0	--	--	--	--	--	--
MAR												
15...	1345	2.7	--	--	4.5	0.5	--	--	--	--	--	--
a20...	1215	4.9	638	7.8	6.0	1.0	250	61	24	29	20	0.8
APR												
04...	1100	5.1	477	--	18.5	4.5	--	--	--	--	--	--
MAY												
02...	1025	4.2	830	--	2.0	3.5	--	--	--	--	--	--
JUN												
25...	1400	1.7	970	--	23.0	20.0	--	--	--	--	--	--
JUL												
a29...	1130	0.24	934	7.2	20.5	20.0	290	40	45	88	39	2
SEP												
23...	1330	0.35	1110	--	12.5	14.0	--	--	--	--	--	--

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR											
a20...	6.2	260	0	210	110	10	0.10	17	403	386	0.55
JUL											
a29...	13	220	0	180	270	25	0.20	5.3	625	595	0.85
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR											
a20...	5.32	1	100	60	<1	30	80	<0.1	3	<1	340
JUL											
a29...	0.41	2	110	10	<1	80	50	0.1	<1	<1	420

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05057500 LAKE ASHTABULA AT BALDHILL DAM, ND

LOCATION.--Lat 47°02'00", long 98°05'00", in NW¹/₄ sec.18, T.141 N., R.58 W., Barnes County, Hydrologic Unit 09020203 at Baldhill Dam on Sheyenne River, and 8 mi northwest of Valley City.

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

MONTHEND-ELEVATION AND CONTENTS RECORDS

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

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

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

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

COOPERATION.--Records furnished by U.S. Army Corps of Engineers.

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

EXTREMES FOR CURRENT YEAR.--Maximum contents, 69,140 acre-ft, July 20, elevation, 1,265.74 ft; minimum, 56,400 acre-ft, Feb. 3, elevation, 1,263.38 ft.

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	1,263.98	59,450	--
Oct. 31-----	1,263.70	58,000	-1,450
Nov. 30-----	1,263.54	57,200	-800
Dec. 31-----	1,263.44	56,700	-500
CAL YR 1990-----	--	--	-950
Jan. 31-----	1,263.39	56,450	-250
Feb. 28-----	1,263.43	56,650	+200
Mar. 31-----	1,263.75	58,250	+1,600
Apr. 30-----	1,264.55	62,520	+4,270
May 31-----	1,265.47	67,630	+5,110
June 30-----	1,265.60	68,360	+730
July 31-----	1,265.57	68,190	-170
Aug. 31-----	1,264.94	64,670	-3,520
Sept. 30-----	1,264.66	63,130	-1,540
WTR YR 1991-----	--	--	+3,680

RED RIVER OF THE NORTH BASIN

77

05058000 SHEYENNE RIVER BELOW BALDHILL DAM, ND

LOCATION.--Lat 47°01'50", long 98°05'50", in NW $\frac{1}{4}$ sec.18, T.141 N., R.58 W., Barnes County, Hydrologic Unit 09020204, on right bank 600 ft downstream from Baldhill Dam, 8 mi northwest of Valley City, and at mile 270.5.

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.5	12	e8.9	e6.9	8.5	e8.3	8.1	9.6	15	26	28	29
2	9.2	12	e8.9	e6.9	8.8	e8.3	8.1	13	15	26	27	30
3	9.6	12	8.8	e6.9	8.8	e8.3	8.1	12	15	26	26	30
4	9.7	12	8.7	e6.9	8.8	8.4	8.1	8.8	15	26	26	23
5	9.8	10	8.5	e6.8	8.8	8.5	8.1	7.5	15	26	28	16
6	10	8.5	8.5	e6.6	8.6	e8.4	7.8	7.8	16	26	27	14
7	9.8	8.5	8.5	e6.6	8.6	8.3	7.3	8.3	16	26	27	14
8	10	8.5	8.5	e6.6	8.4	5.8	7.2	5.8	16	26	25	14
9	8.4	8.5	8.5	e6.5	8.5	6.6	6.6	6.3	16	26	26	14
10	6.5	8.5	8.5	e6.5	e8.5	7.9	6.4	11	14	26	28	13
11	5.9	8.5	8.5	e6.5	e8.5	7.8	5.8	10	13	26	28	13
12	5.6	8.5	8.4	e6.5	8.5	7.7	5.8	10	13	26	29	13
13	5.6	8.5	e8.4	e6.7	8.4	7.5	5.6	11	13	26	30	13
14	5.7	8.5	8.5	e6.6	e8.4	7.7	4.6	11	13	26	30	13
15	3.1	8.8	8.5	e7.0	e8.4	8.0	7.1	11	13	27	30	13
16	.11	8.8	8.5	e7.2	e8.4	8.1	10	11	12	27	31	13
17	.08	8.8	8.5	e7.6	e8.4	8.0	9.6	12	12	27	31	14
18	.06	8.8	8.5	8.0	e8.4	7.8	9.5	13	13	27	29	14
19	.05	8.0	e8.4	8.5	e8.4	7.9	9.4	13	13	29	29	14
20	.04	8.0	e8.4	8.7	8.8	8.1	9.7	13	13	24	28	14
21	.05	8.8	e8.3	9.0	8.7	8.1	9.1	13	13	25	30	14
22	.04	9.1	e8.2	9.3	e8.7	8.1	8.5	14	13	27	32	14
23	.05	9.1	e8.1	9.5	e8.7	8.0	8.2	14	13	29	30	14
24	.05	9.1	e8.0	9.7	e8.6	8.0	8.2	14	13	29	31	14
25	.05	9.1	e7.9	9.8	e8.5	7.9	8.3	14	13	30	32	15
26	.04	9.1	e7.8	9.5	e8.4	7.9	8.3	14	13	28	31	15
27	6.3	9.1	e7.6	9.2	e8.3	8.3	8.3	15	13	29	30	14
28	13	9.1	e7.5	e9.0	e8.3	8.3	8.7	15	21	28	31	14
29	13	9.1	e7.2	e9.0	---	8.5	9.1	15	27	26	31	14
30	13	8.9	e7.0	e8.5	---	8.3	8.2	15	26	26	30	14
31	13	---	e7.0	e8.3	---	8.1	---	15	---	26	29	---
TOTAL	177.32	276.2	255.5	241.3	239.1	246.9	237.8	363.1	446	828	900	473
MEAN	5.72	9.21	8.24	7.78	8.54	7.96	7.93	11.7	14.9	26.7	29.0	15.8
MAX	13	12	8.9	9.8	8.8	8.5	10	15	27	30	32	30
MIN	.04	8.0	7.0	6.5	8.3	5.8	4.6	5.8	12	24	25	13
AC-FT	352	548	507	479	474	490	472	720	885	1640	1790	938

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1991, BY WATER YEAR (WY)

	MEAN	40.3	58.4	55.1	52.5	58.3	160	484	260	145	78.5	37.2	34.3
MAX	153	238	191	140	200	1236	1936	2906	1154	246	216	272	
(WY)	1982	1983	1987	1986	1969	1983	1969	1950	1950	1950	1987	1957	
MIN	1.92	5.27	4.32	3.64	7.66	7.81	2.07	6.86	5.88	7.28	6.72	.81	
(WY)	1956	1956	1980	1956	1956	1955	1953	1959	1958	1959	1977	1955	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1950 - 1991

ANNUAL TOTAL	6278.02	4684.22	
ANNUAL MEAN	17.2	12.8	122
HIGHEST ANNUAL MEAN			521
LOWEST ANNUAL MEAN			12.8
HIGHEST DAILY MEAN	110	Sep 15	4710
LOWEST DAILY MEAN	.04	Oct 20	.00
ANNUAL SEVEN-DAY MINIMUM	.05	Oct 20	.00
INSTANTANEOUS PEAK FLOW		82	Jul 25
INSTANTANEOUS PEAK STAGE		26.60	Jul 25
ANNUAL RUNOFF (AC-FT)	12450	9290	88180
10 PERCENT EXCEEDS	38	27	249
50 PERCENT EXCEEDS	12	9.1	36
90 PERCENT EXCEEDS	7.2	6.7	8.8

e Estimated.

RED RIVER OF THE NORTH BASIN

05058000 SHEYENNE RIVER BELOW BALDHILL DAM, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 25...	1145	0.05	760	--	7.0	4.5	--	--	--	--	--	--
DEC 14...	1035	8.7	850	--	0.0	2.0	--	--	--	--	--	--
JAN 24...	1525	9.9	910	--	-9.0	1.5	--	--	--	--	--	--
MAR 08...	1140	7.8	863	--	-4.5	1.0	--	--	--	--	--	--
APR 02...	1305	8.3	1090	7.5	16.5	8.0	360	69	46	95	35	2
MAY 03...	1120	12	869	--	2.0	6.0	--	--	--	--	--	--
JUN 25...	1130	14	791	--	19.0	23.0	--	--	--	--	--	--
JUL 31...	1145	26	762	8.7	28.0	23.0	240	43	33	74	38	2
SEP 23...	1220	14	763	--	12.0	14.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 02...	12	420	0	340	200	23	0.20	31	699	683	0.95	
JUL 31...	12	290	0	240	150	18	0.20	6.4	495	480	0.67	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 02...	15.6	7	180	20	1	80	2000	<0.1	<1	<1	450	
JUL 31...	34.6	5	110	10	<1	60	220	0.2	<1	1	350	

RED RIVER OF THE NORTH BASIN

79

05058500 SHEYENNE RIVER AT VALLEY CITY, ND

LOCATION.--Lat 46°54'50", long 98°00'30", in SE¹/₄NW¹/₄, sec.28, T.140 N., R.58 W., Barnes County, Hydrologic Unit 09020204, on left bank 100 ft downstream from College Dam in Valley City, and at mile 253.0.

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

GAGE-HEIGHT RECORDS

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

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

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

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 77 ft³/s, Aug. 24, gage height, 3.37 ft, minimum not determined.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.43	2.88	2.83	2.81	2.82	2.82	2.81	2.83	2.84	3.10	2.99	3.00
2	2.41	2.88	2.83	2.81	2.83	2.81	2.81	2.79	2.84	3.04	3.00	3.00
3	2.43	2.86	2.82	2.81	2.85	2.82	2.81	2.89	2.86	3.01	3.00	3.02
4	2.65	2.86	2.84	2.81	2.87	2.84	2.83	2.97	2.89	3.01	2.99	3.03
5	2.78	2.86	2.82	2.81	2.86	2.88	2.83	2.92	2.90	3.01	2.98	3.00
6	2.84	2.87	2.82	2.81	2.86	2.84	2.82	2.87	2.90	3.01	2.98	2.94
7	2.83	2.84	2.82	2.81	2.84	2.83	2.81	2.82	2.89	3.02	2.99	2.89
8	2.84	2.82	2.82	2.81	2.84	2.82	2.81	2.80	2.89	3.01	2.99	2.99
9	2.84	2.82	2.83	2.81	2.83	2.85	2.80	2.79	2.88	3.02	2.98	2.96
10	2.86	2.82	2.83	2.81	2.82	2.87	2.78	2.78	2.88	3.00	2.97	2.90
11	2.86	2.82	2.83	2.81	2.82	2.89	2.76	2.79	2.85	3.08	2.97	2.87
12	2.83	2.79	2.82	2.81	2.81	2.86	2.78	2.79	2.83	3.06	2.98	2.87
13	2.82	2.82	2.81	2.80	2.82	2.84	2.83	2.81	2.85	3.02	2.98	2.86
14	2.81	2.83	2.80	2.82	2.80	2.84	2.83	2.80	2.92	2.99	2.98	2.88
15	2.79	2.84	2.82	2.82	2.80	2.83	2.80	2.98	2.90	2.98	2.98	2.91
16	2.79	2.84	2.82	2.82	2.80	2.82	2.79	2.92	2.86	3.00	3.00	2.89
17	2.87	2.84	2.82	2.84	2.82	2.82	2.79	2.82	2.86	3.02	3.00	2.88
18	2.75	2.84	2.82	2.82	2.82	2.85	2.79	2.79	2.83	3.01	2.99	2.88
19	2.69	2.84	2.82	2.84	2.82	2.85	2.78	2.79	2.79	3.00	3.00	2.86
20	2.70	2.84	2.82	2.84	2.83	2.85	2.77	2.83	2.87	3.01	2.99	2.86
21	2.67	2.85	2.82	2.83	2.83	2.86	2.75	2.85	2.84	2.98	2.97	2.85
22	2.65	2.84	2.82	2.82	2.83	2.85	2.75	2.95	2.80	2.99	2.97	2.87
23	2.67	2.83	2.82	2.83	2.84	2.84	2.73	3.18	2.80	2.98	3.01	2.84
24	2.68	2.83	2.81	2.82	2.83	2.82	2.68	3.06	2.79	2.99	3.06	2.85
25	2.71	2.83	2.81	2.80	2.82	2.82	2.68	2.95	2.76	3.00	3.07	2.86
26	2.70	2.84	2.81	2.81	2.82	2.82	2.68	2.94	2.75	3.01	3.03	2.85
27	2.69	2.84	2.81	2.82	2.82	2.81	2.86	2.96	2.72	3.01	3.02	2.85
28	2.59	2.82	2.81	2.83	2.82	2.80	2.82	2.92	2.87	3.02	3.00	2.85
29	2.78	2.82	2.81	2.83	---	2.79	2.82	2.90	3.25	2.99	3.00	2.87
30	2.86	2.82	2.81	2.82	---	2.79	2.90	2.87	3.17	2.98	3.01	2.89
31	2.88	---	2.81	2.82	---	2.81	---	2.85	---	2.98	3.00	---
MEAN	2.73	2.84	2.82	2.82	2.83	2.83	2.79	2.88	2.87	3.01	3.00	2.90
MAX	2.88	2.88	2.84	2.84	2.87	2.89	2.90	3.18	3.25	3.10	3.07	3.03
MIN	2.41	2.79	2.80	2.80	2.80	2.79	2.68	2.78	2.72	2.98	2.97	2.84

RED RIVER OF THE NORTH BASIN
05058500 SHEYENNE RIVER AT VALLEY CITY, ND--CONTINUED
WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
APR 02...	1115	11	705	7.7	11.0	6.0	230	45	29	59	34	2
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 02...	9.5	270	0	220	130	18	0.10	16	463	438	0.63	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 02...	14.0	4	110	10	<1	50	220	0.1	<1	<1	140	

RED RIVER OF THE NORTH BASIN

81

05058700 SHEYENNE RIVER AT LISBON, ND

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

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	6.4	9.1	e5.0	7.9	11	24	30	42	71	26	29
2	49	6.0	8.8	e5.5	8.3	10	30	33	44	243	27	27
3	48	4.9	8.9	e5.5	9.1	11	25	40	39	178	27	23
4	42	4.3	9.6	e6.0	10	10	24	56	35	133	26	23
5	32	6.0	9.1	e6.0	12	18	22	54	34	102	24	23
6	21	14	9.9	e7.0	15	18	23	56	31	80	25	22
7	14	15	10	e8.0	17	18	21	59	28	64	27	23
8	10	17	11	7.9	19	22	21	56	30	56	28	79
9	7.3	17	12	8.3	20	27	18	47	34	52	27	59
10	5.4	16	13	8.5	e18	37	15	40	35	49	26	48
11	5.3	18	13	9.3	e14	43	15	33	34	47	26	38
12	4.3	15	14	9.2	e12	47	16	27	31	45	25	29
13	3.7	14	13	8.8	e11	43	22	24	29	44	25	26
14	3.6	16	12	9.3	e10	45	26	20	37	40	27	31
15	4.1	14	e11	9.4	e9.0	44	25	26	51	40	26	28
16	11	13	e10	9.1	e8.5	43	23	33	54	54	29	23
17	25	13	e9.0	9.4	e8.0	43	22	34	53	54	26	21
18	23	13	e8.5	9.4	e7.5	42	20	40	51	60	26	13
19	22	13	e7.5	11	e7.5	43	20	46	52	39	27	11
20	21	14	e7.0	11	e7.5	47	18	43	68	17	27	11
21	17	15	e7.0	9.7	e7.5	50	16	35	66	29	25	12
22	14	16	e6.5	9.7	e7.5	51	14	33	49	30	24	14
23	14	13	e6.5	9.8	e7.5	47	12	45	42	30	27	11
24	14	15	e6.0	8.6	e7.5	47	11	62	36	29	28	12
25	12	5.6	e6.0	7.8	e8.0	47	10	141	32	26	41	11
26	11	13	e5.5	6.9	9.8	45	10	132	29	25	31	8.7
27	9.4	9.4	e5.5	6.2	9.9	34	24	106	27	28	26	8.5
28	6.9	11	e5.0	7.0	9.9	34	23	84	28	26	26	8.5
29	7.3	10	e5.0	7.4	---	30	25	61	27	24	28	10
30	5.3	8.8	e5.0	7.6	---	29	33	53	29	24	34	10
31	6.0	---	e5.0	8.3	---	26	---	39	---	25	34	---
TOTAL	520.6	366.4	269.4	252.6	298.9	1062	608	1588	1177	1764	851	692.7
MEAN	16.8	12.2	8.69	8.15	10.7	34.3	20.3	51.2	39.2	56.9	27.5	23.1
MAX	52	18	14	11	20	51	33	141	68	243	41	79
MIN	3.6	4.3	5.0	5.0	7.5	10	10	20	27	17	24	8.5
AC-FT	1030	727	534	501	593	2110	1210	3150	2330	3500	1690	1370

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1991, BY WATER YEAR (WY)

	MEAN	48.0	66.4	61.4	57.1	68.3	277	614	268	152	113	47.1	42.8
MAX	141	195	190	140	202	1328	2548	1989	555	700	263	323	
(WY)	1982	1983	1987	1986	1969	1987	1969	1979	1974	1975	1987	1957	
MIN	7.66	12.2	8.69	8.15	10.7	19.8	20.3	17.5	14.8	6.07	6.54	5.25	
(WY)	1957	1991	1991	1991	1991	1964	1991	1959	1961	1973	1961	1959	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1957 - 1991

ANNUAL TOTAL	9556.5	9450.6	
ANNUAL MEAN	26.2	25.9	151
HIGHEST ANNUAL MEAN			393
LOWEST ANNUAL MEAN			25.9
HIGHEST DAILY MEAN	289	243	5210
LOWEST DAILY MEAN	3.6	3.6	.00
ANNUAL SEVEN-DAY MINIMUM	4.8	4.8	.87
INSTANTANEOUS PEAK FLOW		261	5270
INSTANTANEOUS PEAK STAGE		3.49	19.04
ANNUAL RUNOFF (AC-FT)	18960	18750	109400
10 PERCENT EXCEEDS	43	49	313
50 PERCENT EXCEEDS	20	22	49
90 PERCENT EXCEEDS	9.1	7.2	14

e Estimated.

RED RIVER OF THE NORTH BASIN

05058700 SHEYENNE RIVER AT LISBON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 29...	1050	9.4	1110	--	1.0	5.0	--	--	--	--	--	--
JAN 07...	1105	8.6	1110	--	-19.5	0.0	--	--	--	--	--	--
FEB 28...	0935	9.8	1080	--	-10.5	1.0	--	--	--	--	--	--
MAR 26...	1030	47	631	8.1	-5.0	1.0	240	53	25	64	36	2
MAY 02...	1110	33	985	--	5.5	7.0	--	--	--	--	--	--
JUN 04...	1100	35	786	--	21.0	11.5	--	--	--	--	--	--
JUL 11...	1410	47	641	--	25.0	21.5	--	--	--	--	--	--
AUG 20...	1020	26	1060	8.2	23.5	22.0	320	67	36	97	39	2
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 26...	9.1	220	0	180	150	34	0.20	11	437	456	0.59	
AUG 20...	14	320	0	260	210	42	0.30	16	678	643	0.92	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 26...	55.0	2	170	70	<1	50	100	0.2	3	<1	350	
AUG 20...	47.6	7	180	10	<1	80	130	<0.1	8	<1	500	

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

LOCATION.--Lat 46°37'54", long 97°00'01", in SE¹/₄SE¹/₄SW¹/₄ sec.33, T.137 N., R.50 W., Cass County, Hydrologic Unit 09020204, on left bank 100 ft downstream from North Dakota State Highway 46 bridge crossing, 1.5 mi southeast of Kindred, and at mile 67.9.

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 925.55 ft above National Geodetic Vertical Datum of 1929. From Oct. 1 1962, to Sept. 30 1989, gage was located at site 1,500 ft upstream. July 1949 to Sept. 30, 1962, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for period of estimated daily discharges, which are poor. Flow regulated to a large degree by Lake Ashtabula (station 05057500) 202 mi upstream and several small reservoirs.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	76	36	e21	e12	e18	e26	116	95	109	64	30	31
2	72	35	e20	e13	e18	e25	119	91	93	65	29	31
3	70	33	e19	e14	e18	e24	110	83	84	61	27	34
4	68	30	e19	e14	e19	e24	96	107	77	58	25	30
5	66	29	e20	e15	e20	e24	83	109	68	65	24	35
6	61	25	e21	e16	e21	e25	78	101	68	142	26	37
7	59	15	e22	e16	e22	e27	75	102	69	148	30	35
8	59	24	e23	e17	e23	e28	71	103	64	125	29	40
9	56	29	e23	e17	e24	e29	67	97	62	111	26	46
10	53	29	e24	e18	e25	e30	65	94	59	97	23	68
11	50	30	e24	e18	e28	e34	64	94	57	85	23	74
12	45	30	e24	e18	e29	e38	62	92	50	76	26	85
13	42	29	e24	e18	e30	e41	64	84	50	69	29	81
14	38	44	e23	e18	e30	e45	67	77	53	67	29	73
15	33	45	e23	e18	e31	e50	71	71	61	67	25	66
16	31	44	e22	e18	e32	e55	71	65	66	60	21	59
17	38	42	e21	e18	e32	e70	67	63	62	61	24	52
18	40	41	e20	e18	e32	e80	65	63	60	56	24	49
19	40	38	e19	e18	e32	e85	63	61	60	50	28	52
20	39	42	e18	e18	e32	e95	62	61	66	47	34	51
21	36	40	e17	e18	e32	110	60	63	74	48	35	47
22	39	38	e16	e17	e31	109	60	65	76	48	33	43
23	44	31	e15	e16	e30	98	59	68	77	47	30	40
24	41	e30	e14	e15	e28	100	59	70	86	55	27	35
25	40	e28	e13	e17	e26	108	58	69	88	45	30	32
26	39	e25	e12	e20	e27	124	56	67	82	33	34	29
27	40	e23	e12	e26	e28	122	59	69	71	32	39	29
28	38	e23	e11	e23	e27	106	63	86	63	37	42	30
29	37	e22	e11	e21	---	99	61	133	60	38	45	29
30	36	e22	e10	e20	---	94	80	134	58	32	48	28
31	37	---	e11	e19	---	107	---	123	---	29	37	---
TOTAL	1463	952	572	544	745	2032	2151	2660	2073	2018	932	1371
MEAN	47.2	31.7	18.5	17.5	26.6	65.5	71.7	85.8	69.1	65.1	30.1	45.7
MAX	76	45	24	26	32	124	119	134	109	148	48	85
MIN	31	15	10	12	18	24	56	61	50	29	21	28
AC-FT	2900	1890	1130	1080	1480	4030	4270	5280	4110	4000	1850	2720

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1991, BY WATER YEAR (WY)

	MEAN	68.9	81.8	72.8	67.2	74.3	263	672	421	254	193	82.5	64.4
MAX	186	231	205	170	221	1256	2464	3053	1938	1466	314	325	
(WY)	1966	1980	1987	1987	1976	1987	1969	1950	1950	1975	1987	1957	
MIN	24.6	22.7	17.6	17.5	21.7	35.1	71.7	53.6	48.4	26.7	17.5	25.1	
(WY)	1957	1956	1956	1991	1956	1956	1991	1990	1961	1988	1988	1959	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1949 - 1991

ANNUAL TOTAL	19001.2	17513		
ANNUAL MEAN	52.1	48.0		
HIGHEST ANNUAL MEAN			193	
LOWEST ANNUAL MEAN			633	1950
HIGHEST DAILY MEAN	265	Jun 8	4600	Apr 15 1969
LOWEST DAILY MEAN	9.2	Aug 16	9.2	Aug 16 1990
ANNUAL SEVEN-DAY MINIMUM	11	Dec 25	11	Dec 26 1990
INSTANTANEOUS PEAK FLOW			184	May 29
INSTANTANEOUS PEAK STAGE			3.32	Jul 6
ANNUAL RUNOFF (AC-FT)	37690	34740	139900	Jul 6 1975
10 PERCENT EXCEEDS	98	91	400	
50 PERCENT EXCEEDS	41	39	75	
90 PERCENT EXCEEDS	20	18	32	

e Estimated.

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	
OCT 23...	1050	45	764	8.3	9.5	4.5	5.0	6.8	53	K18	92	
DEC 11...	1050	25	1120	7.9	3.0	0.5	3.3	9.2	64	K26	K45	
JAN 10...	0945	18	1100	--	-25.0	0.0	--	--	--	--	--	
30...	1200	19	1000	--	-10.5	1.0	--	--	--	--	--	
FEB 21...	1100	34	1060	--	-2.0	0.5	--	--	--	--	--	
MAR 27...	0945	117	699	7.9	-9.5	0.5	5.5	10.2	72	K4	K54	
APR 04...	1245	99	728	--	15.5	3.0	--	--	--	--	--	
10...	0925	67	806	8.4	3.5	7.0	13	12.1	100	K4	190	
25...	1015	57	802	--	13.5	--	--	--	--	--	--	
MAY 29...	1030	127	1060	8.1	28.0	19.5	--	10.9	120	250	740	
JUL 08...	1115	126	692	--	22.5	20.5	--	--	--	--	--	
16...	1515	62	996	--	29.0	27.5	--	--	--	--	--	
AUG 15...	0900	25	856	8.4	27.5	25.0	12	7.7	94	--	--	
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)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)
OCT 23...	300	75	27	52	27	1	7.4	279	262	320	0	
DEC 11...	410	100	39	94	33	2	10	335	322	393	0	
MAR 27...	240	60	22	54	32	2	9.0	190	183	223	0	
APR 10...	290	75	26	56	29	1	8.8	244	244	290	4	
MAY 29...	350	86	34	93	36	2	10	267	267	326	0	
AUG 15...	310	78	29	66	31	2	10	268	--	--	--	
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)
OCT 23...	110	24	<0.10	19	473	472	0.64	56.8	0.010	<0.010	<0.100	
DEC 11...	210	44	0.30	17	722	708	0.98	48.5	<0.010	<0.010	<0.100	
MAR 27...	140	27	0.20	13	445	436	0.61	141	<0.010	<0.010	0.120	
APR 10...	160	34	0.20	9.5	525	517	0.71	94.5	0.030	<0.010	<0.050	
MAY 29...	210	52	0.20	15	684	661	0.93	235	0.020	<0.010	<0.050	
AUG 15...	160	35	0.30	21	565	561	0.77	38.6	0.010	<0.010	<0.050	

RED RIVER OF THE NORTH BASIN

85

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS 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)
OCT 23...	<0.100	0.010	<0.010	0.60	--	0.090	0.020	0.060	0.040	<10	4
DEC 11...	<0.100	0.030	0.030	0.50	--	0.050	0.030	0.030	0.010	--	--
MAR 27...	0.150	<0.010	<0.010	1.1	--	0.130	0.060	0.060	0.030	<10	3
APR 10...	<0.050	0.020	0.020	0.90	--	0.140	0.030	0.020	<0.010	20	4
MAY 29...	0.068	0.030	0.020	1.3	--	0.260	0.060	0.090	0.040	--	--
AUG 15...	<0.050	<0.010	0.040	0.90	1.2	0.170	0.070	0.060	0.050	20	10
DATE	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)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)
OCT 23...	100	<0.5	<1.0	<1	<3	4	17	<1	45	43	<0.1
MAR 27...	65	<0.5	<1.0	1	<3	2	60	1	41	100	<0.1
APR 10...	87	<0.5	<1.0	<1	<3	1	20	1	42	71	<0.1
AUG 15...	110	<0.5	<1.0	<1	<3	2	10	<1	49	12	<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. & FINER THAN .062 MM (70331)	
OCT 23...	<10	4	<1	<1.0	330	<6	21	71	8.5	24	
MAR 27...	<10	3	<1	<1.0	270	<6	4	86	27	56	
APR 10...	<10	3	<1	<1.0	330	<6	5	56	10	37	
MAY 29...	--	--	--	--	--	--	--	90	31	52	
AUG 15...	<10	4	<1	<1.0	390	<6	3	57	3.9	74	

RED RIVER OF THE NORTH BASIN

05059400 SHEYENNE RIVER NEAR HORACE, ND

LOCATION.--Lat 46°48'13", long 96°54'13", in NW1/4NW1/4, sec.5, T.138 N., R.49 W., Cass County, Hydrologic Unit 09020204, at bridge on county road 3 mi north and 0.1 mi east of Horace.

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

GAGE-HEIGHT RECORDS

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

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

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 140 ft³/s, Apr. 4, gage height, 6.48 ft; maximum gage height, 7.95 ft, Mar. 20, ice jam; minimum not determined.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.63	4.47	4.50	4.86	5.26	5.52	6.91	5.12	3.50	5.19	4.29	4.44
2	5.59	4.46	4.50	4.85	5.27	5.57	6.87	5.46	3.50	4.99	4.29	4.33
3	5.53	4.44	4.48	4.87	5.32	5.58	6.69	5.51	3.50	4.99	4.34	4.30
4	5.46	4.43	4.49	4.91	5.34	5.55	6.17	5.50	3.50	4.95	4.30	4.30
5	5.43	4.41	4.51	4.91	5.33	5.53	---	5.56	3.50	4.84	4.25	4.29
6	5.36	4.36	4.54	4.93	5.34	5.59	---	5.77	4.52	4.78	4.22	4.26
7	5.26	4.34	4.56	4.93	5.36	5.62	---	5.68	4.98	5.55	4.19	4.34
8	5.10	4.30	4.56	4.93	5.38	5.61	---	5.63	4.98	6.16	4.24	4.39
9	5.06	4.23	4.56	4.93	5.40	5.64	---	5.22	4.96	6.04	4.28	4.39
10	5.00	4.27	4.57	4.91	5.42	5.65	5.12	5.44	4.88	5.79	4.25	4.44
11	4.92	4.30	4.58	4.93	5.43	5.69	---	4.64	4.81	5.58	4.19	4.61
12	4.83	4.38	4.59	4.93	5.45	5.71	---	4.33	4.74	5.41	4.15	4.89
13	4.73	4.40	4.61	4.89	5.47	5.72	---	4.62	4.67	5.25	4.16	5.06
14	4.64	4.33	4.62	4.93	5.48	5.77	---	4.24	4.62	5.10	4.20	5.17
15	4.56	4.46	4.62	4.89	5.50	5.87	---	5.05	4.72	5.01	4.23	5.03
16	4.51	4.59	4.62	5.00	5.58	6.46	---	4.77	4.73	5.00	4.21	4.88
17	4.53	4.66	4.63	5.22	5.59	6.52	---	4.82	4.85	4.95	4.23	4.77
18	4.49	4.69	4.59	5.09	5.63	6.40	---	4.72	4.87	4.91	4.18	4.65
19	4.48	4.77	4.63	5.08	5.66	7.36	---	4.66	4.79	4.86	4.16	4.58
20	4.50	4.82	4.62	5.09	5.64	7.69	---	4.63	4.84	4.75	4.17	4.56
21	4.50	4.60	4.70	5.08	5.59	7.43	---	4.62	4.93	4.66	4.26	4.57
22	4.48	4.53	4.73	5.10	5.53	7.38	---	4.29	5.02	4.66	4.33	4.53
23	4.44	4.44	4.72	5.17	5.49	7.43	---	4.67	5.09	4.66	4.33	4.48
24	4.54	4.52	4.71	5.21	5.45	7.40	4.84	4.71	5.13	4.63	4.28	4.44
25	4.64	4.42	4.77	5.28	5.43	7.26	4.79	4.68	5.22	4.66	4.28	4.39
26	4.62	4.45	4.79	5.34	5.43	7.22	4.76	4.48	5.34	4.62	4.23	4.33
27	4.60	4.49	4.77	5.40	5.44	7.25	4.78	4.83	5.31	4.43	4.24	4.30
28	4.57	4.50	4.84	5.36	5.46	7.37	4.77	4.77	5.18	4.32	4.29	4.28
29	4.53	4.46	4.79	5.31	---	7.36	4.86	4.63	5.07	4.33	4.34	4.27
30	4.51	4.48	4.84	5.27	---	7.16	5.02	5.52	4.98	4.37	4.38	4.27
31	4.49	---	4.82	5.26	---	7.03	---	4.98	---	4.35	4.43	---
MEAN	4.82	4.47	4.64	5.06	5.45	6.43	---	4.95	4.69	4.96	4.26	4.52
MAX	5.63	4.82	4.84	5.40	5.66	7.69	---	5.77	5.34	6.16	4.43	5.17
MIN	4.44	4.23	4.48	4.85	5.26	5.52	---	4.24	3.50	4.32	4.15	4.26

RED RIVER OF THE NORTH BASIN

87

05059400 SHEYENNE RIVER NEAR HORACE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
APR 04...	0930	132	634	8.2	14.0	2.5	210	52	20	49	33	1
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 04...		6.5	210	0	170	110	28	0.20	12	392	381	0.53
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 04...		140	3	120	20	<1	40	280	0.1	<1	<1	290

RED RIVER OF THE NORTH BASIN

05059500 SHEYENNE RIVER AT WEST FARGO, ND

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

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

WATER-DISCHARGE RECORDS

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

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	90	37	22	e17	e22	e40	100	59	100	156	32	32
2	88	36	22	e18	e26	e45	100	64	91	56	30	33
3	88	34	22	e19	e28	e42	112	72	78	48	46	27
4	85	34	21	e20	e27	e39	91	76	68	46	30	24
5	83	34	22	e21	e27	e35	78	69	59	40	28	23
6	81	32	23	e22	e27	e34	73	76	53	36	26	24
7	79	24	24	e23	e28	e33	68	76	46	51	25	e26
8	75	e20	25	e24	e28	e32	65	75	45	125	25	e30
9	71	e22	26	e25	e29	e33	63	82	47	124	27	e32
10	70	24	27	e25	e29	e34	61	85	43	95	28	e38
11	68	26	e27	e26	e30	e34	59	81	40	98	27	e45
12	64	29	e28	e26	e31	e35	59	76	38	80	24	e60
13	60	30	e28	e26	e32	e35	58	74	36	72	23	e70
14	56	32	e28	e26	e33	e36	59	72	36	66	23	e80
15	50	34	e27	e26	e35	e40	58	66	43	64	25	e65
16	45	38	e26	e26	e36	e50	59	62	36	64	25	e55
17	40	36	e25	e27	e37	e60	60	58	39	68	25	e45
18	37	38	e24	e27	e38	e70	60	50	44	67	25	e40
19	40	42	e23	e26	e38	e80	59	48	41	66	23	e35
20	39	59	e22	e25	e38	e100	57	46	47	59	24	e30
21	39	48	e21	e23	e37	110	57	44	44	52	25	e28
22	39	37	e21	e22	e37	108	57	46	47	53	28	e26
23	38	31	e20	e21	e36	104	55	45	51	50	30	e24
24	38	28	e20	e22	e36	103	55	47	53	50	30	23
25	44	17	e19	e24	e36	111	54	49	56	57	30	22
26	44	22	e19	e29	e36	111	52	51	62	62	26	21
27	42	28	e18	e32	e36	108	56	52	62	43	25	19
28	40	27	e17	e29	e36	111	51	51	61	33	24	17
29	39	22	e16	e26	---	126	52	55	52	30	27	17
30	38	22	e15	e22	---	117	67	81	76	33	29	16
31	38	---	e16	e21	---	108	---	106	---	34	30	---
TOTAL	1748	944	694	746	909	2124	1955	1994	1594	1978	845	1027
MEAN	56.4	31.5	22.4	24.1	32.5	68.5	65.2	64.3	53.1	63.8	27.3	34.2
MAX	90	59	28	32	38	126	112	106	100	156	46	80
MIN	37	17	15	17	22	32	51	44	36	30	23	16
AC-FT	3470	1870	1380	1480	1800	4210	3880	3960	3160	3920	1680	2040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1991, BY WATER YEAR (WY)

	MEAN	59.8	70.0	59.2	52.0	57.6	214	674	396	239	166	81.7	58.9
MAX	194	241	227	176	211	1123	1789	2654	1785	1358	355	290	
(WY)	1966	1980	1987	1987	1976	1987	1969	1950	1950	1975	1987	1957	
MIN	9.88	12.4	7.48	6.37	5.47	6.76	65.2	54.0	25.2	14.7	7.46	7.43	
(WY)	1937	1937	1937	1940	1937	1940	1991	1959	1934	1934	1936	1976	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1903 - 1991

ANNUAL TOTAL	17334		16558										
ANNUAL MEAN	47.5		45.4										
HIGHEST ANNUAL MEAN										176			
LOWEST ANNUAL MEAN										584			1950
HIGHEST DAILY MEAN	150	Jun 9	156	Jul 1	3480	Apr 21	1979			37.1			1934
LOWEST DAILY MEAN	11	Aug 13	15	Dec 30	a1.0	Sep 23	1976			2.0			1976
ANNUAL SEVEN-DAY MINIMUM	12	Aug 12	270	Jul 1	3480	Apr 21	1979			b22.25			1975
INSTANTANEOUS PEAK FLOW			11.67	Jul 1									
INSTANTANEOUS PEAK STAGE													
ANNUAL RUNOFF (AC-FT)	34380		32840							127300			
10 PERCENT EXCEEDS	88		80							383			
50 PERCENT EXCEEDS	40		38							70			
90 PERCENT EXCEEDS	20		22							20			

e Estimated.

a Cased by diversion to Red River of the North.

b Backwater from Red and/or Maple Rivers.

RED RIVER OF THE NORTH BASIN

89

05059500 SHEYENNE RIVER AT WEST FARGO, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
DEC 13...	1310	32	1220	--	-2.5	0.0	--	--	--	--	--	--
JAN 09...	1440	25	1310	--	-21.0	0.0	--	--	--	--	--	--
JAN 30...	1420	22	1120	--	-14.0	1.0	--	--	--	--	--	--
FEB 21...	1415	37	1260	--	-3.0	0.5	--	--	--	--	--	--
MAR 12...	1150	36	995	7.6	2.0	0.5	6.7	45	320	78	30	75
MAR a28...	0845	108	678	7.9	-12.0	0.5	--	--	220	55	21	49
APR 02...	1240	99	656	--	4.0	1.5	--	--	--	--	--	--
APR 25...	1200	53	826	--	18.5	11.5	--	--	--	--	--	--
JUN 05...	1250	58	812	--	12.5	17.5	--	--	--	--	--	--
JUL 01...	1430	134	605	--	18.5	23.0	--	--	--	--	--	--
JUL 17...	1215	67	1100	--	28.0	27.0	--	--	--	--	--	--
AUG 19...	0940	23	856	8.3	25.5	20.0	--	--	300	72	30	66
SEP 24...	1045	22	989	--	9.5	10.5	--	--	--	--	--	--
DATE	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	
MAR 12...	33	2	9.0	--	--	--	262	320	0	180	42	
MAR a28...	31	1	6.6	220	0	180	--	--	--	130	28	
AUG 19...	31	2	11	320	0	260	--	--	--	160	37	
DATE	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	NITRO- SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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)	GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	
MAR 12...	0.20	18	592	593	0.81	58.0	0.350	0.020	0.370	0.260	1.3	
MAR a28...	0.20	12	428	409	0.58	125	--	--	--	--	--	
AUG 19...	0.30	23	577	559	0.78	35.8	--	--	--	--	--	
DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIIUM, 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 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)	
MAR 12...	0.170	0.180	--	90	<0.5	--	<1.0	<5	<3	<10	25	
MAR a28...	--	--	2	--	--	140	--	--	--	--	40	
AUG 19...	--	--	9	--	--	200	--	--	--	--	10	

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05059500 SHEYENNE RIVER AT WEST FARGO, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
MAR											
12...	<10	56	120	--	<10	<10	--	<1.0	380	<6	7
a28...	<1	40	70	0.1	4	--	<1	--	300	--	--
AUG											
19...	<1	50	30	<0.1	2	--	2	--	500	--	--

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

91

05059600 MAPLE RIVER NEAR HOPE, ND

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

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

WATER-DISCHARGE RECORDS

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

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

REMARKS.--Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 19.0 ft³/s, May 24, gage height, 3.33 ft; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e.00	.00	.10	2.6	.13	.00	.00
2	---	---	---	---	---	e.00	.00	.07	1.9	.10	.00	.00
3	---	---	---	---	---	e.00	.00	.03	1.4	.05	.00	.00
4	---	---	---	---	---	e.00	.00	.52	1.2	.00	.00	.00
5	---	---	---	---	---	e.00	.00	.75	1.0	.00	.00	.00
6	---	---	---	---	---	e.00	.00	1.7	.88	.00	.00	.00
7	---	---	---	---	---	e.00	.00	5.0	.52	.00	.00	.00
8	---	---	---	---	---	e.00	.00	4.4	.30	.00	.00	.00
9	---	---	---	---	---	e.00	.00	3.5	.27	.00	.00	.00
10	---	---	---	---	---	e.00	.00	2.9	.22	.00	.00	.00
11	---	---	---	---	---	e.00	.00	2.1	.18	.02	.00	.00
12	---	---	---	---	---	e.01	.00	.86	.15	.11	.00	.00
13	---	---	---	---	---	e.01	.00	1.1	.12	.11	.00	.00
14	---	---	---	---	---	e.01	.00	.86	.11	.06	.00	.00
15	---	---	---	---	---	e.01	.02	1.3	.13	.03	.00	.00
16	---	---	---	---	---	e.05	.00	1.5	.12	.00	.00	.00
17	---	---	---	---	---	e.07	e.00	1.7	.12	.00	.00	.00
18	---	---	---	---	---	.12	e.00	1.8	.10	.00	.00	.00
19	---	---	---	---	---	.10	.00	1.4	.01	.00	.00	.00
20	---	---	---	---	---	.07	.00	1.1	.03	.00	.00	.00
21	---	---	---	---	---	.03	.00	.88	.03	.00	.00	.00
22	---	---	---	---	---	.00	.00	1.7	.03	.00	.00	.00
23	---	---	---	---	---	.00	.00	9.3	.00	.00	.00	.00
24	---	---	---	---	---	.00	.00	12	.00	.00	.00	.00
25	---	---	---	---	---	.00	.00	15	.00	.00	.00	.00
26	---	---	---	---	---	.00	.00	10	.00	.00	.00	.00
27	---	---	---	---	---	.00	.06	8.3	.00	.00	.00	.00
28	---	---	---	---	---	.00	.02	6.3	.00	.00	.00	.00
29	---	---	---	---	---	.00	.00	5.4	.00	.00	.00	.00
30	---	---	---	---	---	.00	.11	4.4	.08	.00	.00	.00
31	---	---	---	---	---	.00	---	3.8	---	.00	.00	---
TOTAL	---	---	---	---	---	0.48	0.21	109.77	11.50	0.61	0.00	0.00
MEAN	---	---	---	---	---	.015	.007	3.54	.38	.020	.000	.000
MAX	---	---	---	---	---	.12	.11	15	2.6	.13	.00	.00
MIN	---	---	---	---	---	.00	.00	.03	.00	.00	.00	.00
AC-FT	---	---	---	---	---	1.0	.4	218	23	1.2	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1965	.060	1.07	1966	.000	1965
1966	.003	.054	1967	.000	1966
1967	.000	.000	1968	.000	1967
1968	.000	.000	1969	.000	1968
1969	.000	.006	1970	.000	1969
1970	.000	.000	1971	.000	1970
1971	.000	.000	1972	.000	1971
1972	.000	.000	1973	.000	1972
1973	.000	.000	1974	.000	1973
1974	.000	.000	1975	.000	1974
1975	.000	.000	1976	.000	1975
1976	.000	.000	1977	.000	1976
1977	.000	.000	1978	.000	1977
1978	.000	.000	1979	.000	1978
1979	.000	.000	1980	.000	1979
1980	.000	.000	1981	.000	1980
1981	.000	.000	1982	.000	1981
1982	.000	.000	1983	.000	1982
1983	.000	.000	1984	.000	1983
1984	.000	.000	1985	.000	1984
1985	.000	.000	1986	.000	1985
1986	.000	.000	1987	.000	1986
1987	.000	.000	1988	.000	1987
1988	.000	.000	1989	.000	1988
1989	.000	.000	1990	.000	1989
1990	.000	.000	1991	.000	1990
1991	.000	.000	1992	.000	1991
1992	.000	.000	1993	.000	1992
1993	.000	.000	1994	.000	1993
1994	.000	.000	1995	.000	1994
1995	.000	.000	1996	.000	1995
1996	.000	.000	1997	.000	1996
1997	.000	.000	1998	.000	1997
1998	.000	.000	1999	.000	1998
1999	.000	.000	2000	.000	1999
2000	.000	.000	2001	.000	2000
2001	.000	.000	2002	.000	2001
2002	.000	.000	2003	.000	2002
2003	.000	.000	2004	.000	2003
2004	.000	.000	2005	.000	2004
2005	.000	.000	2006	.000	2005
2006	.000	.000	2007	.000	2006
2007	.000	.000	2008	.000	2007
2008	.000	.000	2009	.000	2008
2009	.000	.000	2010	.000	2009
2010	.000	.000	2011	.000	2010
2011	.000	.000	2012	.000	2011
2012	.000	.000	2013	.000	2012
2013	.000	.000	2014	.000	2013
2014	.000	.000	2015	.000	2014
2015	.000	.000	2016	.000	2015
2016	.000	.000	2017	.000	2016
2017	.000	.000	2018	.000	2017
2018	.000	.000	2019	.000	2018
2019	.000	.000	2020	.000	2019
2020	.000	.000	2021	.000	2020
2021	.000	.000	2022	.000	2021
2022	.000	.000	2023	.000	2022
2023	.000	.000	2024	.000	2023
2024	.000	.000	2025	.000	2024
2025	.000	.000	2026	.000	2025
2026	.000	.000	2027	.000	2026
2027	.000	.000	2028	.000	2027
2028	.000	.000	2029	.000	2028
2029	.000	.000	2030	.000	2029

SUMMARY STATISTICS

WATER YEARS 1965 - 1991

ANNUAL MEAN	a2.82
HIGHEST ANNUAL MEAN	a5.55
LOWEST ANNUAL MEAN	a.002
HIGHEST DAILY MEAN	516
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	900
INSTANTANEOUS PEAK STAGE	6.49
ANNUAL RUNOFF (AC-FT)	a2040
10 PERCENT EXCEEDS	3.1
50 PERCENT EXCEEDS	.00
90 PERCENT EXCEEDS	.00

e Estimated.

a Based on complete water years only (1965-82).

RED RIVER OF THE NORTH BASIN

05059600 MAPLE RIVER NEAR HOPE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (000061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	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)
MAR												
15...	1205	0.01	388	--	3.5	0.0	--	--	--	--	--	--
a21...	1030	0.01	374	7.7	8.0	1.5	130	29	14	14	18	0.5
MAY												
02...	1325	0.10	1830	--	3.0	5.5	--	--	--	--	--	--
07...	1115	5.0	1830	--	11.5	6.0	--	--	--	--	--	--
JUN												
21...	1030	0.01	1930	--	17.5	20.0	--	--	--	--	--	--

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINEITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR											
a21...	9.2	94	0	77	79	9.6	0.10	14	254	216	0.35
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR											
a21...	0.01	1	30	30	<1	20	210	0.2	3	<1	160

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

93

05059700 MAPLE RIVER NEAR ENDERLIN, ND

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

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

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

REMARKS.--Records fair except those for May 28 to June 23, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.5	e2.1	e2.0	e1.6	1.9	2.2	2.2	2.6	e70	e7.0	4.3	1.4
2	2.5	e2.2	e2.0	e1.6	1.9	2.3	2.5	2.7	e60	e6.5	3.9	1.4
3	2.4	e2.2	e2.0	e1.6	1.9	2.0	2.5	5.0	e54	e6.4	3.6	1.4
4	2.3	e2.2	e2.0	e1.6	2.0	1.8	2.3	9.3	e47	e6.1	2.9	1.4
5	2.4	e2.2	e2.0	e1.6	2.0	2.0	2.1	12	e40	5.5	3.0	1.4
6	2.4	e2.2	e1.9	e1.6	1.9	1.9	1.8	12	e38	5.3	2.9	1.4
7	2.4	e2.3	e1.8	e1.6	1.8	1.9	1.7	9.6	e36	5.1	2.6	1.3
8	2.4	e2.4	e1.8	1.6	1.8	1.9	1.8	8.3	e33	4.8	e2.5	3.3
9	2.4	e2.4	e1.8	1.6	1.8	2.8	1.8	7.2	e30	4.4	e2.4	1.7
10	2.3	e2.4	e1.8	1.7	1.8	3.2	1.7	6.0	e28	4.2	e2.3	1.5
11	2.2	e2.4	e1.8	1.6	1.8	3.4	1.6	4.6	e26	3.6	e2.2	1.6
12	1.9	e2.4	e1.8	1.7	1.8	2.4	1.8	4.0	e24	2.9	e2.1	1.7
13	1.7	e2.4	e1.8	1.7	1.7	2.3	2.3	3.3	e21	14	e2.0	1.6
14	1.9	e2.4	e1.8	1.8	2.2	2.7	2.1	2.8	e20	19	e1.9	1.7
15	1.9	e2.3	e1.8	1.8	1.9	3.7	2.3	3.6	e19	16	e1.8	1.7
16	2.2	e2.2	e1.8	1.7	1.8	3.8	2.3	3.1	e18	18	e1.7	1.7
17	3.2	e2.1	e1.8	1.8	1.8	3.6	2.5	2.9	e17	17	e1.6	1.6
18	e2.4	e2.0	e1.8	1.8	1.8	3.7	2.2	2.5	e16	15	e1.5	1.7
19	e2.3	e2.0	e1.7	1.8	1.8	3.6	2.1	2.5	e14	13	e1.4	1.7
20	e2.2	e2.0	e1.6	1.9	1.8	3.8	1.9	2.4	e12	13	e1.4	1.6
21	e2.0	e2.0	e1.6	1.8	1.8	3.8	1.7	2.2	e12	14	1.5	1.7
22	e2.0	e2.0	e1.6	1.7	1.9	3.7	1.7	2.4	e11	16	1.4	1.5
23	e2.0	e2.0	e1.6	1.8	2.0	4.1	1.8	3.0	e10	16	1.5	1.7
24	e2.0	e2.0	e1.6	1.6	1.9	3.8	1.7	3.0	e9.5	14	1.6	1.7
25	e2.0	e2.0	e1.6	1.7	1.9	3.6	1.7	3.2	e9.0	11	1.7	1.6
26	e2.0	e2.0	e1.6	1.7	1.9	3.4	2.1	23	e8.6	9.4	1.5	1.6
27	e2.0	e2.0	e1.6	1.7	1.9	2.9	2.7	168	e8.3	8.6	1.4	1.7
28	e2.0	e2.0	e1.6	1.6	2.0	2.6	1.9	e150	e8.0	7.6	1.3	1.6
29	e2.0	e2.0	e1.6	1.8	---	2.4	2.1	e120	e7.8	6.2	1.2	1.7
30	e2.0	e2.0	e1.6	1.7	---	2.3	2.9	e100	e7.6	5.6	1.3	1.7
31	e2.0	---	e1.6	1.8	---	2.3	---	e80	---	4.8	1.3	---
TOTAL	67.9	64.8	54.4	52.6	52.5	89.9	61.8	761.2	714.8	300.0	63.7	49.3
MEAN	2.19	2.16	1.75	1.70	1.87	2.90	2.06	24.6	23.8	9.68	2.05	1.64
MAX	3.2	2.4	2.0	1.9	2.2	4.1	2.9	168	70	19	4.3	3.3
MIN	1.7	2.0	1.6	1.6	1.7	1.8	1.6	2.2	7.6	2.9	1.2	1.3
AC-FT	135	129	108	104	104	178	123	1510	1420	595	126	98

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1991, BY WATER YEAR (WY)

	MEAN	4.03	4.19	2.97	2.36	2.94	99.2	211	41.2	39.6	39.4	9.92	5.36
MAX	16.6	13.3	5.87	4.05	11.9	622	1231	191	424	477	152	28.1	
(WY)	1966	1958	1958	1976	1976	1966	1969	1970	1975	1975	1962	1957	
MIN	1.59	1.49	1.32	1.21	1.30	2.10	2.06	2.39	1.41	1.44	1.33	1.28	
(WY)	1961	1961	1961	1969	1969	1969	1991	1990	1961	1961	1961	1984	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1956 - 1991

ANNUAL TOTAL	780.92	2332.9	
ANNUAL MEAN	2.14	6.39	
HIGHEST ANNUAL MEAN			38.7
LOWEST ANNUAL MEAN			131
HIGHEST DAILY MEAN	6.8 Sep 7	168 May 27	5450 Jun 30 1975
LOWEST DAILY MEAN	.82 Jul 4	1.2 Aug 29	.10 Dec 7 1963
ANNUAL SEVEN-DAY MINIMUM	1.2 Jul 1	1.3 Aug 27	.67 Dec 7 1963
INSTANTANEOUS PEAK FLOW		178 May 27	7610 Jun 30 1975
INSTANTANEOUS PEAK STAGE		5.25 May 27	15.41 Jun 30 1975
ANNUAL RUNOFF (AC-FT)	1550	4630	28010
10 PERCENT EXCEEDS	2.9	13	48
50 PERCENT EXCEEDS	2.0	2.0	3.2
90 PERCENT EXCEEDS	1.5	1.6	1.7

e Estimated.

RED RIVER OF THE NORTH BASIN
05059700 MAPLE RIVER NEAR ENDERLIN, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 29...	1245	2.0	1930	--	4.0	7.0	--	--	--	--	--	--
JAN 07...	0915	1.6	1850	--	-25.0	0.0	--	--	--	--	--	--
FEB 28...	0805	2.0	2020	--	-12.0	1.0	--	--	--	--	--	--
MAR 26...	0845	3.6	1550	7.4	-4.5	2.0	530	130	49	120	33	2
MAY 02...	0930	2.5	1320	--	4.0	4.5	--	--	--	--	--	--
JUN 04...	0830	47	1140	--	12.5	20.5	--	--	--	--	--	--
JUL 01...	1140	7.0	1140	--	17.0	22.5	--	--	--	--	--	--
AUG 30...	1540	6.0	1380	--	31.5	22.0	--	--	--	--	--	--
AUG 20...	1330	1.3	1530	8.3	17.5	17.5	710	180	62	87	21	1
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 26...	12	350	0	280	430	82	0.30	19	1070	1010	1.46	
AUG 20...	13	470	0	380	450	56	0.20	22	1070	1100	1.46	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 26...	10.4	3	280	60	<1	110	670	<0.1	24	<1	700	
AUG 20...	3.76	3	200	30	2	120	960	0.1	2	<1	870	

05060500 RUSH RIVER AT AMENIA, ND

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

DRAINAGE AREA.--116 mi².

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 943 ft above National Geodetic Vertical Datum of 1929, from topographic map. See WSP 1913 for history of changes prior to June 10, 1961.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	1.6	12	5.2	.88	e.80	.00
2	.00	.00	.00	.00	.00	.00	1.6	15	4.5	.86	e.70	.00
3	.00	.00	.00	.00	.00	.00	1.6	13	3.1	1.2	e.60	.00
4	.00	.00	.00	.00	.00	.00	1.5	13	1.9	2.7	e.50	.00
5	.00	.00	.00	.00	.00	.00	1.4	16	3.0	2.7	e.40	.00
6	.00	.00	.00	.00	.00	.00	1.1	17	2.8	3.4	e.30	.00
7	.00	.00	.00	.00	.00	.00	.88	13	2.4	2.8	e.20	.00
8	.00	.00	.00	.00	.00	e.00	.83	10	1.9	1.6	e.15	.00
9	.00	.00	.00	.00	.00	e.00	.90	8.3	2.1	1.2	e.10	.00
10	.00	.00	.00	.00	.00	e.00	1.2	8.1	2.0	.97	e.05	.00
11	.00	.00	.00	.00	.00	e.00	1.5	9.5	1.7	1.2	e.02	.00
12	.00	.00	.00	.00	.00	e.00	1.4	11	1.3	6.3	.01	.00
13	.00	.00	.00	.00	.00	e.00	1.2	8.7	1.1	15	.01	.00
14	.00	.00	.00	.00	.00	e.00	1.2	8.0	1.3	21	.01	.00
15	.00	.00	.00	.00	.00	e.00	1.4	5.8	1.2	26	.01	.00
16	.00	.00	.00	.00	.00	e.00	1.4	4.8	1.1	22	.02	.00
17	.00	.00	.00	.00	.00	e.00	1.2	3.9	1.0	17	.05	.00
18	.00	.00	.00	.00	.00	e.00	1.1	2.9	.95	14	.05	.00
19	.00	.00	.00	.00	.00	e1.0	1.2	2.8	.61	11	.06	.00
20	.00	.00	.00	.00	.00	e3.0	1.2	2.8	.94	9.5	.02	.00
21	.00	.00	.00	.00	.00	e30	1.1	2.7	.84	8.2	.04	.00
22	.00	.00	.00	.00	.00	e25	1.0	3.8	.77	7.8	.02	.00
23	.00	.00	.00	.00	.00	.19	.88	3.9	.75	5.7	.01	.00
24	.00	.00	.00	.00	.00	.12	.80	30	.58	4.3	.04	.00
25	.00	.00	.00	.00	.00	.8.9	.91	38	.34	e3.0	.04	.00
26	.00	.00	.00	.00	.00	4.2	.89	22	.30	e2.5	.03	.00
27	.00	.00	.00	.00	.00	4.1	1.3	14	.17	e2.0	.02	.00
28	.00	.00	.00	.00	.00	3.5	1.9	11	.30	e1.5	.01	.00
29	.00	.00	.00	.00	---	2.9	2.8	7.6	.60	e1.2	.00	.00
30	.00	.00	.00	.00	---	1.9	7.4	6.2	.80	e1.0	.00	.00
31	.00	---	.00	.00	---	1.5	---	5.4	---	e.90	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	117.00	44.39	330.2	45.55	199.41	4.27	0.00
MEAN	.000	.000	.000	.000	.000	3.77	1.48	10.7	1.52	6.43	.14	.000
MAX	.00	.00	.00	.00	.00	.30	7.4	38	5.2	26	.80	.00
MIN	.00	.00	.00	.00	.00	.00	.80	2.7	.17	.86	.00	.00
AC-FT	.00	.00	.00	.00	.00	232	88	655	90	396	8.5	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1991, BY WATER YEAR (WY)

MEAN	.66	.56	.14	.015	.14	19.4	62.8	11.1	9.36	5.31	.36	.46
MAX	11.4	3.50	1.24	.45	2.21	136	382	81.3	48.9	40.7	2.77	7.88
(WY)	1983	1983	1963	1987	1976	1984	1979	1950	1953	1986	1986	1973
MIN	.000	.000	.000	.000	.000	.000	1.12	.12	.009	.000	.000	.000
(WY)	1949	1953	1950	1947	1947	1948	1981	1955	1988	1955	1946	1946

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1946 - 1991

ANNUAL TOTAL	1108.75	740.82	
ANNUAL MEAN	3.04	2.03	9.16
HIGHEST ANNUAL MEAN			34.1
LOWEST ANNUAL MEAN			.68
HIGHEST DAILY MEAN	59	Jun 4	3160
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			3940
INSTANTANEOUS PEAK STAGE			12.15
ANNUAL RUNOFF (AC-FT)	2200	1470	6630
10 PERCENT EXCEEDS	9.7	6.7	11
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

05060500 RUSH RIVER AT AMENIA, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAR												
21...	0720	6.9	1040	--	1.5	0.5	--	--	--	--	--	--
27...	1030	3.7	1030	6.8	-2.5	1.0	310	76	28	70	32	2
APR												
02...	0930	1.7	870	--	10.0	4.5	--	--	--	--	--	--
MAY												
07...	1310	13	1570	--	11.5	8.5	--	--	--	--	--	--
JUN												
24...	1120	0.63	1330	--	18.5	20.0	--	--	--	--	--	--
JUL												
16...	1230	22	1220	--	32.0	25.0	--	--	--	--	--	--
AUG												
12...	1210	0.01	1020	7.8	24.5	22.0	460	110	44	51	19	1
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINEITY 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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
27...	16	200	0	170	240	47	0.20	14	589	592	0.80	
AUG												
12...	12	430	0	350	180	21	0.30	31	706	664	0.96	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
27...	5.85	<1	170	120	<1	70	200	0.2	3	<1	430	
AUG												
12...	0.02	13	230	30	<1	90	670	<0.1	<1	<1	580	

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

LOCATION.--Lat 47°21'10", long 96°50'50", on line between secs.24 and 25, T.14S N., R.49 W., Traill County, Hydrologic Unit 09020107, on left bank on upstream side of highway bridge, 0.5 mi west of Halstad, 2.5 mi downstream from Wild Rice River, and at mile 375.2.

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

WATER-DISCHARGE RECORDS

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

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

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

REMARKS.--Records good except those for Nov. 28 to Apr. 2, which are poor; and those for July 3-9, which are fair.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	259	207	e155	e72	e140	e215	e1700	1250	1380	1800	1040	417
2	258	201	e145	e70	e140	e220	e2000	1640	1470	2510	981	403
3	250	197	e140	e72	e140	e220	2300	1790	1480	e2800	967	411
4	237	197	e150	e74	e145	e220	2150	2150	1500	e3000	1030	471
5	221	199	e155	e76	e150	e225	2080	2700	1780	e3100	1090	493
6	209	194	e160	e80	e155	e230	1780	3030	2110	e3300	964	443
7	204	185	e165	e80	e160	e235	1440	3090	2110	e3500	844	425
8	199	203	e170	e80	e160	e240	1230	3100	1920	e3600	808	423
9	193	193	e175	e80	e160	e245	1090	3060	1730	e3500	807	407
10	189	226	e180	e80	e165	e250	985	2930	1590	3390	807	424
11	183	221	e180	e82	e165	e260	890	2750	1480	3080	799	444
12	178	190	e180	e84	e170	e270	819	2560	1400	2770	778	772
13	185	192	e180	e86	e170	e280	788	2390	1340	2620	738	1580
14	186	180	e180	e90	e170	e290	788	2380	1370	2440	680	2120
15	185	186	e175	e90	e170	e300	792	2300	1510	2290	630	2330
16	179	196	e160	e90	e170	e320	791	2080	1630	2250	623	2220
17	181	208	e155	e90	e170	e340	765	1990	1540	2240	615	1850
18	183	196	e150	e92	e170	e370	737	1750	1410	2170	600	1500
19	217	205	e145	e94	e170	e450	741	1660	1400	2070	595	1270
20	249	181	e140	e100	e170	e550	780	1590	1500	1940	582	1130
21	221	188	e135	e100	e170	e750	883	1550	1550	1810	568	963
22	207	196	e125	e100	e170	e900	1010	1550	1540	1770	555	778
23	203	239	e115	e100	e175	e1000	1020	1970	1450	1720	542	641
24	198	247	e105	e105	e180	e1200	990	1940	1380	1660	534	559
25	193	237	e100	e110	e185	e1300	953	1650	1520	1580	530	535
26	185	256	e98	e115	e200	e1350	927	1480	1820	1500	500	574
27	185	246	e96	e120	e205	e1400	923	1400	1950	1410	453	595
28	197	e210	e92	e125	e210	e1450	919	1400	1860	1340	403	592
29	203	e195	e86	e125	---	e1500	963	1410	1710	1290	408	555
30	204	e175	e80	e130	---	e1550	1020	1390	1690	1200	432	524
31	207	---	e74	e135	---	e1650	---	1360	---	1110	436	---
TOTAL	6348	6146	4346	2927	4705	19780	34254	63290	48120	70760	21339	25849
MEAN	205	205	140	94.4	168	638	1142	2042	1604	2283	688	862
MAX	259	256	180	135	210	1650	2300	3100	2110	3600	1090	2330
MIN	178	175	74	70	140	215	737	1250	1340	1110	403	403
AC-FT	12590	12190	8620	5810	9330	39230	67940	125500	95450	140400	42330	51270

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1991, BY WATER YEAR (WY)

	MEAN	682	645	502	422	432	1991	6688	3114	2527	2194	753	577
MAX	2188	1771	1253	1023	1052	9429	20080	8994	10310	20060	3866	2034	
(WY)	1987	1972	1987	1987	1987	1966	1969	1979	1962	1975	1962	1986	
MIN	61.5	92.3	51.2	32.1	45.9	249	705	449	242	153	59.5	38.4	
(WY)	1977	1977	1977	1977	1977	1962	1981	1977	1977	1988	1977	1976	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1961 - 1991

ANNUAL TOTAL	186581	307864											
ANNUAL MEAN	511	843								1723			
HIGHEST ANNUAL MEAN										3968		1975	
LOWEST ANNUAL MEAN										214		1977	
HIGHEST DAILY MEAN	2580	Jun 4	3600	Jul 8	41500	Apr 22	1979						
LOWEST DAILY MEAN	74	Dec 31	70	Jan 2	10	Sep 2	1976						
ANNUAL SEVEN-DAY MINIMUM	89	Dec 25	74	Dec 30	17	Aug 28	1976						
INSTANTANEOUS PEAK FLOW			3700	Jul 8	42000	Apr 22	1979						
INSTANTANEOUS PEAK STAGE			9.99	Jul 8	39.00	Apr 22	1979						
INSTANTANEOUS LOW FLOW					5.4	Oct 8	1936						
ANNUAL RUNOFF (AC-FT)	370100	610600			1248000								
10 PERCENT EXCEEDS	1240	2090			3700								
50 PERCENT EXCEEDS	249	450			684								
90 PERCENT EXCEEDS	125	123			194								

e Estimated.

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	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)	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 24...	1115	--	197	626	8.6	4.5	5.0	10	7.9	62	K10	
DEC 12...	1040	180	--	904	7.9	-2.0	0.0	6.6	8.7	60	K15	
JAN 11...	1045	--	82	482	--	-15.5	1.0	--	--	--	--	
MAR 12...	1610	--	269	810	7.7	1.5	0.0	5.0	8.9	59	K4	
APR 01...	1235	--	1710	509	--	11.0	3.5	--	--	--	--	
09...	0955	--	1110	562	8.3	5.5	8.0	89	11.2	94	K13	
MAY 08...	1015	--	3080	704	--	9.5	8.5	--	--	--	--	
30...	1020	--	1420	596	8.3	20.5	18.0	25	7.9	85	K46	
JUL 05...	1445	--	3110	426	--	22.5	21.0	--	--	--	--	
18...	1325	--	2210	640	--	25.0	26.5	--	--	--	--	
AUG 14...	1040	--	691	569	8.3	27.5	24.0	83	7.5	89	K56	
DATE		STREP- TOCOCCHI 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 AD- SORP- TION RATIO (00932)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	
OCT 24...	K27	260	51	31	33	21	0.9	7.1	223	202	234	
DEC 12...	K9	370	74	45	52	23	1	9.8	296	298	364	
MAR 12...	250	340	73	39	41	20	1	8.5	300	303	370	
APR 09...	K180	240	52	26	22	16	0.6	7.9	187	181	220	
MAY 30...	430	280	59	32	22	14	0.6	6.1	231	216	264	
AUG 14...	K51	280	57	34	23	15	0.6	7.6	227	205	250	
DATE		CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)
OCT 24...	6	87	20	<0.10	6.8	382	357	0.52	203	--	<0.010	
DEC 12...	0	130	37	0.40	10	557	542	0.76	271	0.190	0.020	
MAR 12...	0	86	33	0.20	18	462	485	0.63	336	0.610	0.010	
APR 09...	0	95	16	0.30	12	347	343	0.47	1040	0.610	0.090	
MAY 30...	0	88	14	0.20	10	367	363	0.50	1410	0.310	0.160	
AUG 14...	0	92	15	0.20	20	390	373	0.53	728	--	0.030	

RED RIVER OF THE NORTH BASIN

99

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO- GEN, NO2+NO3 SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA SOLVED (MG/L AS N) (00608)	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
OCT 24...	<0.010	<0.100	<0.100	0.020	0.030	1.0	--	0.130	0.050	0.060	0.050
DEC 12...	0.010	0.300	0.200	1.70	1.60	3.1	--	0.640	0.570	0.650	0.520
MAR 12...	0.010	0.590	0.620	0.360	0.340	1.2	--	0.160	0.100	0.100	0.060
APR 09...	0.030	0.670	0.640	0.220	0.170	1.7	--	0.320	0.150	0.200	0.100
MAY 30...	0.050	0.370	0.360	0.110	0.040	1.2	--	0.600	0.150	0.270	0.150
AUG 14...	<0.010	0.059	0.056	0.030	0.030	1.0	0.80	0.260	0.170	0.170	0.130
DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
OCT 24...	<10	3	61	<0.5	--	<1.0	<1	<3	4	8	2
MAR 12...	<10	1	82	<0.5	110	<1.0	<1	<3	1	11	<1
APR 09...	20	2	53	<0.5	--	<1.0	<1	<3	5	23	1
AUG 14...	30	<1	65	<0.5	--	<1.0	<1	<3	10	8	<1
DATE	MANGA- LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS HG) (71890)	DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- SILVER, DIS- SOLVED (UG/L AS AG) (01075)	VANA- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	DIUM, DIS- SOLVED (UG/L AS V) (01085)	GROSS ALPHA, ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	DIS- SOLVED (UG/L AS U-NAT) (80030)
OCT 24...	31	2	<0.1	<10	3	<1	<1.0	210	<6	7	--
MAR 12...	34	61	<0.1	<10	1	<1	<1.0	280	<6	7	--
APR 09...	26	3	<0.1	<10	1	<1	<1.0	190	<6	10	1.6
AUG 14...	29	3	<0.1	<10	4	<1	<1.0	230	<6	5	3.1
DATE	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/90) (80050)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/90) (80060)	RADIUM 226, DIS- SOLVED (PCI/L AS SR/90) (09511)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. & FINER THAN .062 MM (70331)
OCT 24...	--	--	--	--	--	--	--	--	20	11	21
DEC 12...	--	--	--	--	--	--	--	--	41	20	31
MAR 12...	--	--	--	--	--	--	--	7.4	17	12	54
APR 09...	12	13	3.5	10	3.2	0.08	1.3	--	214	641	79
MAY 30...	--	--	--	--	--	--	--	--	364	1400	99
AUG 14...	6.9	11	5.7	8.3	5.3	0.09	1.5	--	276	515	95

RED RIVER OF THE NORTH BASIN

05064900 BEAVER CREEK NEAR FINLEY, ND
(Hydrologic bench-mark station)LOCATION.--Lat 47°35'40", long 97°42'18", in NE¹/₄, sec.31, T.148 N., R.55 W., Steele County, Hydrologic Unit 09020109, on right bank 500 ft upstream from bridge on county highway, and 7 mi northeast of Finley.DRAINAGE AREA.--160 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1964 to current year.

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

REMARKS.--Records fair. Since June 1987, some regulation by flood control dam 2.0 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	2.3	.68	.97	.27	.00
2	.00	.00	.00	.00	.00	.00	.01	2.1	.57	.61	.29	.00
3	.00	.00	.00	.00	.00	.00	.01	2.4	.45	.54	.57	.00
4	.00	.00	.00	.00	.00	.00	.01	4.0	.41	.73	.53	.00
5	.00	.00	.00	.00	.00	.00	.03	2.8	.40	.98	.41	.00
6	.00	.00	.00	.00	.00	.00	.05	2.5	.32	1.6	.36	.00
7	.00	.00	.00	.00	.00	.00	.09	2.0	.27	5.1	.33	.00
8	.00	.00	.00	.00	.00	.00	.15	1.7	.23	6.5	.27	.00
9	.00	.00	.00	.00	.00	e.02	.15	1.6	.26	6.4	.25	.00
10	.00	.00	.00	.00	.00	e.05	.16	1.6	.32	5.5	.25	.00
11	.00	.00	.00	.00	.00	e.07	.16	1.4	.24	4.8	.22	.00
12	.00	.00	.00	.00	.00	e.08	.20	1.2	.21	4.0	.19	.00
13	.00	.00	.00	.00	.00	e.09	.26	1.2	.22	3.3	.10	.00
14	.00	.00	.00	.00	.00	e.10	.52	1.1	.57	2.9	.05	.00
15	.00	.00	.00	.00	.00	e.15	.62	2.2	1.2	2.5	.02	.00
16	.00	.00	.00	.00	.00	e.11	.59	1.9	.67	2.0	.11	.00
17	.00	.00	.00	.00	.00	e.06	.58	1.6	.47	1.6	.21	.00
18	.00	.00	.00	.00	.00	.11	.60	1.3	.42	1.2	.20	.00
19	.00	.00	.00	.00	.00	.15	.60	1.0	.33	1.1	.11	.00
20	.00	.00	.00	.00	.00	.09	.58	.87	.29	1.2	.05	.00
21	.00	.00	.00	.00	.00	.08	.57	.76	.28	.90	.02	.00
22	.00	.00	.00	.00	.00	.03	.59	1.1	.24	1.2	.01	.00
23	.00	.00	.00	.00	.00	.01	.59	5.2	.21	.94	.00	.00
24	.00	.00	.00	.00	.00	.00	.62	3.0	.16	.82	.00	.00
25	.00	.00	.00	.00	.00	.00	.62	2.2	.11	.83	.00	.00
26	.00	.00	.00	.00	.00	.00	.57	1.8	.18	.73	.00	.00
27	.00	.00	.00	.00	.00	.00	1.0	2.0	.15	.60	.00	.00
28	.00	.00	.00	.00	.00	.00	1.6	1.9	.14	.51	.00	.00
29	.00	.00	.00	.00	---	.00	1.3	1.6	.16	.40	.00	.00
30	.00	.00	.00	.00	---	.00	2.8	1.1	.87	.35	.00	.00
31	.00	---	.00	.00	---	.00	---	.88	---	.32	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	1.20	15.63	58.31	11.03	61.13	4.82	0.00
MEAN	.000	.000	.000	.000	.000	.039	.52	1.88	.37	1.97	.16	.000
MAX	.00	.00	.00	.00	.00	.15	2.8	5.2	1.2	6.5	.57	.000
MIN	.00	.00	.00	.00	.00	.00	.00	.76	.11	.32	.00	.00
AC-FT	.00	.00	.00	.00	.00	2.4	31	116	22	121	9.6	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1991, BY WATER YEAR (WY)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.07	.39	.066	.002	.20	22.0	55.0	9.33	4.30	4.17	1.76	1.14															
MAX	9.30	1.87	.36	.031	2.61	64.6	244	47.0	19.8	54.3	18.3	10.6															
(WY)	1983	1984	1984	1983	1984	1966	1979	1979	1987	1987	1983	1983															
MIN	.000	.000	.000	.000	.000	.000	.19	.042	.001	.000	.000	.000															
(WY)	1968	1968	1965	1965	1965	1965	1981	1977	1980	1972	1969	1967															

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1965 - 1991

ANNUAL TOTAL	99.70	152.12	8.28
ANNUAL MEAN	.27	.42	24.3
HIGHEST ANNUAL MEAN			.12
LOWEST ANNUAL MEAN			1540
HIGHEST DAILY MEAN	8.0 Jun 30	6.5 Jul 8	.00 Apr 19 1979
LOWEST DAILY MEAN	.00 Jan 1	.00 Oct 1	.00 Nov 21 1964
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Oct 1	.00 Nov 21 1964
INSTANTANEOUS PEAK FLOW		7.8 May 23	1900 Apr 19 1979
INSTANTANEOUS PEAK STAGE		2.65 May 23	9.70 Mar 14 1966
ANNUAL RUNOFF (AC-FT)	198	302	6000
10 PERCENT EXCEEDS	1.1	1.3	12
50 PERCENT EXCEEDS	.00	.00	.02
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

101

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, KF AGAR (COLS. PER 100 ML) (31673)	
MAR 21...	0810	0.08	900	7.4	3.0	1.5	1.5	12.3	89	K4	K12	
APR 04...	1410	0.02	1090	--	21.5	10.0	--	--	--	--	--	
MAY 01...	1335	2.2	1390	--	2.5	4.5	--	--	--	--	--	
JUN 21...	1200	0.29	1510	8.0	22.5	21.0	1.9	9.4	107	--	--	
JUL 17...	0910	1.6	1350	--	24.0	24.5	--	--	--	--	--	
AUG 14...	1210	0.02	1260	--	29.5	22.5	--	--	--	--	--	
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 AD-SORP-TION RATIO (00932)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	
MAR 21...	290	69	28	59	30	2	13	121	146	178	0	
JUN 21...	560	120	62	110	30	2	13	278	252	308	0	
DATE		SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
MAR 21...	270	27	0.10	10	564	566	0.77	0.12	0.210	0.020	0.020	
JUN 21...	520	38	0.20	16	1060	1030	1.44	0.83	--	--	--	
DATE		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, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	
MAR 21...	0.220	0.230	0.110	0.110	1.6	0.330	0.270	0.220	0.220	10		
JUN 21...	--	--	--	--	--	--	--	--	--	10		
DATE		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)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	
MAR 21...	2	12	<0.5	<1.0	4	<3	2	52	<1	46		
JUN 21...	4	33	<0.5	<1.0	<1	<3	2	15	<1	100		

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)
MAR 21...	210	<0.1	<10	3	<1	<1.0	360	<6	11	--
JUN 21...	150	<0.1	<10	4	<1	<1.0	630	<6	8	3.9
DATE	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- PENDE (MG/L (80154)	SEDI- MENT, DIS- SOLVED (UG/L AS U) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
MAR 21...	--	--	--	--	--	--	--	38	0.01	30
JUN 21...	<0.6	19	1.4	14	1.4	0.03	4.8	23	0.02	39

RED RIVER OF THE NORTH BASIN

103

05066500 GOOSE RIVER AT HILLSBORO, ND

LOCATION.--Lat 47°24'34", long 97°03'39", in NW1/4, sec.5, T.145 N., R.50 W., Traill County, Hydrologic Unit 09020109, on right bank 600 ft upstream from Foggman Dam in Hillsboro, and 27.5 mi upstream from mouth.

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

WATER-DISCHARGE RECORDS

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

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

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.00	e.00	e.00	e.01	e.40	e1.4	6.5	e50	289	9.9	.42	.00
2	e.00	e.00	e.00	e.01	e.60	e1.4	10	e60	172	13	.76	.00
3	e.00	e.00	e.00	e.01	e2.0	e1.4	14	e70	e125	14	3.1	.00
4	e.00	e.00	e.00	e.01	e3.0	e1.4	16	e85	e90	16	2.0	.00
5	e.00	e.00	e.00	e.01	e4.0	e1.4	14	e100	e70	14	1.5	.00
6	e.00	e.00	e.00	e.01	e5.0	e1.4	9.9	e70	e50	15	1.4	.00
7	e.00	e.01	e.00	e.02	e6.0	e1.5	9.2	e55	e32	14	.95	.00
8	e.00	e.01	e.00	e.03	e7.0	e1.6	13	48	e50	12	.83	.00
9	e.00	e.01	e.00	e.03	e6.5	e1.7	17	52	e60	13	.66	.00
10	e.00	e.01	e.00	e.04	e6.0	e1.9	17	52	e55	14	.66	.00
11	e.00	e.01	e.00	e.05	e5.0	e2.1	17	51	e50	13	.55	.00
12	e.00	e.01	e.00	e.05	e4.5	e2.3	25	58	46	13	.43	.00
13	e.00	e.01	e.00	e.20	e3.5	e2.9	27	67	38	12	.42	.00
14	e.00	e.01	e.00	e.40	e3.0	e3.5	29	49	35	13	.31	.00
15	e.00	e.01	e.00	e.60	e2.5	e4.0	25	44	31	12	.36	.00
16	e.00	e.01	e.00	e.70	e2.3	4.7	30	61	26	12	.98	.00
17	e.00	e.01	e.00	e.80	e2.1	5.1	33	76	23	14	.52	.00
18	e.00	e.01	e.00	e.90	e1.9	5.8	33	56	21	13	.42	.00
19	e.00	e.01	e.00	e1.1	e1.8	6.2	32	40	18	9.4	.30	.00
20	e.00	e.01	e.00	e.70	e2.2	6.9	33	30	17	4.1	.18	.00
21	e.00	e.01	e.00	e.50	e2.0	6.2	33	26	17	4.0	.13	.00
22	e.00	e.01	e.00	e.40	e1.8	9.8	31	20	15	4.2	.00	.00
23	e.00	e.01	e.00	e.30	e1.7	14	24	23	15	3.1	.09	.00
24	e.00	e.01	e.00	e.25	e1.6	14	24	34	16	2.5	.00	.00
25	e.00	e.01	e.00	e.20	e1.5	31	25	148	13	2.5	.00	.00
26	e.00	e.00	e.00	e.15	e1.5	18	34	262	14	1.9	.00	.00
27	e.00	e.00	e.00	e.15	e1.5	9.5	36	223	12	1.7	.00	.00
28	e.00	e.00	e.00	e.15	e1.4	12	20	173	11	1.9	.00	.00
29	e.00	e.00	e.00	e.20	---	e16	31	144	11	1.7	.00	.00
30	e.00	e.00	e.00	e.25	---	19	e40	136	11	1.6	.00	.00
31	e.00	---	e.00	e.30	---	15	---	123	---	.63	.00	---
TOTAL	0.00	0.19	0.00	8.53	82.30	223.1	708.6	2486	1433	276.13	16.97	0.00
MEAN	.000	.006	.000	.28	2.94	7.20	23.6	80.2	47.8	8.91	.55	.000
MAX	.00	.01	.00	1.1	7.0	31	40	262	289	16	3.1	.00
MIN	.00	.00	.00	.01	.40	1.4	6.5	20	11	.63	.00	.00
AC-FT	.00	.4	.00	17	163	443	1410	4930	2840	548	34	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1991, BY WATER YEAR (WY)

	MEAN	6.52	6.54	4.58	2.80	3.21	129	440	108	59.0	31.1	10.9	8.01
MAX	62.9	46.5	22.5	12.7	20.0	1106	2878	2275	385	533	160	123	
(WY)	1983	1972	1988	1987	1932	1966	1979	1950	1968	1987	1987	1962	
MIN	.000	.000	.000	.000	.000	.000	6.51	1.12	1.35	.000	.000	.000	
(WY)	1939	1939	1939	1939	1939	1940	1938	1939	1938	1940	1938	1938	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1931 - 1991

ANNUAL TOTAL	1999.09	5234.82	
ANNUAL MEAN	5.48	14.3	69.8
HIGHEST ANNUAL MEAN			394
LOWEST ANNUAL MEAN			3.47
HIGHEST DAILY MEAN	76	Apr 4	289
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			351
INSTANTANEOUS PEAK STAGE			2.75
ANNUAL RUNOFF (AC-FT)	3970	10380	50580
10 PERCENT EXCEEDS	13	42	95
50 PERCENT EXCEEDS	1.4	1.1	4.4
90 PERCENT EXCEEDS	.00	.00	.10

e Estimated.

RED RIVER OF THE NORTH BASIN
05066500 GOOSE RIVER AT HILLSBORO, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)
JAN 15...	1145	0.60	204	--	-5.0	0.5	--	--	--	--	--	--
MAR 13...	1005	2.9	3160	7.6	0.0	1.0	4.1	28	--	--	--	--
MAR 29...	1010	16	1560	8.1	-6.0	0.5	--	--	510	120	52	140
MAY 08...	1315	48	1090	--	7.5	9.0	--	--	--	--	--	--
JUN 11...	1135	49	927	--	32.0	21.5	--	--	--	--	--	--
JUL 18...	1035	14	1120	--	28.0	27.0	--	--	--	--	--	--
AUG 23...	0920	0.05	503	7.8	21.0	20.5	--	--	360	75	42	55
DATE	SODIUM PERCENT (00932)	SODIUM RATIO (00931)	POTAS- SIUM, DIS- SORP- TION SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)
MAR 29...	36	3	14	330	0	270	410	110	0.40	14	1060	1020
AUG 23...	24	1	10	240	0	190	240	34	0.20	12	644	585
DATE	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 29...	1.44	46.4	4	290	20	1	100	260	0.1	<1	1	860
AUG 23...	0.88	0.09	8	110	20	<1	70	260	0.1	1	1	480

LOCATION.--Lat 47°55'38", long 97°01'34", in sec.2, T.151 N., R.50 W., Grand Forks County, Hydrologic Unit 09020301, on the right bank, 200 ft upstream from the DeMers Avenue bridge, 0.4 mi downstream from Red Lake River, and at mile 293.8.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1882 to current year. Prior to January 1904 monthly discharge only, published in WSP 1308.

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

GAGE.--Water-stage recorder. Datum of gage is 779.00 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1983, to Sept. 30, 1986, datum of gage was 780.00 ft at same site. Apr. 14, 1965, to Sept. 30, 1983, water-stage recorder 1.9 mi downstream at a datum of 778.35 ft. Nov. 3, 1933, to Apr. 13, 1965, water-stage recorder 0.3 mi upstream at 778.35 ft datum. See WSP 1728 or 1913 for history of changes prior to Nov. 3, 1933.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	349	378	313	180	195	352	2090	1370	1760	2060	1550	625
2	383	377	270	185	207	371	2540	1500	1690	2130	1460	607
3	368	345	228	194	213	376	3180	1970	1800	2790	1470	592
4	380	337	200	200	229	379	3300	2480	1800	3600	1430	596
5	381	352	189	200	239	360	2830	2990	1720	4140	1400	618
6	360	337	189	200	239	342	2680	3720	1850	4570	1450	698
7	355	319	197	200	248	343	2450	4240	2160	4780	1360	718
8	352	252	221	193	253	350	2070	4120	2250	4850	1260	724
9	336	262	231	185	273	350	1770	4030	2170	4850	1200	710
10	341	256	236	185	291	352	1530	3940	2290	4720	1150	718
11	317	261	256	185	310	361	1350	3740	2290	4410	1130	818
12	323	323	263	185	326	367	1230	3530	2060	4020	1110	1150
13	297	306	271	185	351	367	1130	3260	2020	3600	1080	1400
14	302	323	262	185	351	373	1110	2980	2230	3350	1060	2010
15	321	341	265	180	351	395	1090	2900	2940	3190	1030	2600
16	315	326	254	180	350	427	1060	2800	2750	3020	1020	2870
17	323	304	233	185	354	462	1060	2600	2550	2910	956	2740
18	366	293	222	188	352	485	1050	2360	2170	2850	957	2620
19	329	292	223	192	350	505	1020	2170	1860	2770	988	2640
20	312	356	214	196	341	552	1030	2010	1730	2730	921	2340
21	392	454	197	215	326	625	1050	1890	1710	2500	787	2110
22	415	470	200	230	323	766	1100	1900	1760	2360	790	1840
23	364	337	179	223	326	972	1200	2790	1770	2250	834	1570
24	355	227	168	219	332	1240	1270	4100	1680	2180	824	1320
25	370	285	184	207	335	1520	1260	4090	1580	2120	799	1070
26	362	270	192	207	346	1640	1230	3190	1620	2070	771	1020
27	349	250	192	195	350	1660	1240	2640	1850	2020	763	998
28	370	275	178	192	350	1760	1200	2310	2040	1890	715	998
29	331	281	180	192	---	1840	1160	2060	2070	1770	624	962
30	373	296	183	190	---	1880	1330	1920	2070	1700	583	870
31	384	---	168	192	---	1920	---	1840	---	1650	613	---
TOTAL	10875	9485	6758	6045	8511	23692	47610	87440	60240	93850	32085	40552
MEAN	351	316	218	195	304	764	1587	2821	2008	3027	1035	1352
MAX	415	470	313	230	354	1920	3300	4240	2940	4850	1550	2870
MIN	297	227	168	180	195	342	1020	1370	1580	1650	583	592
AC-FT	21570	18810	13400	11990	16880	46990	94430	173400	119500	186200	63640	80430

MEAN	1323	1151	926	790	756	2289	9147	4921	3850	3024	1536	1329
MAX	4290	5218	3073	1929	1869	10250	31480	36510	19340	25270	6564	4702
(WY)	1972	1972	1972	1951	1952	1966	1979	1950	1962	1975	1905	1985
MIN	12.1	30.5	17.8	18.8	2.87	42.1	954	373	151	88.8	30.6	20.3
(WY)	1937	1937	1937	1937	1937	1937	1938	1934	1934	1936	1934	1936

ANNUAL TOTAL	310538			427143					
ANNUAL MEAN	851			1170			2565		
HIGHEST ANNUAL MEAN							7580		1950
LOWEST ANNUAL MEAN							244		1934
HIGHEST DAILY MEAN	4880	Apr	4	4850	Jul	8	80900	Apr	23 1979
LOWEST DAILY MEAN	143	Jan	1	168	Dec	24	a1.8	Sep	2 1977
ANNUAL SEVEN-DAY MINIMUM	153	Jan	1	181	Dec	27	2.5	Feb	12 1937
INSTANTANEOUS PEAK FLOW				4870	Jul	8	b85000	Apr	10 1897
INSTANTANEOUS PEAK STAGE				17.63	Jul	8	c50.20	Apr	10 1897
ANNUAL RUNOFF (AC-FT)	616000			847200			1858000		
10 PERCENT EXCEEDS	1870			2790			5710		
50 PERCENT EXCEEDS	395			715			1280		
90 PERCENT EXCEEDS	207			200			255		

a Caused by unusual regulation during repair of dam at Grand Forks.
b From rating curve extended above 58,000 ft³/s.
c Site and datum then in use.

RED RIVER OF THE NORTH BASIN

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

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCHI FECAL, KF AGAR (COLS. / PER 100 ML) (31673)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
NOV												
20...	1505	377	640	--	6.0	1.5	--	--	--	--	--	--
DEC												
31...	1255	168	920	--	-15.0	0.0	--	--	--	--	--	--
JAN												
30...	1300	186	875	--	-18.0	0.0	--	--	--	--	--	--
FEB												
26...	1120	346	900	--	-3.5	0.5	--	--	--	--	--	--
MAR												
13...	1440	356	790	7.8	7.5	0.0	10.9	72	160	>1000	340	75
APR												
01...	1020	2060	460	--	5.0	1.5	--	--	--	--	--	--
04...	1205	3330	475	8.2	15.0	2.0	--	--	--	--	200	42
29...	1550	1170	560	--	13.5	12.5	--	--	--	--	--	--
MAY												
09...	1110	3870	660	--	17.0	13.5	--	--	--	--	--	--
30...	1305	1980	700	--	20.5	21.5	--	--	--	--	--	--
JUL												
01...	1210	2000	675	--	24.0	22.0	--	--	--	--	--	--
09...	1115	4830	400	--	20.0	22.0	--	--	--	--	--	--
AUG												
a01...	1220	1530	638	8.4	23.0	23.0	--	--	--	--	300	62
22...	1520	818	410	--	32.0	25.0	--	--	--	--	--	--
SEP												
03...	1520	581	640	--	24.0	24.5	--	--	--	--	--	--
16...	1540	2870	495	--	15.0	17.0	--	--	--	--	--	--

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)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)
MAR												
13...	38	40	20	0.9	7.4	--	--	--	301	367	0	89
APR												
04...	22	16	15	0.5	6.1	180	0	150	--	--	--	63
AUG												
a01...	34	18	11	0.5	5.7	270	0	220	--	--	--	100
DATE	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)

MAR												
13...	32	0.20	17	475	483	0.65	457	0.580	0.010	0.590	0.290	1.3
APR												
04...	11	0.10	13	304	264	0.41	2730	--	--	--	--	--
AUG												
a01...	13	0.20	23	451	388	0.61	1860	--	--	--	--	--
DATE	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)
MAR												
13...	0.100	0.090	1	82	<0.5	100	<1.0	<5	<3	<10	10	<10
APR												
04...	--	--	2	--	--	40	--	--	--	--	20	<1
AUG												
a01...	--	--	6	--	--	80	--	--	--	--	10	<1

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

107

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	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)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L AS C) (00689)
MAR 13...	33	42	<0.1	<10	<10	<1	<1.0	270	<6	10	8.8	0.3
APR 04...	20	10	<0.1	2	--	<1	--	200	--	--	--	--
AUG a01...	30	10	0.1	2	--	<1	--	480	--	--	--	--

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05084000 FOREST RIVER NEAR FORDVILLE, ND

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

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

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 1,035 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to July 21, 1951, nonrecording gage at site 50 ft downstream at same datum.

REMARKS.--Records fair except those for period of estimated daily discharges and July 23 to Sept. 23, which are poor. Some regulation of high flows by temporary retention in several retarding basins above station. Retarding basins have a combined capacity of about 14,000 acre-ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.6	4.5	e4.2	e3.7	e4.5	7.3	8.7	16	5.0	24	2.1	1.7
2	2.3	4.6	e3.3	e3.9	e5.0	7.2	9.1	14	4.8	19	2.1	2.0
3	2.2	4.7	e3.2	e4.3	e6.5	7.3	9.6	14	4.2	15	4.2	1.9
4	2.3	4.6	e4.3	e4.4	e6.0	7.2	9.7	21	5.0	11	3.2	1.7
5	2.5	4.6	e4.8	e4.4	e6.0	6.9	9.6	20	5.2	12	3.0	1.6
6	2.6	3.9	e5.1	e4.4	e5.8	6.4	9.1	17	5.4	12	4.7	2.8
7	2.3	3.6	e5.3	e4.2	e5.8	6.8	8.5	15	5.2	19	5.1	2.1
8	2.4	4.6	e5.7	e3.7	e5.6	6.7	8.2	13	5.6	19	4.6	3.0
9	2.5	4.5	e5.8	e3.3	e5.4	6.4	8.0	12	7.0	15	3.8	4.4
10	2.6	3.6	e5.8	e3.3	e5.2	6.3	7.4	12	6.2	12	3.0	4.4
11	2.4	4.5	e5.9	e3.2	e5.0	6.2	7.7	12	5.5	9.5	2.1	6.3
12	2.5	4.4	e6.1	e2.9	e4.6	5.9	7.2	12	6.3	9.7	1.6	4.9
13	2.7	4.1	e5.7	e2.9	e4.4	5.8	7.5	11	7.1	9.7	1.7	4.2
14	2.7	4.8	e5.4	e3.0	e4.2	5.8	9.4	9.1	7.3	46	1.5	4.3
15	2.9	4.9	e5.2	e3.4	e4.0	5.8	10	8.5	10	68	1.4	4.5
16	2.8	4.3	e5.0	e5.2	e4.2	5.9	9.9	7.8	8.3	56	3.1	13
17	3.7	3.9	e5.4	e5.3	e4.4	6.0	9.2	7.0	7.8	43	2.6	16
18	3.7	4.1	e5.6	e5.6	e4.6	6.5	9.0	6.5	7.5	32	8.2	58
19	3.7	3.7	e5.0	e6.0	e4.8	7.4	8.6	6.1	6.8	24	13	43
20	3.6	4.0	e4.8	e5.8	e5.0	8.3	8.4	5.9	7.8	24	8.3	34
21	3.3	4.9	e5.0	e5.5	e5.2	9.4	8.5	5.4	7.9	20	5.7	28
22	3.3	3.5	e4.8	e5.2	e5.5	9.1	8.7	7.9	7.1	17	4.1	28
23	3.3	3.4	e4.6	e5.0	e6.0	8.4	8.5	17	6.0	14	3.3	27
24	3.4	3.2	e4.5	e4.8	e6.8	8.6	8.4	15	6.2	11	3.5	25
25	3.9	e3.5	e4.7	e4.6	e7.5	8.8	8.5	11	6.3	8.3	4.5	24
26	4.2	e3.5	e4.7	e4.4	8.0	8.7	9.3	9.2	6.7	6.2	4.5	20
27	4.3	e3.9	e4.7	e4.2	7.7	8.1	13	8.0	6.0	4.5	3.7	17
28	4.1	e3.9	e4.7	e4.0	7.6	8.4	14	6.9	6.3	3.9	4.2	15
29	4.1	e3.5	e4.4	e4.0	---	7.9	12	6.1	7.8	2.6	3.8	12
30	4.2	e4.1	e4.2	e4.0	---	8.0	18	5.5	14	3.0	2.9	12
31	4.6	---	e4.0	e4.0	---	8.6	---	4.9	---	2.5	2.3	---
TOTAL	97.7	123.3	151.9	132.6	155.3	226.1	283.7	336.8	202.3	572.9	121.8	421.8
MEAN	3.15	4.11	4.90	4.28	5.55	7.29	9.46	10.9	6.74	18.5	3.93	14.1
MAX	4.6	4.9	6.1	6.0	8.0	9.4	18	21	14	68	13	58
MIN	2.2	3.2	3.2	2.9	4.0	5.8	7.2	4.9	4.2	2.5	1.4	1.6
AC-FT	194	245	301	263	308	448	563	668	401	1140	242	837

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1991, BY WATER YEAR (WY)

	MEAN	9.93	8.58	7.11	6.15	7.20	56.5	203	63.3	33.0	21.9	7.57	8.00
MAX	57.9	23.7	19.2	16.3	29.9	278	1182	1037	255	232	52.6	21.5	
(WY)	1983	1983	1983	1986	1981	1966	1950	1950	1964	1982	1982	1979	
MIN	1.52	2.03	2.06	2.70	1.21	4.07	9.46	7.07	2.74	3.34	1.64	.91	
(WY)	1941	1941	1941	1941	1963	1941	1991	1961	1940	1941	1945	1940	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1940 - 1991

ANNUAL TOTAL	1964.97	2826.2	
ANNUAL MEAN	5.38	7.74	36.4
HIGHEST ANNUAL MEAN			193
LOWEST ANNUAL MEAN			6.37
HIGHEST DAILY MEAN	16 Jun 3	68 Jul 15	10900 Apr 18 1950
LOWEST DAILY MEAN	.76 Aug 5	1.4 Aug 15	.00 Apr 1 1940
ANNUAL SEVEN-DAY MINIMUM	.99 Aug 17	2.0 Sep 1	.00 Apr 1 1940
INSTANTANEOUS PEAK FLOW		77 Sep 18	a16400 Apr 18 1950
INSTANTANEOUS PEAK STAGE		2.58 Jul 15	b14.48 Apr 18 1950
ANNUAL RUNOFF (AC-FT)	3900	5610	26370
10 PERCENT EXCEEDS	11	14	40
50 PERCENT EXCEEDS	4.6	5.5	8.0
90 PERCENT EXCEEDS	2.2	2.9	3.5

e Estimated.

a From rating curve extended above 5,600 ft³/s on basis of contracted opening and slope area measurement of peak flow.

b From floodmark.

RED RIVER OF THE NORTH BASIN

109

05084000 FOREST RIVER NEAR FORDVILLE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
16...	1340	2.6	710	--	9.5	7.0	--	--	--	--	--	--
DEC												
11...	1155	5.8	725	--	-1.0	0.5	--	--	--	--	--	--
JAN												
15...	1250	3.3	768	--	0.5	0.5	--	--	--	--	--	--
MAR												
19...	1205	7.8	645	--	12.0	1.0	--	--	--	--	--	--
29...	1145	8.0	565	8.4	-2.5	2.0	250	63	23	19	14	0.5
MAY												
03...	1130	12	--	--	10.0	13.0	--	--	--	--	--	--
JUN												
10...	1355	5.8	620	--	22.0	23.0	--	--	--	--	--	--
JUL												
23...	1230	15	740	8.6	25.0	22.0	290	67	30	47	25	1
SEP												
23...	1310	28	735	--	15.0	11.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
29...	4.2	240	0	200	93	4.8	0.10	15	347	342	0.47	
JUL												
23...	7.3	250	5	220	160	15	0.20	21	524	478	0.71	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
29...	7.49	2	40	10	<1	20	160	<0.1	2	1	230	
JUL												
23...	20.8	3	100	10	<1	30	10	0.2	2	<1	510	

RED RIVER OF THE NORTH BASIN

05085000 FOREST RIVER AT MINTO, ND

LOCATION.--Lat 48°16'10", long 97°22'10", in SE 1/4 sec. 51, T.156 N., R.52 W., Walsh County, Hydrologic Unit 09020308, on right bank 30 ft upstream from dam in Minto, 150 ft upstream from Burlington Northern Railway bridge, and 900 ft east of U.S. Highway 81.

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

WATER-DISCHARGE RECORDS

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

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

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

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	1.5	e.00	e.00	e.00	16	18	7.2	15	12	3.7
2	.00	.00	1.1	e.00	e.00	e.00	18	18	5.6	8.0	11	3.4
3	.00	.00	1.0	e.00	e.00	e.00	25	19	5.1	6.4	11	2.8
4	.00	.00	1.2	e.00	e.00	e.00	40	21	5.1	8.8	8.8	2.6
5	.00	.00	1.3	e.00	e.00	e.00	45	21	5.3	13	9.4	2.5
6	.00	.00	1.2	e.00	e.00	e.00	45	22	4.6	12	11	2.2
7	.00	.00	1.4	e.00	e.00	e.00	45	23	4.8	13	7.9	1.8
8	.00	.00	1.4	e.00	e.00	e.00	40	22	4.7	12	6.7	2.7
9	.00	.00	1.5	e.00	e.00	e.00	31	19	3.7	12	6.2	3.2
10	.00	.00	1.4	e.00	e.00	e.00	29	17	3.7	12	6.3	2.7
11	.00	.00	1.4	e.00	e.00	e.00	24	15	3.6	13	6.1	2.4
12	.00	.00	1.5	e.00	e.00	e.00	23	15	3.8	13	6.3	2.2
13	.00	.00	1.4	e.00	e.00	e.00	24	15	3.9	12	5.9	2.5
14	.00	.00	1.4	e.00	e.00	e.00	24	13	3.5	12	5.6	2.8
15	.00	.00	1.4	e.00	e.00	e.00	26	14	4.1	13	5.0	2.8
16	.00	e.32	e1.3	e.00	e.00	e.00	25	14	3.7	12	5.5	12
17	.00	e1.6	e1.0	e.00	e.00	e.00	27	13	3.7	12	5.3	12
18	.00	e2.4	e.74	e.00	e.00	e.00	20	11	3.8	18	5.6	8.6
19	.00	e2.4	e.60	e.00	e.00	.14	17	9.0	3.7	21	4.6	7.0
20	.00	e2.7	e.50	e.00	e.00	.46	16	8.0	4.0	23	4.3	10
21	.00	e2.7	e.46	e.00	e.00	5.4	15	6.8	3.3	21	4.5	31
22	.00	e2.2	e.38	e.00	e.00	5.7	15	7.9	3.2	19	4.0	33
23	.00	2.1	e.24	e.00	e.00	5.2	13	9.2	3.5	17	4.5	32
24	.00	2.6	e.20	e.00	e.00	6.2	13	8.2	3.7	17	6.4	31
25	.00	2.0	e.12	e.00	e.00	8.0	11	10	4.4	16	6.7	31
26	.00	1.8	e.06	e.00	e.00	8.0	10	15	3.9	16	6.3	28
27	.00	1.7	e.03	e.00	e.00	6.1	12	14	3.2	18	5.4	27
28	.00	1.7	e.02	e.00	e.00	7.8	12	11	3.6	18	4.9	25
29	.00	1.4	e.00	e.00	---	12	13	9.4	3.4	17	4.4	22
30	.00	1.5	e.00	e.00	---	12	17	8.1	6.4	15	4.0	19
31	.00	---	e.00	e.00	---	12	---	6.8	---	13	3.9	---
TOTAL	0.00	29.12	25.75	0.00	0.00	89.00	691	433.4	126.2	448.2	199.5	368.9
MEAN	.000	.97	.83	.000	.000	2.87	23.0	14.0	4.21	14.5	6.44	12.3
MAX	.00	2.7	1.5	.00	.00	12	45	23	7.2	23	12	33
MIN	.00	.00	.00	.00	.00	.00	10	6.8	3.2	6.4	3.9	1.8
AC-FT	.00	58	51	.00	.00	177	1370	860	250	889	396	732

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1944 - 1991, BY WATER YEAR (WY)

	9.04	8.71	4.61	2.25	1.85	55.7	296	96.0	45.9	24.7	8.94	7.43
MEAN	59.1	23.6	13.4	9.66	17.3	438	1573	1515	267	236	96.4	56.6
MAX	1983	1983	1983	1983	1981	1966	1950	1950	1964	1982	1982	1957
MIN	.000	.97	.29	.000	.000	.000	21.9	10.6	4.21	1.87	.000	.000
(WY)	1991	1991	1990	1977	1961	1962	1953	1946	1991	1980	1946	1961

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1944 - 1991

ANNUAL TOTAL	1549.47	2411.07	
ANNUAL MEAN	4.25	6.61	
HIGHEST ANNUAL MEAN			47.3
LOWEST ANNUAL MEAN			268
HIGHEST DAILY MEAN	41	Apr 22	4.36
LOWEST DAILY MEAN	.00	Jan 1	11600
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			.00
INSTANTANEOUS PEAK STAGE			60
ANNUAL RUNOFF (AC-FT)	3070	4780	1.54
10 PERCENT EXCEEDS	15	19	Apr 4
50 PERCENT EXCEEDS	.12	2.8	34230
90 PERCENT EXCEEDS	.00	.00	60
			7.0
			.40

e Estimated.

a From rating curve extended above 7,200 ft³/s on basis of contracted opening measurement of peak flow.

b From floodmarks.

RED RIVER OF THE NORTH BASIN

111

05085000 FOREST RIVER AT MINTO, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 19...	1150	2.5	800	--	5.0	3.5	--	--	--	--	--	--
MAR 19...	1600	0.10	600	--	15.0	1.5	--	--	--	--	--	--
MAR 29...	1540	13	605	8.1	-1.5	1.5	220	53	22	32	23	0.9
MAY 07...	1520	22	705	--	10.0	6.0	--	--	--	--	--	--
JUN 17...	1525	3.7	620	--	28.0	27.0	--	--	--	--	--	--
JUL 25...	1540	17	845	8.3	25.0	22.5	320	72	34	49	24	1
SEP 25...	1415	27	778	--	13.5	12.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 29...		6.6	200	0	170	100	27	0.10	12	356	354	0.48
JUL 25...		7.8	290	0	240	140	22	0.20	25	580	493	0.79
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 29...		12.9	1	70	20	<1	20	210	0.1	1	1	250
JUL 25...		26.2	4	70	10	<1	40	30	0.2	2	<1	510

RED RIVER OF THE NORTH BASIN

05088500 HOMME RESERVOIR NEAR PARK RIVER, ND

LOCATION.--Lat 48°24'20", long 97°47'10", in SE¹/₄NW¹/₄ sec.19, T.157 N., R.55 W., Walsh County, Hydrologic Unit 09020310, at Homme Dam on South Branch Park River, and 2 mi west of town of Park River.

DRAINAGE AREA.--226 mi².

MONTHEND-ELEVATION AND CONTENTS RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

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

REMARKS.--Reservoir is formed by an earth-fill dam, 865 ft long; storage began in September 1949, dam completed in October 1950. Usable capacity between invert of outlet, elevation, 1,048.0 ft, and crest of spillway, elevation, 1,080.0 ft, is 3,550 acre-ft. Dead storage is 100 acre-ft. Low flows are controlled by two gates 3 x 5 ft. The spillway, which is 150 ft long, is uncontrolled. The records herein represent total contents. The reservoir is operated for flood control, water supply, and pollution abatement during low-flow periods.

COOPERATION.--Records furnished by U.S. Army Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 4,710 acre-ft, Apr. 20, 1979, elevation, 1,084.58 ft; minimum since first reaching spillway level, 184 acre-ft, Feb. 8, 1952, elevation, 1,051.22 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 2,880 acre-ft, July 8, elevation, 1,080.18 ft; minimum, 2,550 acre-ft, Oct. 15, elevation, 1,078.34 ft.

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	1,078.47	2,570	--
Oct. 31-----	1,078.34	2,550	-20
Nov. 30-----	1,078.42	2,560	+10
Dec. 31-----	1,078.69	2,610	+50
CAL YR 1990-----	--	--	-190
Jan. 31-----	1,078.92	2,650	+40
Feb. 28-----	1,079.22	2,700	+50
Mar. 31-----	1,079.60	2,770	+70
Apr. 30-----	1,080.02	2,840	+70
May 31-----	1,079.97	2,840	0
June 30-----	1,080.00	2,840	0
July 31-----	1,079.23	2,700	-140
Aug. 31-----	1,079.15	2,690	-10
Sept. 30-----	1,079.80	2,800	+110
WTR YR 1991-----	--	--	+230

RED RIVER OF THE NORTH BASIN

113

05089000 SOUTH BRANCH PARK RIVER BELOW HOMME DAM, ND

LOCATION.--Lat 48°24'07", long 97°46'55", in SE¹/₄, sec.19, T.157 N., R.55 W., Walsh County, Hydrologic Unit 09020310, on right bank 0.5 mi downstream from Homme Dam, and 2 mi west of town of Park River.

DRAINAGE AREA.--226 mi².

WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,000.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Flow regulated by Homme Reservoir (station 05088500).

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.08	e.07	e.02	e.05	e.05	e.05	7.4	1.6	8.6	2.9	.00
2	.00	.08	e.07	e.02	e.05	e.05	e.05	6.0	1.6	17	2.3	.00
3	.00	.08	e.07	e.02	e.05	e.05	e.05	5.8	1.6	10	.49	.00
4	.00	.07	e.07	e.02	e.05	e.05	e.05	6.0	1.6	9.6	.21	.00
5	.00	.08	e.07	e.02	e.05	e.05	e.05	5.5	1.6	11	.16	.00
6	.00	.08	e.07	e.02	e.05	e.05	e.05	5.9	1.7	26	.58	.00
7	.00	.10	e.07	e.03	e.05	e.05	e.06	5.9	1.6	20	.35	.00
8	.00	.10	e.07	e.03	e.05	e.05	e.05	5.9	1.7	13	.19	.08
9	.00	.09	e.07	e.03	e.05	e.05	e.05	6.0	1.9	10	.13	.12
10	.00	.10	e.08	e.04	e.05	e.05	e.05	5.9	1.9	9.2	.12	.07
11	.00	.09	e.09	e.04	e.05	e.05	e.05	5.9	1.7	9.4	.10	.06
12	.00	.08	e.10	e.05	e.05	e.05	e.05	5.9	1.9	11	.09	.03
13	.00	.07	e.10	e.05	e.05	e.05	e.05	6.1	1.8	13	.10	.02
14	.00	.07	e.11	e.05	e.05	e.05	e.08	6.0	1.8	12	.09	.01
15	.00	.07	e.12	e.05	e.05	e.05	e.08	6.2	3.5	11	.08	.02
16	.00	.08	e.10	e.05	e.05	e.05	e.05	6.1	2.3	11	.08	.21
17	.00	.08	e.09	e.05	e.05	e.05	e.05	4.9	2.2	11	.08	.11
18	.00	.07	e.08	e.05	e.05	e.06	e.05	3.8	2.5	10	.07	.29
19	.00	.07	e.07	e.05	e.05	e.06	e.05	1.2	2.5	8.1	.07	.10
20	.01	.07	e.05	e.05	e.05	e.06	e.05	1.0	3.4	6.6	.06	.08
21	.03	.07	e.03	e.05	e.05	e.09	e.05	.90	6.5	6.4	.06	.07
22	.03	.07	e.02	e.05	e.05	e.08	.35	1.8	6.2	6.3	.04	1.7
23	.04	.07	e.02	e.05	e.05	e.08	1.0	1.6	5.8	5.8	.06	.56
24	.05	.07	e.02	e.05	e.05	e.08	.82	.87	5.4	5.4	.07	.18
25	.07	.07	e.02	e.05	e.05	e.08	.23	.64	5.3	5.3	.06	.39
26	.07	.07	e.02	e.05	e.05	e.08	1.2	.55	6.0	4.1	.03	.47
27	.07	.07	e.02	e.05	e.05	e.08	2.7	1.1	6.1	2.6	.02	.13
28	.07	.07	e.02	e.05	e.05	e.09	3.1	1.6	6.0	2.7	.02	.09
29	.07	.06	e.02	e.05	---	e.05	6.0	1.6	6.2	2.8	.01	.08
30	.07	.07	e.02	e.05	---	e.05	12	1.5	6.6	2.8	.00	.64
31	.08	---	e.02	e.05	---	e.05	---	1.5	---	2.8	.00	---
TOTAL	0.66	2.30	1.85	1.29	1.40	1.84	28.52	121.06	100.5	284.5	8.62	5.51
MEAN	.021	.077	.060	.042	.050	.059	.95	3.91	3.35	9.18	.28	.18
MAX	.08	.10	.12	.05	.05	.09	12	7.4	6.6	26	2.9	1.7
MIN	.00	.06	.02	.02	.05	.05	.05	.55	1.6	2.6	.00	.00
AC-FT	1.3	4.6	3.7	2.6	2.8	3.6	57	240	199	564	17	11

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1991, BY WATER YEAR (WY)

	MEAN	3.85	3.60	4.21	5.33	5.61	27.1	150	49.2	19.9	10.9	3.20	5.03
MAX	25.7	16.0	12.2	31.2	28.6	234	749	706	181	92.3	17.6	36.2	
(WY)	1983	1985	1983	1974	1981	1966	1950	1950	1964	1982	1985	1951	
MIN	.000	.015	.010	.000	.000	.059	.61	.73	.78	.028	.000	.000	
(WY)	1950	1989	1990	1990	1990	1991	1977	1977	1989	1990	1990	1990	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1950 - 1991

ANNUAL TOTAL	188.52	558.05	
ANNUAL MEAN	.52	1.53	
HIGHEST ANNUAL MEAN			23.9
LOWEST ANNUAL MEAN			125
HIGHEST DAILY MEAN	11	Apr 6	4870
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			32
INSTANTANEOUS PEAK STAGE			23.56
ANNUAL RUNOFF (AC-FT)	374	1110	17330
10 PERCENT EXCEEDS	1.8	6.0	27
50 PERCENT EXCEEDS	.00	.07	3.1
90 PERCENT EXCEEDS	.00	.02	.30

e Estimated.

a About, from rating curve extended above 5,500 ft³/s, result of failure of emergency embankment at site of Homme Dam.

RED RIVER OF THE NORTH BASIN

05089000 SOUTH BRANCH PARK RIVER BELOW HOMME DAM, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
DEC 10...	1520	0.08	1080	--	-1.5	1.5	--	--	--	--	--	--
JAN 15...	1420	0.05	1220	--	0.0	0.5	--	--	--	--	--	--
MAR 19...	1345	0.12	885	--	12.5	3.5	--	--	--	--	--	--
MAR 29...	1325	0.05	800	--	-2.0	6.0	--	--	--	--	--	--
APR 05...	1205	0.05	600	8.1	20.0	12.5	250	61	24	27	19	0.7
MAY 07...	1225	5.6	968	--	7.5	6.5	--	--	--	--	--	--
JUN 13...	1410	1.9	900	--	30.0	24.0	--	--	--	--	--	--
JUL 23...	1520	5.7	895	8.3	25.0	22.0	360	83	38	44	20	1
SEP 23...	1515	0.40	868	--	13.0	12.5	--	--	--	--	--	--
DATE		POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
APR 05...		4.9	150	0	130	180	7.0	0.10	4.6	404	385	0.55
JUL 23...		7.5	240	0	200	250	16	0.20	16	643	576	0.87
DATE		SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)
APR 05...		0.05	1	50	10	<1	30	70	0.1	1	<1	320
JUL 23...		9.83	4	110	10	<1	50	800	0.1	2	<1	660

05090000 PARK RIVER AT GRAFTON, ND

LOCATION.--Lat 48°25'29", long 97°24'42", in NE¹/₄ sec.13, T.157 N., R.53 W., Walsh County, Hydrologic Unit 09020310, on right bank at the upstream corner of U.S. Highway 81 bridge in Grafton, and 3.5 mi downstream from South Branch.

DRAINAGE AREA.--695 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1931 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 955: 1941. WSP 1438: 1932, 1933(M), 1936-37(M), 1939(M), 1944. WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 811.00 ft above National Geodetic Vertical Datum of 1929. Prior to Oct. 1, 1984, gage located on right bank 30 ft upstream of Wakeman Avenue bridge. Datum of gage was 807.39 ft. Prior to Sept. 30, 1940, nonrecording gage at site 30 ft downstream at same datum. Oct. 1, 1940, to Sept. 17, 1946, nonrecording gage at site 2 mi downstream above masonry dam at same datum. Sept. 18, 1946, to July 25, 1952, nonrecording gage at site 30 ft downstream at same datum.

REMARKS.--Records good except those for May 8 to Sept. 30, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	1.3	12	5.1	e.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.20	11	4.5	e.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.13	13	4.5	e.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.09	20	4.5	e.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.20	21	4.5	e.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.20	19	6.2	e.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.11	21	5.8	e.00
8	.00	.00	.00	.00	.00	.00	.00	.82	.01	40	5.2	e.00
9	.00	.00	.00	.00	.00	.00	.00	2.4	.10	36	5.2	e.00
10	.00	.00	.00	.00	.00	.00	.00	3.0	.14	27	5.2	.00
11	.00	.00	.00	.00	.00	.00	.00	3.7	.01	23	5.2	.00
12	.00	.00	.00	.00	.00	.00	.00	4.2	.01	20	4.5	.00
13	.00	.00	.00	.00	.00	.00	.00	4.0	.01	19	e3.5	.00
14	.00	.00	.00	.00	.00	.00	.00	3.2	.01	19	e2.0	.00
15	.00	.00	.00	.00	.00	.00	.00	4.3	1.7	20	e1.5	.00
16	.00	.00	.00	.00	.00	.00	.00	4.0	1.9	18	e1.0	6.0
17	.00	.00	.00	.00	.00	.00	.00	3.5	.98	18	e.80	4.9
18	.00	.00	.00	.00	.00	.00	.00	3.2	.20	17	e.20	3.2
19	.00	.00	.00	.00	.00	.00	.00	3.2	.20	16	e.05	e3.0
20	.00	.00	.00	.00	.00	.00	.00	3.6	.20	15	e.01	e2.8
21	.00	.00	.00	.00	.00	.00	.00	3.2	.20	15	e.01	e2.6
22	.00	.00	.00	.00	.00	.00	.00	5.2	.28	13	e.01	e2.4
23	.00	.00	.00	.00	.00	.00	.00	20	.14	11	e.01	e2.2
24	.00	.00	.00	.00	.00	.00	.00	28	.88	8.1	e.01	e2.0
25	.00	.00	.00	.00	.00	.00	.00	25	4.6	7.6	e.00	1.9
26	.00	.00	.00	.00	.00	.00	.00	15	6.0	6.9	e.00	.60
27	.00	.00	.00	.00	.00	.00	.00	8.2	e6.5	6.2	e.00	.60
28	.00	.00	.00	.00	.00	.00	.00	5.3	e7.0	6.0	e.00	.60
29	.00	.00	.00	.00	---	.00	.00	3.3	e8.0	6.0	e.00	.60
30	.00	.00	.00	.00	---	.00	.00	1.0	9.2	6.0	e.00	.60
31	.00	---	.00	.00	---	.00	---	1.1	---	5.5	e.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	158.42	50.50	496.3	69.50	34.00
MEAN	.000	.000	.000	.000	.000	.000	.000	5.11	1.68	16.0	2.24	1.13
MAX	.00	.00	.00	.00	.00	.00	.00	28	9.2	40	6.2	6.0
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.01	5.5	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	314	100	984	138	67

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1991, BY WATER YEAR (WY)

	MEAN	4.95	3.28	2.07	1.08	1.96	58.0	393	109	45.0	21.4	4.91	6.70
MAX	69.9	31.3	17.4	13.9	45.7	410	2051	2071	576	254	38.6	151	
(WY)	1983	1981	1983	1983	1981	1945	1950	1950	1964	1982	1982	1957	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	2.05	.000	.000	.000	
(WY)	1934	1934	1933	1932	1933	1936	1991	1939	1961	1990	1932	1932	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1931 - 1991

ANNUAL TOTAL	486.73	808.72	54.3	
ANNUAL MEAN	1.33	2.22	353	1950
HIGHEST ANNUAL MEAN			1.38	1990
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	22	40	11700	Apr 19 1950
LOWEST DAILY MEAN	.00	.00	.00	Aug 10 1931
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00	Aug 21 1931
INSTANTANEOUS PEAK FLOW		48	a12600	Apr 19 1950
INSTANTANEOUS PEAK STAGE		7.47	20.13	Apr 19 1950
ANNUAL RUNOFF (AC-FT)	965	1600	39360	
10 PERCENT EXCEEDS	4.9	6.2	63	
50 PERCENT EXCEEDS	.00	.00	1.2	
90 PERCENT EXCEEDS	.00	.00	.00	

e Estimated.

a From rating curve extended above 9,000 ft³/s.

RED RIVER OF THE NORTH BASIN

05090000 PARK RIVER AT GRAFTON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAY 09...	1545	3.4	2500	8.5	16.0	22.0	350	66	45	370	69	9
JUN 17...	1415	1.6	1070	--	28.0	24.0	--	--	--	--	--	--
JUL 25...	1235	7.6	1040	8.3	25.5	22.0	380	86	41	77	30	2
SEP 25...	1245	1.8	750	--	12.0	11.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAY 09...	14	350	0	280	340	410	0.70	12	1450	1430	1.97	
JUL 25...	9.2	270	0	220	280	45	0.30	10	718	681	0.98	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAY 09...	13.2	5	580	30	<1	110	10	0.1	<1	<1	580	
JUL 25...	14.8	4	190	10	<1	60	10	0.1	3	<1	680	

DRAINAGE AREA.--34,800 mi², approximately, includes 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1936 to June 1937, April 1941 to current year (fragmentary prior to April 1949).

REVISED RECORDS.--WSP 1388: 1949-50. WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 755.00 ft above National Geodetic Vertical Datum of 1929 (Minnesota highway benchmark). Prior to Nov. 30, 1954, nonrecording gage at site 1.5 mi upstream at datum 1.59 ft higher.

REMARKS.--Records good. Some regulation by reservoirs on tributaries.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of April 1897 reached a stage of about 41 ft, at site and datum in use prior to Nov. 30, 1954.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	322	308	e315	e166	e202	e322	2390	1300	2180	2140	1780	619
2	335	335	e315	e161	e197	e349	2620	1360	2070	2150	1690	608
3	315	362	e315	e156	e197	e376	3230	1430	2030	2180	1600	625
4	335	398	e315	e156	e191	e376	4820	1630	1960	2260	1560	643
5	348	376	e302	e161	e186	e362	4150	2000	1980	2860	1510	608
6	322	335	e270	e166	e197	e328	3420	2440	1920	3540	1530	608
7	348	322	e252	e166	e213	e322	3120	2960	1880	4040	1490	592
8	348	328	e247	e171	e224	e322	2900	3540	1920	4470	1480	651
9	335	335	e235	e181	e230	e322	2590	3860	2100	4720	1450	777
10	335	295	e235	e181	e241	e322	2270	3910	e2300	4890	1360	824
11	295	283	e241	e181	e252	e335	1960	3840	e2220	4940	1260	814
12	302	283	e247	e176	e264	e335	1690	3690	e2340	e4890	1180	795
13	302	283	e252	e171	e276	e335	1490	3540	e2300	e4760	1130	843
14	295	295	e258	e166	e295	e335	1350	3340	2190	e4450	1090	1030
15	295	322	e264	e166	e348	e335	1260	3120	e2040	3940	1070	1350
16	283	308	e270	e166	e376	e342	1180	2930	e2240	e3640	1040	2000
17	264	308	e270	e166	e405	e342	1150	2810	e2940	e3390	1000	2630
18	308	342	e264	e166	e412	e355	1090	2680	e2760	e3230	960	2860
19	308	355	e258	e176	e412	e390	1100	2500	2560	3060	901	2840
20	302	e369	e252	e186	e390	e427	1120	2300	e2180	3020	843	2800
21	315	e369	e247	e213	e348	e503	1100	2150	e1860	2950	795	2620
22	295	e376	e241	e235	e322	e575	1080	2040	e1740	2810	795	2440
23	295	e434	e230	e230	e315	e643	1090	1990	e1720	2660	777	2300
24	328	e369	e213	e224	e315	e731	1140	2120	e1760	2490	777	2100
25	342	e362	e213	e224	e322	901	1210	2950	e1780	2390	777	1810
26	322	e355	e202	e230	e328	1170	1270	3890	e1680	2300	768	1580
27	302	e328	e191	e218	e328	1490	1290	3770	1580	2230	777	1380
28	355	e322	e171	e218	e322	1770	1270	3280	1610	2180	768	1200
29	315	e322	e171	e207	---	1980	1210	2900	1810	2100	713	1130
30	322	e315	e176	e207	---	2120	1250	2560	2020	1990	686	1070
31	328	---	e171	e207	---	2270	---	2300	---	1870	660	---
TOTAL	9816	10094	7603	5798	8108	21085	56810	85130	61670	98540	34217	42147
MEAN	317	336	245	187	290	680	1894	2746	2056	3179	1104	1405
MAX	355	434	315	235	412	2270	4820	3910	2940	4940	1780	2860
MIN	264	283	171	156	186	322	1080	1300	1580	1870	660	592
AC-FT	19470	20020	15080	11500	16080	41820	112700	168900	122300	195500	67870	83600

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1991, BY WATER YEAR (WY)

MEAN	1721	1489	1183	1041	1012	2480	13710	8379	5270	4204	1951	1617
MAX	4463	5653	3072	2065	1876	9329	38390	58890	23420	28240	7247	5392
(WY)	1972	1972	1972	1966	1952	1983	1966	1950	1962	1975	1985	1957
MIN	317	277	149	174	201	280	1275	938	676	348	243	329
(WY)	1991	1977	1977	1990	1977	1962	1981	1977	1977	1988	1977	1988

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1949 - 1991

ANNUAL TOTAL	325368			441018				
ANNUAL MEAN	891			1208			3685	
HIGHEST ANNUAL MEAN							10510	1950
LOWEST ANNUAL MEAN							536	1977
HIGHEST DAILY MEAN	5000	Apr	7	4940	Jul	11	91000	Apr 28 1979
LOWEST DAILY MEAN	125	Jan	1	156	Jan	3	110	Dec 23 1989
ANNUAL SEVEN-DAY MINIMUM	129	Jan	1	162	Jan	1	118	Dec 28 1989
INSTANTANEOUS PEAK FLOW				4940	Jul	11	92900	Apr 28 1979
INSTANTANEOUS PEAK STAGE				13.26	Jul	11	43.66	Apr 28 1979
INSTANTANEOUS LOW FLOW							7.7	Oct 16 1936
ANNUAL RUNOFF (AC-FT)	645400			874800			2670000	
10 PERCENT EXCEEDS	1960			2910			7850	
50 PERCENT EXCEEDS	375			660			1650	
90 PERCENT EXCEEDS	220			213			440	

e Estimated.

05092000 RED RIVER OF THE NORTH AT DRAYTON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOC- CI, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	
OCT	15...	1635	275	1050	--	12.5	7.5	--	--	--	--	--	
NOV	19...	1515	341	--	--	7.0	2.5	--	--	--	--	--	
JAN	17...	1525	168	1100	--	-3.0	0.0	--	--	--	--	--	
MAR	14...	1105	336	1010	7.8	0.0	0.0	11.9	80	<2	K250	380 82	
APR	08...	1340	2900	610	8.0	11.5	6.5	--	--	--	--	220 48	
MAY	10...	1740	4120	600	--	25.5	13.0	--	--	--	--	--	
JUN	14...	1320	2180	702	--	24.0	24.0	--	--	--	--	--	
JUL	10...	1550	5100	395	--	26.0	22.0	--	--	--	--	--	
SEP	10...	1225	827	840	8.6	14.5	20.0	--	--	--	290	59	
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)	BICAR-BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR-BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR-BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR-BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)
MAR	14...	42	70	28	2	8.2	--	--	--	320	390	0	100
APR	08...	24	37	26	1	6.7	190	0	160	--	--	--	86
SEP	10...	35	59	30	2	12	270	7	230	--	--	--	120
DATE		CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, 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, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)
MAR	14...	83	0.20	16	635	598	0.86	576	<0.010	0.770	0.230	1.1	0.110
APR	08...	45	0.10	12	380	352	0.52	2980	--	--	--	--	--
SEP	10...	70	0.20	16	537	509	0.73	1200	--	--	--	--	--
DATE		PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BERYL-LIUM, DIS-SOLVED (UG/L AS BE) (01010)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)
MAR	14...	0.110	1	86	<0.5	140	<1.0	<5	<3	<10	11	10	43
APR	08...	--	2	--	--	70	--	--	--	--	90	<1	30
SEP	10...	--	8	--	--	150	--	--	--	--	20	<1	40
DATE		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)	CARBON, ORGANIC DIS-SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS-PENDED TOTAL (MG/L AS C) (00689)	
MAR	14...	45	<0.1	<10	<10	<1	1.0	360	<6	9	9.1	0.3	
APR	08...	<10	<0.1	2	--	<1	--	270	--	--	--	--	
SEP	10...	10	<0.1	1	--	<1	--	390	--	--	--	--	

RED RIVER OF THE NORTH BASIN

119

05098700 HIDDEN ISLAND COULEE NEAR HANSBORO, ND
(International gaging station)

LOCATION.--Lat 48°57'10", long 99°25'35", in SE¹/₄SW¹/₄ sec.11, T.163 N., R.68 W., Towner County, Hydrologic Unit 09020313, on right bank 400 ft downstream from bridge on county highway, and 2.5 mi west of Hansboro.

DRAINAGE AREA.--38 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1961 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,615 ft above National Geodetic Vertical Datum of 1929 from topographic map. Prior to May 20, 1962, nonrecording gage 400 ft upstream at same datum.

REMARKS.--Records good except those for Aug. 6-9, which are poor.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.51	.28	.16	.07	.00	.00
2	.00	.00	.00	.00	.00	.00	.50	.20	.08	.09	.00	.00
3	.00	.00	.00	.00	.00	.00	.49	.19	.05	.05	.00	.00
4	.00	.00	.00	.00	.00	.00	.48	.27	.03	.04	.00	.00
5	.00	.00	.00	.00	.00	.00	.40	.36	.02	.04	.00	.00
6	.00	.00	.00	.00	.00	.00	.27	.63	.02	.04	e.50	.00
7	.00	.00	.00	.00	.00	.00	.18	.73	.02	.33	e1.1	.00
8	.00	.00	.00	.00	.00	.00	.12	.60	.06	.32	e.35	.00
9	.00	.00	.00	.00	.00	.00	.10	.48	.13	.27	e.35	.00
10	.00	.00	.00	.00	.00	.00	.08	.39	.07	.22	.11	.00
11	.00	.00	.00	.00	.00	.00	.07	.37	.04	.17	.06	.00
12	.00	.00	.00	.00	.00	.00	.06	.39	.03	.25	.04	.00
13	.00	.00	.00	.00	.00	.00	.06	.54	.04	.28	.02	.00
14	.00	.00	.00	.00	.00	.00	.08	.54	.05	.24	.00	.00
15	.00	.00	.00	.00	.00	.00	.10	.39	.12	.19	.00	e.04
16	.00	.00	.00	.00	.00	.00	.11	.27	.05	.15	.00	e.10
17	.00	.00	.00	.00	.00	.00	.10	.18	.03	.10	.00	e.10
18	.00	.00	.00	.00	.00	.00	.10	.13	.01	.13	.00	e.09
19	.00	.00	.00	.00	.00	.00	.09	.09	.00	.09	.00	e.08
20	.00	.00	.00	.00	.00	.00	.08	.07	.00	.05	.00	.06
21	.00	.00	.00	.00	.00	e.02	.08	.06	.00	.03	.00	.05
22	.00	.00	.00	.00	.00	.05	.09	.06	.00	.03	.00	.10
23	.00	.00	.00	.00	.00	.22	.09	.05	.00	.01	.00	.06
24	.00	.00	.00	.00	.00	.16	.08	.04	.00	.00	.00	.05
25	.00	.00	.00	.00	.00	.44	.08	.03	.00	.00	.00	.03
26	.00	.00	.00	.00	.00	.79	.08	.03	.00	.00	.00	.02
27	.00	.00	.00	.00	.00	.67	.14	.02	.00	.00	.00	.02
28	.00	.00	.00	.00	.00	.28	.19	.01	.00	.00	.00	.01
29	.00	.00	.00	.00	---	.16	.23	.00	.00	.00	.00	.01
30	.00	.00	.00	.00	---	.34	.35	.00	.00	.00	.00	.02
31	.00	---	.00	.00	---	.46	---	.10	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	3.59	5.39	7.50	1.01	3.19	2.53	0.84
MEAN	.000	.000	.000	.000	.000	.12	.18	.24	.034	.10	.082	.028
MAX	.00	.00	.00	.00	.00	.79	.51	.73	.16	.33	1.1	.10
MIN	.00	.00	.00	.00	.00	.00	.06	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	7.1	11	15	2.0	6.3	5.0	1.7

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1991, BY WATER YEAR (WY)

	MEAN	.067	.030	.035	.000	.38	3.10	23.4	4.83	1.19	1.47	.88	.63
MAX	1.05	.54	1.02	.000	11.4	24.3	117	43.9	9.34	19.5	17.1	16.7	
(WY)	1981	1981	1983	1962	1981	1972	1974	1974	1986	1970	1968	1968	
MIN	.000	.000	.000	.000	.000	.000	.003	.000	.000	.000	.000	.000	
(WY)	1962	1962	1962	1962	1962	1962	1963	1963	1977	1962	1962	1962	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1962 - 1991

ANNUAL TOTAL	35.53	24.05	2.99	
ANNUAL MEAN	.097	.066	13.8	
HIGHEST ANNUAL MEAN			.003	1974
LOWEST ANNUAL MEAN				1977
HIGHEST DAILY MEAN	4.3	1.1	1000	Apr 23 1979
LOWEST DAILY MEAN	.00	.00	.00	Oct 1 1961
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00	Oct 1 1961
INSTANTANEOUS PEAK FLOW		a6.0	1200	Apr 23 1979
INSTANTANEOUS PEAK STAGE			b10.50	Apr 23 1979
INSTANTANEOUS LOW FLOW		.00	.00	Oct 1 1961
ANNUAL RUNOFF (AC-FT)	70	48	2170	
10 PERCENT EXCEEDS	.08	.24	2.0	
50 PERCENT EXCEEDS	.00	.00	.00	
90 PERCENT EXCEEDS	.00	.00	.00	

e Estimated.

a About.

b From floodmark, backwater from ice.

RED RIVER OF THE NORTH BASIN

05098700 HIDDEN ISLAND COULEE NEAR HANSBORO, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 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)
MAR												
21...	1500	0.02	--	--	10.0	5.0	--	--	--	--	--	--
26...	1420	0.76	810	7.9	-4.0	0.5	370	90	34	25	12	0.6
APR												
03...	0950	0.49	560	--	18.0	4.0	--	--	--	--	--	--
11...	1530	0.07	--	--	12.0	10.0	--	--	--	--	--	--
26...	0950	0.08	960	--	13.0	11.0	--	--	--	--	--	--
JUN												
12...	1250	0.03	1240	8.0	23.0	19.0	570	140	54	56	17	1
JUL												
17...	0945	0.11	1070	--	--	--	--	--	--	--	--	--
SEP												
19...	1430	0.07	1040	--	15.0	9.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
26...	20	170	0	140	220	12	0.10	16	586	503	0.80	
JUN												
12...	12	450	0	370	300	21	0.20	28	909	835	1.24	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
26...	1.20	4	30	60	1	40	30	0.1	4	15	310	
JUN												
12...	0.07	4	40	40	1	70	180	<0.1	2	<1	480	

05098820 CYPRESS CREEK ABOVE INTERNATIONAL BOUNDARY NEAR SARLES, ND
(International gaging station)

LOCATION.--Lat 48°58'37", long 98°56'04", in NW¹/₄NW¹/₄ sec.3, T.163 N., R.64 W., Cavalier County, Hydrologic Unit 09020313, on right bank 12 ft downstream of bridge on State Highway 20, 4.5 mi northeast of Sarles.

DRAINAGE AREA.--83 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1, 1988, to current year. Records for May 1961 to Sept. 1988, published as Cypress Creek near Sarles, ND (station 05098800) at site 3 mi upstream, are not equivalent because of difference in drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,550 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum observed discharge at site 3 mi upstream, (station 05098800 Cypress Creek near Sarles, ND) 2,000 ft³/s, Apr. 21, 1979.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	e.00	12	.27	e6.0	e1.4	.02	.00
2	.00	.00	.00	.00	.00	e.00	10	.32	e5.0	e1.2	.02	.00
3	.00	.00	.00	.00	.00	e.00	9.1	.39	e4.0	e1.1	.01	.00
4	.00	.00	.00	.00	.00	e.00	7.9	.65	e3.5	e1.0	.01	.00
5	.00	.00	.00	.00	.00	e.00	6.8	.89	e3.0	e.90	.00	.00
6	.00	.00	.00	.00	.00	e.00	e6.0	.95	e2.6	e.80	.02	.00
7	.00	.00	.00	.00	.00	e.00	e4.0	e1.1	e2.4	e.70	.02	.00
8	.00	.00	.00	.00	.00	e.00	e3.0	e1.0	e2.2	e.60	.02	.00
9	.00	.00	.00	.00	.00	e.00	e2.0	e.90	e2.2	e.50	.01	.00
10	.00	.00	.00	.00	.00	e.00	e1.5	e.80	2.1	e.40	.01	.00
11	.00	.00	.00	.00	.00	e.00	.95	e.70	2.1	e.30	.00	.00
12	.00	.00	.00	.00	.00	e.00	.95	e.60	2.1	.22	.00	.00
13	.00	.00	.00	.00	.00	e.00	1.0	e3.0	2.2	.22	.00	.00
14	.00	.00	.00	.00	.00	e.00	e.90	e8.0	2.2	.20	.00	.00
15	.00	.00	.00	.00	.00	e.00	e.80	e6.0	2.3	.20	.00	.00
16	.00	.00	.00	.00	.00	e.00	e.70	e4.0	2.2	.22	.00	.00
17	.00	.00	.00	.00	.00	e.00	e.60	e3.6	2.0	.22	.00	.00
18	.00	.00	.00	.00	.00	e.00	e.50	e3.4	1.8	.23	.00	.00
19	.00	.00	.00	.00	.00	e1.0	e.45	e3.2	1.6	.22	.00	.00
20	.00	.00	.00	.00	.00	e5.0	e.40	e3.0	e1.5	.23	.00	.00
21	.00	.00	.00	.00	.00	e30	e.35	e2.8	e1.4	.21	.00	.00
22	.00	.00	.00	.00	.00	e80	e.30	e2.7	e1.3	.21	.00	.00
23	.00	.00	.00	.00	.00	e65	e.25	e2.6	e1.2	.20	.00	.00
24	.00	.00	.00	.00	.00	e55	e.20	e2.5	e1.2	.19	.00	.00
25	.00	.00	.00	.00	.00	e35	.27	e2.4	e1.1	.17	.00	.00
26	.00	.00	.00	.00	.00	e21	.23	e2.3	e1.1	.14	.00	.00
27	.00	.00	.00	.00	.00	22	.27	e2.2	e1.0	.12	.00	.00
28	.00	.00	.00	.00	.00	11	.29	e2.1	e1.0	.09	.00	.00
29	.00	.00	.00	.00	---	10	.32	e2.0	e1.1	.07	.00	.00
30	.00	.00	.00	.00	---	10	.27	e3.0	e1.2	.06	.00	.00
31	.00	---	.00	.00	---	13	---	e7.0	---	.04	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	358.00	72.30	74.37	64.6	12.36	0.14	0.00
MEAN	.000	.000	.000	.000	.000	11.5	2.41	2.40	2.15	.40	.005	.000
MAX	.00	.00	.00	.00	.00	80	12	8.0	6.0	1.4	.02	.00
MIN	.00	.00	.00	.00	.00	.00	.20	.27	1.0	.04	.00	.00
AC-FT	.00	.00	.00	.00	.00	710	143	148	128	25	.3	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1989 - 1991, BY WATER YEAR (WY)

	MEAN	.000	.000	.000	.000	.000	3.87	12.6	.90	.75	.13	.002	.000
MAX	.000	.000	.000	.000	.000	.000	11.5	18.8	2.40	2.15	.40	.005	.000
(WY)	1989	1989	1989	1989	1989	1991	1990	1991	1991	1991	1991	1991	1989
MIN	.000	.000	.000	.000	.000	.000	2.41	.042	.035	.000	.000	.000	.000
(WY)	1989	1989	1989	1989	1989	1989	1991	1989	1990	1990	1989	1989	1989

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1989 - 1991

ANNUAL TOTAL	575.94	581.77	
ANNUAL MEAN	1.58	1.59	1.52
HIGHEST ANNUAL MEAN			1.59
LOWEST ANNUAL MEAN			1.38
HIGHEST DAILY MEAN	164	80	164
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		85	258
INSTANTANEOUS PEAK STAGE		a13.70	b15.29
ANNUAL RUNOFF (AC-FT)	1140	1150	1100
10 PERCENT EXCEEDS	.29	2.7	1.1
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

a From floodmark.

b Backwater from ice.

RED RIVER OF THE NORTH BASIN

05098820 CYPRESS CREEK ABOVE INTERNATIONAL BOUNDARY NEAR SARLES, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1989 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAR 21...	1650	59	178	--	8.5	2.5	--	--	--	--	--	--
APR 03...	1135	9.5	370	8.1	18.0	6.5	150	37	13	17	19	0.6
11...	1430	1.0	--	--	9.0	12.0	--	--	--	--	--	--
26...	1120	0.20	600	--	13.0	12.5	--	--	--	--	--	--
JUN 12...	1445	2.2	638	7.8	26.0	24.0	250	62	22	41	26	1
JUL 17...	1220	0.22	650	--	24.0	23.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 03...		6.6	150	0	120	60	2.6	0.10	17	257	225	0.35
JUN 12...		5.9	300	0	250	84	5.5	0.20	32	426	401	0.58
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 03...		6.61	3	30	10	<1	10	30	0.1	1	1	180
JUN 12...		2.48	6	50	40	<1	30	120	<0.1	1	<1	280

RED RIVER OF THE NORTH BASIN

123

05099100 SNOWFLAKE CREEK NEAR SNOWFLAKE, MANITOBA
(International gaging station)LOCATION.--Lat 49°01'17", long 98°36'13", in SW¹/₄, sec.10, T.1, R.9 W., first meridian, Hydrologic Unit 09020313,
at traffic bridge, 2.5 mi east, and 1.5 mi south of Snowflake, Manitoba.DRAINAGE AREA.--348 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1961 to current year.

GAGE.--Water-stage recorder since March 1968 and nonrecording gage prior thereto. Datum of gage is Geodetic
Survey of Canada Datum of 1929. Prior to Jan. 1, 1987, recording gage at same site at datum of 1221.66 ft
above Geodetic Survey of Canada Datum of 1929. Prior to Apr. 2, 1964, nonrecording gage at present site and
datum. Apr. 2, 1964, to May 10, 1965, nonrecording gage at site 0.5 mi downstream at present datum.COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with
the United States. Records provided by the Water Survey of Canada.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.00	e.00	e.00	e.00	e.00	e.00	e15	e.67	e.60	e14	e.81	e.00
2	e.00	e.00	e.00	e.00	e.00	e.00	e17	e.64	e1.4	e13	e.74	e.00
3	e.00	e.00	e.00	e.00	e.00	e.00	e25	e.71	e2.3	e11	e.71	e.00
4	e.00	e.00	e.00	e.00	e.00	e.00	e16	e1.2	e2.3	e9.2	e.64	e.00
5	e.00	e.00	e.00	e.00	e.00	e.00	e8.1	e1.5	e2.0	e6.5	e.60	e.00
6	e.00	e.00	e.00	e.00	e.00	e.00	e4.0	e2.0	e1.9	e4.1	e2.5	e.00
7	e.00	e.00	e.00	e.00	e.00	e.00	e5.4	e2.0	e1.7	e4.8	e2.6	e.00
8	e.00	e.00	e.00	e.00	e.00	e.00	e5.2	e1.7	e1.4	e6.4	e1.6	e.00
9	e.00	e.00	e.00	e.00	e.00	e.00	e8.5	e1.5	e1.4	e5.1	e1.2	e.00
10	e.00	e.00	e.00	e.00	e.00	e.00	e7.5	e1.3	e1.3	e3.6	e1.0	e.00
11	e.00	e.00	e.00	e.00	e.00	e.00	e4.6	e1.3	e1.2	e8.5	e.78	e.00
12	e.00	e.00	e.00	e.00	e.00	e.00	e3.0	e1.4	e.88	e125	e.60	e.00
13	e.00	e.00	e.00	e.00	e.00	e.00	e2.0	e10	e17	e75	e.53	e.00
14	e.00	e.00	e.00	e.00	e.00	e.00	e2.5	e4.2	e14	e43	e.46	e.00
15	e.00	e.00	e.00	e.00	e.00	e.00	e2.1	e2.2	e21	e27	e.39	e.00
16	e.00	e.00	e.00	e.00	e.00	e.00	e1.6	e1.3	e19	e18	e.35	e.00
17	e.00	e.00	e.00	e.00	e.00	e.00	e1.2	e1.1	e13	e12	e.32	e.00
18	e.00	e.00	e.00	e.00	e.00	e.00	e1.0	e.85	e9.4	e9.8	e.25	e.00
19	e.00	e.00	e.00	e.00	e.00	e3.2	e.81	e.67	e6.5	e7.6	e.21	e.00
20	e.00	e.00	e.00	e.00	e.00	e23	e.64	e.64	e4.8	e5.4	e.07	e.00
21	e.00	e.00	e.00	e.00	e.00	e49	e.56	e.53	e4.1	e4.0	e.00	e.00
22	e.00	e.00	e.00	e.00	e.00	e43	e.71	e.46	e2.9	e5.2	e.00	e.00
23	e.00	e.00	e.00	e.00	e.00	e29	e.64	e.35	e2.2	e3.7	e.00	e.00
24	e.00	e.00	e.00	e.00	e.00	e9.5	e.49	e.28	e2.0	e2.8	e.00	e.00
25	e.00	e.00	e.00	e.00	e.00	e7.9	e.42	e.25	e14	e2.1	e.00	e.00
26	e.00	e.00	e.00	e.00	e.00	e5.3	e.35	e.21	e14	e1.8	e.00	e.00
27	e.00	e.00	e.00	e.00	e.00	e3.0	e.49	e.18	e5.5	e1.7	e.00	e.00
28	e.00	e.00	e.00	e.00	e.00	e2.4	e.71	e.14	e3.0	e1.5	e.00	e.00
29	e.00	e.00	e.00	e.00	---	e1.5	e.78	e.11	e2.0	e1.3	e.00	e.00
30	e.00	e.00	e.00	e.00	---	e1.8	e.74	e.07	e2.8	e1.1	e.00	e.00
31	e.00	---	e.00	e.00	---	e3.1	---	e.81	---	e.95	e.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	181.70	137.04	40.27	175.58	435.15	16.36	0.00
MEAN	.000	.000	.000	.000	.000	5.86	4.57	1.30	5.85	14.0	.53	.000
MAX	.00	.00	.00	.00	.00	.49	.25	.10	.21	.125	.2.6	.00
MIN	.00	.00	.00	.00	.00	.00	.35	.07	.60	.95	.00	.00
AC-FT	.00	.00	.00	.00	.00	360	272	80	348	863	32	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1991, BY WATER YEAR (WY)

	MEAN	.99	.51	.054	.000	.17	4.58	74.2	54.0	17.4	5.97	1.99	1.08
MAX	12.3	5.24	.75	.008	4.90	22.1	296	390	123	34.9	11.0	8.22	
(WY)	1968	1981	1983	1975	1981	1985	1971	1979	1974	1970	1970	1970	
MIN	.000	.000	.000	.000	.000	.000	.000	.22	.061	.000	.000	.000	.000
(WY)	1962	1962	1962	1962	1962	1962	1973	1988	1962	1961	1961	1961	1961

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1961 - 1991

ANNUAL TOTAL	1057.50	986.10	
ANNUAL MEAN	2.90	2.70	13.8
HIGHEST ANNUAL MEAN			65.1
LOWEST ANNUAL MEAN			.38
HIGHEST DAILY MEAN	68	125	1130
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		188	1130
INSTANTANEOUS PEAK STAGE		1226.63	1229.94
ANNUAL RUNOFF (AC-FT)	2100	1960	10020
10 PERCENT EXCEEDS	12	6.5	22
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

05099150 MOWBRAY CREEK NEAR MOWBRAY, MANITOBA
(International gaging station)

LOCATION.--Lat 49°00'00", long 98°27'15", in SE¹/₄, sec.3, T.1, R.8 W., first meridian, Hydrologic Unit 09020313, on downstream side of bridge on Municipal Road on international boundary, and 1.5 mi east of Mowbray, Manitoba.

DRAINAGE AREA.--93.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1962 to current year (seasonal records only most years).

GAGE.--Water-stage recorder. Datum of gage is Geodetic Survey of Canada datum of 1929. Nonrecording gage prior to 1971.

COOPERATION.--Records furnished by the Water Survey of Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.00	e.00	e6.6	3.4	52	4.4	3.6	.00
2	.00	.00	.00	.00	e.00	e.00	e7.9	2.7	22	3.9	3.1	.00
3	.00	.00	.00	.00	e.00	e.00	6.0	2.4	11	5.7	2.6	.00
4	.00	.00	.00	.00	e.00	e.00	5.3	2.2	6.8	7.2	2.2	.00
5	.00	.00	.00	.00	e.00	e.00	5.2	2.2	4.7	7.1	1.9	.00
6	.00	.00	.00	.00	e.00	e.00	4.1	2.2	4.2	5.4	2.5	.00
7	.00	.00	.00	.00	e.00	e.00	5.2	2.2	4.0	6.2	2.1	.00
8	.00	.00	.00	.00	e.00	e.00	3.8	2.6	3.6	5.9	1.9	.00
9	.00	.00	.00	.00	e.00	e.00	2.3	2.4	3.4	7.5	1.7	.00
10	.00	.00	.00	.00	e.00	e.00	2.0	2.4	2.8	9.4	1.4	.00
11	.00	.00	.00	.00	e.00	e.00	1.7	2.4	2.6	18	1.3	.00
12	.00	.00	.00	.00	e.00	e.00	1.4	2.4	2.5	14	1.2	.00
13	.00	.00	.00	.00	e.00	e.00	1.2	3.0	6.7	14	1.0	.00
14	.00	.00	.00	.00	e.00	e.00	1.3	2.4	2.7	13	.92	.00
15	.00	.00	.00	e.00	e.00	e.00	1.3	2.0	52	11	.74	.00
16	.00	.00	.00	e.00	e.00	e.00	1.3	1.8	63	8.3	.60	.00
17	.00	.00	.00	e.00	e.00	e.14	.95	1.5	44	6.7	.53	.00
18	.00	.00	.00	e.00	e.00	e3.9	.88	1.3	28	9.0	.35	.00
19	.00	.00	.00	e.00	e.00	e5.7	.78	1.2	18	5.5	.25	.00
20	.00	.00	.00	e.00	e.00	e12	.71	1.1	15	4.5	.21	.00
21	.00	.00	.00	e.00	e.00	e7.3	.60	.99	14	4.3	.18	.00
22	.00	.00	.00	e.00	e.00	e40	.60	.88	12	4.4	.18	.00
23	.00	.00	.00	e.00	e.00	e40	.42	.71	9.9	4.2	.14	.00
24	.00	.00	.00	e.00	e.00	e46	.32	.53	7.4	3.9	.11	.00
25	.00	.00	.00	e.00	e.00	e36	.21	.39	7.6	3.5	.11	.00
26	.00	.00	.00	e.00	e.00	e7.1	.18	.28	5.1	3.7	.07	.00
27	.00	.00	.00	e.00	e.00	e2.7	.07	.04	4.1	5.0	.04	.00
28	.00	.00	.00	e.00	e.00	e3.5	.14	.07	3.5	6.0	.00	.00
29	.00	.00	.00	e.00	---	e1.4	4.6	.00	3.2	5.7	.00	.00
30	.00	.00	.00	e.00	---	e2.4	4.4	.74	3.3	5.0	.00	.00
31	.00	---	.00	e.00	---	e5.6	---	99	---	4.2	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	213.74	71.46	147.43	419.1	216.6	30.93	0.00
MEAN	.000	.000	.000	.000	.000	6.89	2.38	4.76	14.0	6.99	1.00	.000
MAX	.00	.00	.00	.00	.00	46	7.9	99	63	18	3.6	.00
MIN	.00	.00	.00	.00	.00	.00	.07	.00	2.5	3.5	.00	.00
AC-FT	.00	.00	.00	.00	.00	424	142	292	831	430	61	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1962	.62	5.15	1981	.000	1963
1963	.063	.63	1988	.000	1963
1964	.004	.036	1988	.000	1963
1965	.000	.000	1988	.000	1963
1966	.000	.000	1988	.000	1963
1967	.000	.000	1988	.000	1963
1968	.000	.000	1988	.000	1963
1969	.000	.000	1988	.000	1963
1970	.000	.000	1988	.000	1963
1971	.000	.000	1988	.000	1963
1972	.000	.000	1988	.000	1963
1973	.000	.000	1988	.000	1963
1974	.000	.000	1988	.000	1963
1975	.000	.000	1988	.000	1963
1976	.000	.000	1988	.000	1963
1977	.000	.000	1988	.000	1963
1978	.000	.000	1988	.000	1963
1979	.000	.000	1988	.000	1963
1980	.000	.000	1988	.000	1963
1981	.000	.000	1988	.000	1963
1982	.000	.000	1988	.000	1963
1983	.000	.000	1988	.000	1963
1984	.000	.000	1988	.000	1963
1985	.000	.000	1988	.000	1963
1986	.000	.000	1988	.000	1963
1987	.000	.000	1988	.000	1963
1988	.000	.000	1988	.000	1963
1989	.000	.000	1988	.000	1963
1990	.000	.000	1988	.000	1963
1991	.000	.000	1988	.000	1963

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1962 - 1991

ANNUAL TOTAL	1518.92	1099.26	6.12	
ANNUAL MEAN	4.16	3.01	16.3	1966
HIGHEST ANNUAL MEAN			.59	1963
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	116	99	787	Apr 6 1987
LOWEST DAILY MEAN	.00	.00	.00	Mar 1 1962
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00	Mar 1 1962
INSTANTANEOUS PEAK FLOW		133	943	Apr 6 1987
INSTANTANEOUS PEAK STAGE		1531.75	1534.57	Apr 6 1987
ANNUAL RUNOFF (AC-FT)	3010	2180	4440	
10 PERCENT EXCEEDS	8.1	6.7	14	
50 PERCENT EXCEEDS	.00	.00	.00	
90 PERCENT EXCEEDS	.00	.00	.00	

e Estimated.

RED RIVER OF THE NORTH BASIN

125

05099300 PEMBINA RIVER NEAR WINDYGATES, MANITOBA
(International gaging station)

LOCATION.--Lat 49°01'53", long 98°16'40", in SE 1/4, sec.13, T.1, R.7 W., first meridian, Hydrologic Unit 09020313, on left bank 0.2 mi downstream from bridge, and 3 mi northeast of Windygates, Manitoba.

DRAINAGE AREA.--3,020 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is Geodetic Survey of Canada datum of 1929. Prior to Jan. 1, 1985, datum of gage at 1102.02 ft above Geodetic Survey of Canada datum of 1929.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records provided by Water Survey of Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	e.00	e.00	e.00	47	20	69	180	112	27
2	.00	.00	.00	e.00	e.00	e.00	58	18	73	164	109	25
3	.00	.00	.00	e.00	e.00	e.00	70	18	52	162	105	23
4	.00	.00	.00	e.00	e.00	e.00	84	22	42	175	103	20
5	.00	.00	.00	e.00	e.04	e.00	132	28	35	201	100	19
6	.00	.00	.00	e.00	e.35	e.00	126	32	32	201	156	16
7	.00	.00	.00	e.00	e.53	e.00	97	33	28	184	144	16
8	.00	.00	.00	e.00	e.71	e.00	84	32	25	168	113	14
9	.00	.00	.00	e.00	e.39	e.00	75	28	27	152	92	13
10	.00	.00	.00	e.00	e.25	e.00	65	29	25	162	82	13
11	.00	.00	.00	e.00	e.07	e.00	57	30	21	189	78	9.5
12	.00	.00	.00	e.00	e.00	e.11	51	34	19	346	75	7.5
13	.00	.00	.00	e.00	e.00	e.32	45	101	70	353	71	5.6
14	.00	.00	.00	e.00	e.00	e.53	44	48	90	322	67	4.9
15	.00	.00	.00	e.00	e.00	e.64	41	44	295	410	65	4.8
16	.00	.00	.00	e.00	e.00	e1.1	38	40	337	360	61	4.2
17	.00	.00	.00	e.00	e.00	e1.4	34	36	262	276	59	4.7
18	.00	.00	.00	e.00	e.00	e2.9	32	35	196	237	56	5.9
19	.00	.00	.00	e.00	e.00	e7.9	30	34	143	201	53	5.1
20	.00	.00	.00	e.00	e.00	e11	28	31	114	185	50	4.6
21	.00	.00	.00	e.00	e.00	e14	27	29	97	166	49	4.3
22	.00	.00	.00	e.00	e.00	e8.4	27	28	84	150	47	7.5
23	.00	.00	.00	e.00	e.00	e42	24	24	74	142	45	8.0
24	.00	.00	.00	e.00	e.00	e61	23	19	67	139	43	6.5
25	.00	.00	.00	e.00	e.00	e66	21	15	138	138	40	5.8
26	.00	.00	.00	e.00	e.00	e44	21	15	171	132	38	5.8
27	.00	.00	.00	e.00	e.00	e39	22	13	100	127	37	6.0
28	.00	.00	.00	e.00	e.00	e35	23	10	160	125	35	5.6
29	.00	.00	.00	e.00	---	e32	22	9.7	221	123	32	5.5
30	.00	.00	.00	e.00	---	e32	21	12	176	119	29	7.7
31	.00	---	.00	e.00	---	e47	---	58	---	114	28	---
TOTAL	0.00	0.00	0.00	0.00	2.34	446.30	1469	925.7	3243	6103	2174	305.5
MEAN	.000	.000	.000	.000	.084	14.4	49.0	29.9	108	197	70.1	10.2
MAX	.00	.00	.00	.00	.71	66	132	101	337	410	156	27
MIN	.00	.00	.00	.00	.00	.00	21	9.7	19	114	28	4.2
AC-FT	.00	.00	.00	.00	4.6	885	2910	1840	6430	12110	4310	606

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1991, BY WATER YEAR (WY)

	MEAN	40.6	22.4	9.48	4.73	4.61	58.0	775	689	287	123	67.6	50.9
MAX	343	171	45.3	19.1	44.5	320	3112	3616	1512	633	292	325	
(WY)	1969	1969	1969	1969	1976	1985	1969	1974	1974	1970	1971	1968	
MIN	.000	.000	.000	.000	.000	.000	21.3	27.0	4.03	.070	.000	.000	
(WY)	1989	1989	1989	1965	1963	1964	1977	1988	1988	1988	1988	1988	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1962 - 1991

ANNUAL TOTAL	13675.30	14668.84	
ANNUAL MEAN	37.5	40.2	181
HIGHEST ANNUAL MEAN			737
LOWEST ANNUAL MEAN			9.61
HIGHEST DAILY MEAN	646	410	11200
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		487	11500
INSTANTANEOUS PEAK STAGE		1107.33	1121.52
ANNUAL RUNOFF (AC-FT)	27120	29100	130900
10 PERCENT EXCEEDS	120	138	441
50 PERCENT EXCEEDS	.11	6.0	25
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

05100000 PEMBINA RIVER AT NECHE, ND
(International gaging station)

LOCATION.--Lat 48°59'20", long 97°33'05", in SE¹/₄, NW¹/₄, sec.31, T.164 N., R.53 W., Pembina County, Hydrologic Unit 09020313, on right bank 0.3 mi east of State Highway 18, and at north edge of Neche.

DRAINAGE AREA.--3,410 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to September 1908, June 1909 to September 1915, April 1919 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1904-8, 1910-15, 1920, 1921, 1923, 1924. WSP 1388: 1904(M), 1914, 1915(M), 1931(M), 1933, 1938(M). WSP 1728: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 809.69 ft above National Geodetic Vertical Datum of 1929. Prior to May 24, 1932, nonrecording gage at Burlington Northern Railway bridge 1 mi upstream, at same datum. May 25, 1932, to Apr. 17, 1939, nonrecording gage on bridge on State Highway 18, 500 ft downstream from railway bridge, at same datum.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.04	1.1	e.23	e.05	.00	.00	e50	52	28	234	156	38
2	e.03	1.1	e.10	e.05	.00	.00	e55	51	188	248	152	36
3	e.03	1.4	e.10	e.04	.00	.00	e100	51	144	250	148	31
4	e.03	1.4	e.10	e.04	.00	.00	e140	54	116	245	145	26
5	e.02	1.6	e.10	e.03	.00	.00	120	55	98	248	143	23
6	e.02	1.5	e.10	e.02	.00	.00	100	69	78	244	142	17
7	e.02	1.4	e.10	e.02	.00	.00	120	77	63	242	142	8.9
8	e.01	1.7	e.10	e.02	.00	.00	146	82	51	243	146	8.6
9	e.01	2.5	e.10	e.02	.00	.00	131	83	50	284	145	15
10	e.00	2.3	e.10	e.02	.00	.00	110	78	42	236	134	17
11	e.00	1.6	e.10	e.02	.00	.00	98	73	38	208	125	16
12	e.00	1.6	e.10	e.02	.00	.00	86	67	36	206	118	17
13	e.00	1.2	e.10	e.02	.00	.00	75	63	32	250	115	16
14	e.00	1.2	e.10	e.02	.00	.00	75	62	29	371	109	15
15	e.00	1.0	e.10	e.02	.00	.00	75	246	31	446	106	15
16	e.00	1.0	e.10	e.02	.00	.00	71	200	481	395	94	15
17	e.00	.93	e.10	e.02	.00	.00	69	139	546	413	91	16
18	e.02	1.1	e.10	e.02	.00	.00	61	109	325	402	84	13
19	e.04	1.4	e.09	e.02	.00	.00	57	90	280	362	83	14
20	e.04	1.5	e.09	e.02	.00	.00	53	77	253	325	80	14
21	e.05	1.7	e.09	e.02	.00	.85	49	68	214	295	73	14
22	e.05	1.0	e.09	e.02	.00	3.4	45	66	171	268	64	19
23	e.06	.66	e.08	e.02	.00	8.5	43	63	153	231	63	18
24	e.06	.62	e.08	e.01	.00	11	45	59	146	212	62	19
25	e.07	.50	e.08	e.01	.00	23	47	52	138	191	58	16
26	e.07	.51	e.07	e.01	.00	39	44	46	121	175	57	15
27	e.08	.28	e.07	e.00	.00	36	42	41	110	175	57	14
28	e.08	.20	e.07	e.00	.00	e40	41	37	181	174	56	13
29	e.09	.20	e.07	.00	---	e40	45	34	149	169	48	13
30	e.09	e.25	e.06	.00	---	e40	55	15	150	168	41	13
31	.33	---	e.06	.00	---	e45	---	19	---	160	39	---
TOTAL	1.34	34.45	2.93	0.60	0.00	286.75	2248	2278	4442	8070	3076	525.5
MEAN	.043	1.15	.095	.019	.000	9.25	74.9	73.5	148	260	99.2	17.5
MAX	.33	2.5	.23	.05	.00	45	146	246	546	446	156	38
MIN	.00	.20	.06	.00	.00	.00	41	15	28	160	39	8.6
AC-FT	2.7	68	5.8	1.2	.00	569	4460	4520	8810	16010	6100	1040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1991, BY WATER YEAR (WY)

	MEAN	65.8	42.3	19.2	9.96	7.02	81.3	743	621	307	156	87.2	67.4
MAX	378	234	130	66.0	49.5	741	3146	4618	1777	839	811	463	
(WY)	1969	1945	1905	1960	1945	1945	1969	1974	1974	1904	1944	1944	
MIN	.000	.000	.000	.000	.000	.000	24.7	11.8	6.56	.000	.000	.000	
(WY)	1939	1939	1939	1933	1933	1936	1939	1939	1940	1940	1939	1938	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1903 - 1991

ANNUAL TOTAL	20949.35	20965.57	
ANNUAL MEAN	57.4	57.4	185
HIGHEST ANNUAL MEAN			865
LOWEST ANNUAL MEAN			3.96
HIGHEST DAILY MEAN	900	546	9950
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		888	a10700
INSTANTANEOUS PEAK STAGE		10.22	23.64
INSTANTANEOUS LOW FLOW		.00	.00
ANNUAL RUNOFF (AC-FT)	41550	41590	134300
10 PERCENT EXCEEDS	186	175	416
50 PERCENT EXCEEDS	.83	14	38
90 PERCENT EXCEEDS	.00	.00	1.0

e Estimated.

a From rating curve extended above 5,300 ft³/s.

RED RIVER OF THE NORTH BASIN

127

05100000 PEMBINA RIVER AT NECHE, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 19...	1145	0.04	1060	--	6.0	6.5	--	--	--	--	--	--
DEC 10...	1210	0.10	1000	--	0.0	0.0	--	--	--	--	--	--
APR 08...	1645	154	685	8.1	14.0	9.5	250	65	22	42	26	1
MAY 10...	1340	75	--	--	24.5	16.0	--	--	--	--	--	--
JUN 19...	1325	282	618	--	24.0	22.5	--	--	--	--	--	--
24...	1055	148	--	--	26.0	22.0	--	--	--	--	--	--
JUL a26...	1305	176	775	8.4	25.0	22.5	280	72	25	50	27	1
SEP 03...	1136	32	--	--	24.0	19.0	--	--	--	--	--	--
24...	1525	17	850	--	12.5	11.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 08...	7.8	210	0	170	160	13	0.20	20	459	432	0.62	
JUL a26...	9.1	290	0	240	160	16	0.30	30	559	506	0.76	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 08...	191	2	90	20	<1	50	40	0.1	4	2	370	
JUL a26...	266	5	140	20	<1	60	20	0.1	5	1	670	

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05101000 TONGUE RIVER AT AKRA, ND

LOCATION.--Lat 48°46'42", long 97°44'43", in SW¹/₄ sec.10, T.161 N., R.55 W., Pembina County, Hydrologic Unit 09020313, on left bank 300 ft downstream from Renwick Dam, 0.9 mi northwest of Akra, and 6 mi west of Cavalier.

DRAINAGE AREA.--160 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to June 1950 (WSP 1137-B), October 1951 to current year (seasonal record since 1983).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 930.00 ft above National Geodetic Vertical Datum of 1929. Prior to July 10, 1954, nonrecording gage 1.2 mi downstream at datum 30.00 ft lower. July 23, 1954, to Dec. 19, 1973, water stage recorder 2.7 mi downstream at datum 9.10 ft lower.

REMARKS.--Records poor. Flow regulated by temporary retention in ten retarding basins beginning 300 ft above station, four of which have slow release outlet structures to regulate the flow. Retarding basins were completed during the period 1955 to 1961 and have a combined capacity of 19,245 acre-ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 35 ft³/s, June 19, gage height, 9.45 ft; minimum recorded daily discharge, 0.13 ft³/s, Mar. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e.87	.25	7.3	5.4	11	3.1	2.9
2	---	---	---	---	---	e.87	.18	7.4	8.8	11	3.2	3.0
3	---	---	---	---	---	e.87	.30	8.2	10	12	4.1	3.6
4	---	---	---	---	---	e.87	.24	13	9.8	11	4.0	3.4
5	---	---	---	---	---	e.94	.12	13	11	10	4.2	3.2
6	---	---	---	---	---	e.94	.08	14	13	8.7	4.1	2.7
7	---	---	---	---	---	e1.0	.08	14	15	8.1	3.7	2.9
8	---	---	---	---	---	e.94	.08	14	16	7.2	4.6	3.0
9	---	---	---	---	---	e.94	.04	14	17	6.7	6.9	4.0
10	---	---	---	---	---	.98	.03	14	16	6.5	5.3	3.8
11	---	---	---	---	---	1.1	.02	13	15	6.8	5.9	3.0
12	---	---	---	---	---	.94	.01	11	14	7.4	5.5	2.7
13	---	---	---	---	---	.94	.01	12	13	6.6	6.9	6.5
14	---	---	---	---	---	1.0	.01	9.0	14	5.6	7.9	8.0
15	---	---	---	---	---	1.1	.01	9.1	14	5.7	8.7	7.8
16	---	---	---	---	---	1.1	.02	12	14	5.1	9.2	7.8
17	---	---	---	---	---	1.2	.03	12	26	5.1	10	8.7
18	---	---	---	---	---	1.3	.08	11	34	5.2	9.8	e5.4
19	---	---	---	---	---	1.2	.18	8.6	35	4.4	8.8	e4.3
20	---	---	---	---	---	.71	.18	6.6	33	4.6	9.0	e3.2
21	---	---	---	---	---	.78	.22	5.5	32	4.2	9.7	e2.0
22	---	---	---	---	---	.25	.91	10	29	3.7	8.8	e3.0
23	---	---	---	---	---	.13	.62	14	24	3.6	9.0	e2.0
24	---	---	---	---	---	.27	.54	13	21	3.6	9.7	e1.1
25	---	---	---	---	---	.33	.46	12	19	3.7	9.6	4.1
26	---	---	---	---	---	.16	.36	11	17	4.3	7.5	3.9
27	---	---	---	---	---	.16	.48	8.1	14	3.0	3.5	1.3
28	---	---	---	---	---	.19	.45	7.2	11	4.1	3.3	1.0
29	---	---	---	---	---	.17	.95	7.7	9.7	4.0	3.0	e1.0
30	---	---	---	---	---	.24	5.9	6.6	10	3.3	2.8	e1.5
31	---	---	---	---	---	.27	---	7.0	---	3.0	3.2	---
TOTAL	---	---	---	---	---	22.76	12.84	325.3	520.7	189.2	195.0	110.8
MEAN	---	---	---	---	---	.73	.43	10.5	17.4	6.10	6.29	3.69
MAX	---	---	---	---	---	1.3	5.9	14	35	12	10	8.7
MIN	---	---	---	---	---	.13	.01	5.5	5.4	3.0	2.8	1.0
AC-FT	---	---	---	---	---	45	25	645	1030	375	387	220

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1991, BY WATER YEAR (WY)

	6.29	6.76	4.46	3.16	3.60	19.5	107	48.8	19.1	8.69	4.28	5.81
MEAN	6.29	6.76	4.46	3.16	3.60	19.5	107	48.8	19.1	8.69	4.28	5.81
MAX	30.1	22.7	12.9	7.27	18.7	135	294	225	78.7	34.9	28.9	28.3
(WY)	1981	1981	1971	1971	1981	1966	1956	1974	1964	1955	1985	1980
MIN	.51	.56	.065	.51	.24	.22	.43	1.63	.47	.086	.21	.096
(WY)	1962	1976	1953	1953	1953	1964	1991	1980	1988	1978	1988	1989

SUMMARY STATISTICS

WATER YEARS 1952 - 1991

ANNUAL MEAN	a21.4
HIGHEST ANNUAL MEAN	a50.1
LOWEST ANNUAL MEAN	a3.11
HIGHEST DAILY MEAN	1150
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	b11800
INSTANTANEOUS PEAK STAGE	c48.70
ANNUAL RUNOFF (AC-FT)	a15480
10 PERCENT EXCEEDS	40
50 PERCENT EXCEEDS	4.2
90 PERCENT EXCEEDS	.70

e Estimated.

a Based on complete water years only (1952-82).

b Site and datum then in use, from contracted-opening measurement of peak flow.

c From floodmark.

RED RIVER OF THE NORTH BASIN

129

05101000 TONGUE RIVER AT AKRA, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 19...	1415	1.7	800	--	8.0	4.0	--	--	--	--	--	--
FEB 28...	1305	0.85	800	--	-3.0	4.0	--	--	--	--	--	--
MAR 28...	1420	0.20	780	8.2	-4.0	4.5	350	89	30	34	17	0.8
MAY 10...	1140	13	552	--	22.5	13.5	--	--	--	--	--	--
JUN 19...	1615	34	558	--	25.0	24.5	--	--	--	--	--	--
JUL 26...	1545	2.6	558	8.3	25.5	22.0	240	62	20	25	18	0.7
SEP 24...	1305	1.0	559	--	14.5	10.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 28...	6.8	360	0	300	110	12	0.30	24	515	487	0.70	
JUL 26...	4.4	270	0	220	68	9.6	0.30	19	378	340	0.51	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 28...	0.28	2	90	10	<1	40	1800	<0.1	3	<1	370	
JUL 26...	2.63	6	100	30	<1	30	60	0.1	2	<1	460	

RED RIVER OF THE NORTH BASIN

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA
(National stream-quality accounting network station)
(International gaging station)

LOCATION.--Lat 49°00'30", long 97°12'40", in sec.2, T.1, R.2 E., Hydrologic Unit 09020311, on right bank 1,500 ft downstream from Canadian National Railway bridge in Emerson, 0.8 mi downstream from international boundary, 3.6 mi downstream from Pembina River, and at mile 154.3.

DRAINAGE AREA.--40,200 mi², approximately, includes 3,800 mi² in closed basins.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to November 1902 (gage heights only), May 1912 to September 1929 (monthly discharge only, published in WSP 1308), October 1929 to current year.

GAGE.--Water-stage recorder. Datum of gage is Geodetic Survey of Canada Datum of 1929. See WSP 1728 or 1913 for history of changes prior to Apr. 10, 1953.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records provided by Water Survey of Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	313	301	e282	e195	e184	e309	e2410	1360	2600	2150	2140	713
2	305	297	e279	e193	e183	e317	e2620	1410	2490	2390	2010	660
3	302	293	e278	e190	e180	e320	e3080	1470	2440	2720	1890	629
4	300	e299	e280	e188	e179	e320	e4100	1600	2380	3110	1770	614
5	298	e311	e281	e186	e177	e327	e4980	1770	2270	3470	1680	629
6	314	e319	e279	e184	e176	e338	4630	2060	2200	4030	1660	618
7	317	e312	e273	e181	e180	e349	3920	2450	2130	4590	1650	597
8	320	e299	e261	e180	e189	e351	3390	2920	2060	5010	1620	604
9	324	e308	e248	e181	e202	e343	2980	3420	2090	5330	1610	667
10	318	e306	e238	e180	e214	e340	2670	3780	2180	5540	1600	710
11	315	e301	e229	e181	e225	e339	2370	3880	2260	5650	1540	763
12	304	e302	e223	e181	e232	e339	2090	3880	2300	5690	1440	791
13	288	e303	e219	e181	e234	e339	1850	3810	2320	5610	1360	784
14	289	e313	e218	e180	e241	e335	1670	3640	2330	5580	1300	798
15	285	e326	e219	e177	e249	e334	1520	3440	2280	5580	1250	915
16	284	e321	e219	e175	e253	e334	1400	3290	2240	5540	1220	1320
17	287	e323	e221	e172	e261	e334	1310	3190	2470	5370	1180	1830
18	275	e318	e220	e167	e272	e339	1250	3010	3000	4980	1140	2280
19	272	e325	e218	e164	e285	e349	1210	2850	3030	4480	1120	2780
20	286	e350	e218	e162	e297	e371	1190	2680	2900	4100	1100	3200
21	288	e388	e218	e161	e306	e406	1170	2490	2670	3780	1030	3350
22	288	e374	e216	e160	e311	e459	1150	2380	2430	3600	982	3340
23	298	e322	e215	e156	e321	e533	1140	2340	2230	3410	957	3190
24	290	e261	e213	e160	e316	e590	1150	2300	2090	3200	936	2980
25	289	e292	e212	e172	e309	e678	1190	2340	2040	2980	911	2740
26	306	e325	e209	e176	e303	e791	1240	2870	2020	2800	879	2490
27	310	e340	e207	e178	e299	e971	1290	3570	1960	2690	869	2260
28	290	e327	e204	e178	e298	e1310	1320	3740	1890	2580	869	1970
29	297	e296	e202	e181	---	e1700	1310	3510	1900	2490	851	1670
30	308	e285	e199	e185	---	e2020	1300	3170	1970	2380	809	1460
31	297	---	e197	e185	---	e2240	---	2840	---	2270	763	---
TOTAL	9257	9437	7195	5490	6876	18425	62900	87460	69170	123100	40136	47352
MEAN	299	315	232	177	246	594	2097	2821	2306	3971	1295	1578
MAX	324	388	282	195	321	2240	4980	3880	3030	5690	2140	3350
MIN	272	261	197	156	176	309	1140	1360	1890	2150	763	597
AC-FT	18360	18720	14270	10890	13640	36550	124800	173500	137200	244200	79610	93920

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1991, BY WATER YEAR (WY)

	MEAN	1434	1279	940	779	739	1959	12490	8407	4924	3734	1707	1454
MAX	4533	5163	2760	2053	1914	9361	45820	72820	25430	28020	7342	6388	
(WY)	1986	1972	1966	1951	1952	1983	1966	1950	1962	1975	1985	1957	
MIN	28.6	23.7	33.3	7.05	1.21	2.25	1282	663	196	121	46.6	23.6	
(WY)	1937	1937	1937	1937	1937	1937	1938	1934	1934	1936	1934	1934	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1912 - 1991

ANNUAL TOTAL	359186	486798		
ANNUAL MEAN	984	1334		
HIGHEST ANNUAL MEAN			3328	
LOWEST ANNUAL MEAN			12100	1950
HIGHEST DAILY MEAN	5470	Apr 10	333	1934
LOWEST DAILY MEAN	138	Jan 2	94400	May 13 1950
ANNUAL SEVEN-DAY MINIMUM	151	Jan 1	.90	Feb 6 1937
INSTANTANEOUS PEAK FLOW			.97	Feb 4 1937
INSTANTANEOUS PEAK STAGE			5690	Jul 12 1950
INSTANTANEOUS LOW FLOW			756.15	Jul 12 1950
ANNUAL RUNOFF (AC-FT)	712400	965600	2411000	May 1 1979
10 PERCENT EXCEEDS	2310	3310	.90	Feb 6 1937
50 PERCENT EXCEEDS	378	667		
90 PERCENT EXCEEDS	214	190		

e Estimated.

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1977 to current year.

WATER TEMPERATURE: October 1977 to current year.

REMARKS.--Records of daily mean values of water temperature and specific conductance are furnished by Water Survey of Canada.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily mean, 2,180 microsiemens, Dec. 8, 1989; minimum daily mean, 259 microsiemens, Apr. 14, 1989.

WATER TEMPERATURES: Maximum daily mean, 26.7°C, Aug. 16, 1988; minimum daily mean, 0.0°C, on many days during winter months.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum daily mean, 1,650 microsiemens, Feb. 21; minimum daily mean, 501 microsiemens, Apr. 5.

WATER TEMPERATURES: Maximum daily mean, 26.2°C, Aug. 14; minimum daily mean, 0.1°C, Jan. 14, 15, 17, and 18.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	
OCT 30...	1230	--	310	1020	--	9.5	5.5	--	--	--	--	--	
NOV a01...	1100	301	--	935	8.7	11.0	6.5	24	13.2	109	K4	K8	
DEC 11...	1015	229	--	1230	8.1	3.0	0.5	8.8	10.3	72	K4	K33	
JAN 17...	1210	--	172	1180	--	--	0.0	--	--	--	--	--	
MAR 14...	1450	--	337	940	7.8	5.5	0.0	4.0	11.3	76	<2	K20	
APR 09...	1245	--	2980	667	8.0	8.0	4.0	130	12.4	94	K10	K100	
MAY 29...	1100	3510	--	753	7.9	29.0	22.0	22	7.8	90	230	460	
SEP 06...	1200	--	618	850	8.4	15.0	17.5	65	9.0	94	--	--	
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 AD-SORP-TION RATIO (00932)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	
NOV a01...	280	55	34	89	40	2	9.1	222	210	228	14	100	
DEC 11...	370	74	46	110	38	2	17	298	324	361	17	140	
MAR 14...	380	82	42	61	25	1	8.1	324	326	398	0	110	
APR 09...	200	46	21	34	26	1	7.3	156	--	--	--	73	
MAY 29...	280	63	30	45	25	1	8.4	201	--	--	--	110	
SEP 06...	330	68	38	62	29	1	8.1	239	216	234	14	120	
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 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, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
NOV a01...	100	0.30	8.1	543	522	0.74	441	--	0.030	<0.010	<0.100	<0.100	
DEC 11...	140	0.30	5.9	720	730	0.98	445	0.190	0.010	0.010	0.200	0.200	
MAR 14...	66	0.20	16	589	586	0.80	536	--	0.010	<0.010	0.870	0.840	
APR 09...	43	0.20	14	356	336	0.48	2860	0.390	0.130	0.040	0.430	0.430	
MAY 29...	52	0.20	12	453	445	0.62	4290	0.670	0.210	0.010	0.590	0.680	
SEP 06...	71	0.30	18	532	516	0.72	888	0.046	<0.010	0.010	<0.050	0.056	

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA--CONTINUED
(National stream-quality accounting network station)

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS 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)	BORON, DIS- SOLVED (UG/L AS B) (01020)	
	NOV a01...	0.020	0.010	1.0	0.180	0.120	0.160	0.100	20	4	62	<0.5	--
	DEC 11...	0.190	0.190	1.3	0.440	0.380	0.430	0.350	--	--	--	--	--
MAR 14...	0.220	0.180	0.90	0.130	0.110	0.120	0.110	<10	<1	86	<0.5	130	
APR 09...	0.170	0.080	0.90	0.420	0.160	0.370	0.070	420	2	46	<0.5	--	
MAY 29...	0.140	0.120	1.2	0.520	0.130	0.280	0.120	--	--	--	--	--	
SEP 06...	0.020	<0.010	0.90	0.280	0.130	0.100	0.100	100	6	74	<0.5	--	
DATE	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 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)		
NOV a01...	<1.0	<1	<3	10	15	<1	47	11	<0.10	<0.1	<10		
MAR 14...	<1.0	<1	<3	1	7	<1	42	43	--	<0.1	<10		
APR 09...	<1.0	2	<3	17	640	6	24	34	--	0.3	<10		
SEP 06...	1.0	<1	<3	16	160	<1	49	17	--	<0.1	<10		
DATE	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)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	CARBON, ORGANIC SUS- PENDE TOTAL (MG/L AS C) (00689)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L (T/DAY) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. & FINER THAN .062 MM (70331)		
NOV a01...	5	<1	<1.0	320	<6	6	--	--	51	41	74		
DEC 11...	--	--	--	--	--	--	--	--	45	28	70		
MAR 14...	1	<1	<1.0	350	<6	6	9.3	0.4	34	31	22		
APR 09...	11	<1	<1.0	210	<6	24	--	--	500	4020	95		
MAY 29...	--	--	--	--	--	--	--	--	726	6880	97		
SEP 06...	4	<1	<1.0	350	9	17	--	--	235	392	87		

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

133

05102500 RED RIVER OF THE NORTH AT EMERSON, MANITOBA--CONTINUED
(National stream-quality accounting network station)

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	994	960	1180	1290	954	996	967	868	723	651	720	798
2	996	963	1100	1280	949	1010	831	861	757	630	713	794
3	1000	957	1020	1270	946	1110	688	871	774	649	732	798
4	1000	956	1000	1250	948	1140	560	858	788	696	752	780
5	986	908	1080	1240	951	1010	501	908	789	705	763	784
6	973	882	1110	1250	954	1040	581	985	842	687	787	801
7	963	944	1230	1270	964	997	580	1000	882	670	810	796
8	959	939	1370	1270	953	974	575	1010	912	657	788	775
9	953	1010	1470	1280	937	915	593	1040	905	655	764	749
10	942	1050	1280	1260	934	947	622	1060	879	612	760	745
11	940	995	1160	1210	925	958	652	1070	791	631	762	761
12	936	922	1090	1180	925	941	666	994	795	667	773	804
13	934	918	1020	1180	925	914	724	852	772	647	800	812
14	932	936	1000	1110	924	913	728	832	752	636	796	810
15	929	944	1050	1100	920	955	753	851	718	603	843	808
16	925	906	1080	1080	918	959	772	855	726	582	881	747
17	960	860	1160	1070	857	941	806	877	756	597	902	759
18	1090	850	1160	1070	983	946	819	895	723	624	922	784
19	1080	861	1180	1070	1250	966	822	897	629	656	893	611
20	1040	818	1220	1070	1360	1100	853	891	668	666	845	611
21	1030	1100	1240	1070	1650	1040	899	884	651	675	812	625
22	997	1300	1260	1070	1570	995	932	875	629	680	798	613
23	970	1350	1240	1060	1470	962	967	894	635	704	800	619
24	989	1360	1220	1050	1340	964	967	899	649	715	807	614
25	1080	1380	1240	1030	1150	961	947	864	672	720	814	640
26	1140	1410	1260	1030	1110	1050	936	831	647	727	839	680
27	1110	1530	1340	1020	1040	1140	925	856	622	732	810	689
28	987	1510	1360	1000	1000	1230	931	847	624	740	807	709
29	971	1320	1360	980	---	1110	928	832	625	744	799	736
30	957	1250	1370	966	---	1010	931	754	629	745	811	779
31	970	---	1370	961	---	1080	---	727	---	743	803	---
MEAN	991	1070	1200	1130	1060	1010	782	895	732	672	803	734

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.6	5.3	1.8	.3	.9	.8	.7	11.0	24.3	22.1	23.7	23.0
2	10.5	5.2	1.7	.2	1.0	.8	1.2	10.1	23.9	21.7	23.2	22.7
3	10.5	4.1	1.6	.4	.9	.8	1.9	8.9	23.9	20.8	22.7	21.9
4	9.7	2.8	1.6	.4	.7	.8	1.8	8.4	24.3	21.2	22.7	20.8
5	9.1	1.1	1.6	.3	.7	.7	2.6	8.4	24.4	21.5	22.9	20.5
6	8.9	.5	1.5	.3	.7	.8	4.9	8.4	24.4	22.1	22.4	21.3
7	8.5	.1	1.6	.2	.8	.8	6.6	8.8	24.4	22.4	22.7	21.3
8	8.4	1.2	1.7	.2	.8	.7	7.2	9.9	24.3	22.5	23.4	21.3
9	8.1	2.3	1.4	.3	.7	.7	7.5	11.8	24.2	23.2	24.2	20.9
10	7.9	2.2	1.0	.3	.7	.7	7.8	14.0	25.0	23.6	24.8	19.8
11	7.8	2.3	1.0	.3	.8	.8	8.9	16.1	25.4	23.9	25.3	19.3
12	7.6	2.1	1.0	.4	.8	.8	9.0	17.5	24.6	23.8	26.0	19.1
13	7.6	2.2	1.0	.2	.8	.8	8.9	19.2	24.1	23.9	26.1	19.8
14	7.4	2.2	.9	.1	.8	.9	8.4	19.5	24.1	24.2	26.2	20.6
15	7.5	2.2	1.0	.1	.8	.7	8.2	18.7	24.5	24.5	26.0	20.5
16	7.0	2.1	1.0	.2	.9	.8	8.8	17.6	24.0	25.6	25.9	19.6
17	6.0	2.1	1.3	.1	.7	.8	9.6	16.9	24.0	26.1	24.6	18.6
18	5.2	1.9	1.0	.1	.9	.8	10.3	15.5	23.9	26.1	23.8	18.0
19	4.3	2.0	.9	.3	.7	.9	9.8	15.3	23.4	26.0	23.4	15.6
20	4.4	2.1	.7	.3	.8	.9	9.0	16.8	23.9	25.9	23.4	15.4
21	4.7	2.2	.8	.4	.8	.9	11.2	17.7	23.5	26.0	24.0	14.7
22	4.6	1.7	.8	.9	.7	.8	11.2	22.2	23.2	25.9	24.7	14.3
23	4.5	1.7	.7	.9	.7	.7	9.6	22.9	22.8	25.6	24.8	13.8
24	4.9	1.6	.6	.8	.7	.7	9.3	23.1	22.7	24.9	24.7	13.8
25	4.7	1.7	.5	.8	.8	.7	11.7	23.2	22.8	24.6	24.5	13.7
26	5.0	1.8	.5	.9	.8	.7	14.4	23.8	23.3	24.4	25.3	12.8
27	5.7	1.6	.4	.9	.8	.7	14.6	24.0	24.0	24.0	25.3	12.9
28	4.9	1.7	.3	.9	.9	.7	13.2	24.1	24.0	23.7	25.9	13.8
29	4.6	1.7	.3	1.0	---	.6	13.1	24.5	23.1	23.5	26.0	13.6
30	4.5	1.7	.4	.9	---	.7	13.7	24.3	22.4	23.9	25.4	13.1
31	4.5	---	.3	.9	---	.7	---	24.4	---	23.5	23.9	---
MEAN	6.8	2.1	1.0	.5	.8	.8	8.5	17.0	23.9	23.9	24.4	17.9

RED RIVER OF THE NORTH BASIN

05113360 LONG CREEK AT WESTERN CROSSING OF INTERNATIONAL BOUNDARY, SASKATCHEWAN
(International gaging station)

LOCATION.--Lat 49°00'01", long 103°21'08", in SE $\frac{1}{4}$ sec.1, T.1, R.11 W., second meridian, Hydrologic Unit 09010001, and on right bank 10 mi south of Outram, Saskatchewan.

DRAINAGE AREA.--1,320 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1959 to current year.

GAGE.--Water-stage recorder and artificial control. Datum of gage is 1,894.00 ft above National Geodetic Vertical Datum of 1929, international boundary survey.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States. Records provided by the Water Survey of Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY 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	.39	20	.07
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	2.8	22	.04
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	90	21	.04
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	86	18	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	130	17	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	195	17	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	147	17	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	76	16	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	49	22	42
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	43	37	41
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	90	27	19
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	84	19	9.6
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	123	15	5.8
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	145	14	3.7
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	249	14	1.6
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	183	15	.81
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	125	12	.46
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	112	9.2	.25
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	86	7.0	.18
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	68	5.6	.18
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	59	4.9	.28
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	52	3.5	.32
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	47	2.1	.32
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	42	1.5	.25
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	37	1.1	.14
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	33	.78	.11
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	31	.49	.11
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	27	.35	.07
29	.00	.00	.00	.00	---	.00	.00	.00	.00	24	.25	.07
30	.00	.00	.00	.00	---	.00	.00	.00	.00	21	.18	.07
31	.00	---	.00	.00	---	.00	---	.00	---	18	.11	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2475.19	360.06	126.47
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	.000	79.8	11.6	4.22
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	249	37	42
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.39	.11	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	.00	4910	714	251

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1991, BY WATER YEAR (WY)

	1960	1960	1960	1960	1960	1964	1961	1961	1961	1961	1960	1960
MEAN	1.08	.24	.081	.009	.98	53.2	213	63.0	30.4	28.4	3.63	3.05
MAX	25.1	4.17	.82	.17	26.5	397	1052	578	360	415	33.3	61.4
(WY)	1979	1979	1979	1987	1981	1976	1979	1970	1976	1978	1963	1978
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1960	1960	1960	1960	1960	1964	1961	1961	1961	1961	1960	1960

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1960 - 1991

ANNUAL TOTAL	1572.34	2961.72	
ANNUAL MEAN	4.31	8.11	
HIGHEST ANNUAL MEAN			33.0
LOWEST ANNUAL MEAN			150
HIGHEST DAILY MEAN	456	Jul 4	4350
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW		338	4690
INSTANTANEOUS PEAK STAGE		4.52	12.05
ANNUAL RUNOFF (AC-FT)	3120	5870	23890
10 PERCENT EXCEEDS	.11	19	33
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

RED RIVER OF THE NORTH BASIN

135

05113600 LONG CREEK NEAR NOONAN, ND
(International gaging station)

LOCATION.--Lat 48°58'52", long 103°04'34", near north line of NE 1/4 sec.1, T.163 N., R.96 W., Divide County, Hydrologic Unit 09010001, on right bank 150 ft upstream from county highway bridge, 1.5 mi upstream from international boundary, and 7 mi northwest of Noonan.

DRAINAGE AREA.--1,790 mi², approximately, of which about 1,160 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1959 to current year.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,840 ft, from topographic map. Prior to Aug. 18, 1960, non-recording gage at same site and datum.

REMARKS.--Records good.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.08	.00	83	20	.14
2	.00	.00	.00	.00	.00	.00	.00	.06	.00	75	20	.00
3	.00	.00	.00	.00	.00	.00	.02	.06	.00	62	23	.00
4	.00	.00	.00	.00	.00	.00	.04	.07	.00	73	23	.00
5	.00	.00	.00	.00	.00	.00	.04	.07	.00	163	20	.00
6	.00	.00	.00	.00	.00	.00	.04	.08	.00	207	19	.00
7	.00	.00	.00	.00	.00	.00	.02	.08	.00	286	18	.00
8	.00	.00	.00	.00	.00	.00	.00	.04	.00	224	18	.00
9	.00	.00	.00	.00	.00	.00	.00	.04	.00	140	18	.00
10	.00	.00	.00	.00	.00	.00	.00	.05	.00	103	18	.91
11	.00	.00	.00	.00	.00	.00	.00	.07	.00	156	25	14
12	.00	.00	.00	.00	.00	.00	.00	.08	.00	191	24	16
13	.00	.00	.00	.00	.00	.02	.00	.11	.00	177	19	12
14	.00	.00	.00	.00	.00	.04	.00	.11	.00	188	16	8.8
15	.00	.00	.00	.00	.00	.06	.00	.08	.00	240	15	6.7
16	.00	.00	.00	.00	.00	.08	.00	.05	.00	330	14	5.5
17	.00	.00	.00	.00	.00	.08	.00	.04	.00	234	14	4.7
18	.00	.00	.00	.00	.00	.07	.00	.01	.00	184	14	2.7
19	.00	.00	.00	.00	.00	.07	.00	.00	.00	152	12	1.8
20	.00	.00	.00	.00	.00	.04	.00	.00	.00	121	9.1	.79
21	.00	.00	.00	.00	.00	.03	.00	.00	.00	97	8.0	.42
22	.00	.00	.00	.00	.00	.02	.00	.00	.00	82	6.0	.40
23	.00	.00	.00	.00	.00	.02	.00	.00	.00	68	3.1	.40
24	.00	.00	.00	.00	.00	.01	.00	.00	.00	56	2.0	.35
25	.00	.00	.00	.00	.00	.00	.00	.00	.03	47	1.3	.34
26	.00	.00	.00	.00	.00	.00	.00	.00	29	39	.91	.34
27	.00	.00	.00	.00	.00	.00	.01	.00	12	36	.71	.34
28	.00	.00	.00	.00	.00	.00	.08	.00	110	35	.59	.32
29	.00	.00	.00	.00	---	.00	.11	.00	142	30	.52	.22
30	.00	.00	.00	.00	---	.00	.11	.00	103	26	.38	.17
31	.00	---	.00	.00	---	.00	---	.00	---	23	.27	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.54	0.47	1.18	396.03	3928	382.88	77.34
MEAN	.000	.000	.000	.000	.000	.017	.016	.038	13.2	127	12.4	2.58
MAX	.00	.00	.00	.00	.00	.08	.11	.11	142	330	25	16
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	23	.27	.00
AC-FT	.00	.00	.00	.00	.00	1.1	.9	2.3	786	7790	759	153

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1991, BY WATER YEAR (WY)

MEAN	1.75	.81	.55	.33	2.79	74.0	272	78.4	36.4	39.3	5.27	4.05
MAX	31.0	7.17	4.35	5.11	71.3	595	1396	728	375	452	39.1	77.2
(WY)	1979	1979	1976	1976	1981	1976	1979	1970	1976	1978	1978	1978
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1960	1961	1961	1961	1961	1965	1990	1990	1961	1961	1960	1960

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1960 - 1991

ANNUAL TOTAL	1844.68	4786.44	
ANNUAL MEAN	5.05	13.1	42.9
HIGHEST ANNUAL MEAN			200
LOWEST ANNUAL MEAN			.017
HIGHEST DAILY MEAN	505	330	5710
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		381	6310
INSTANTANEOUS PEAK STAGE		7.02	17.61
ANNUAL RUNOFF (AC-FT)	3660	9490	31080
10 PERCENT EXCEEDS	.06	23	47
50 PERCENT EXCEEDS	.00	.00	.30
90 PERCENT EXCEEDS	.00	.00	.00

RED RIVER OF THE NORTH BASIN
05113600 LONG CREEK NEAR NOONAN, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAY 07...	1045	0.08	890	8.8	12.0	9.0	300	55	40	100	41	3
JUL 17...	1150	231	960	7.6	30.0	26.0	230	47	28	110	49	3
AUG 06...	1015	20	900	--	17.5	19.0	--	--	--	--	--	--

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAY 07...	12	300	0	250	220	16	0.20	1.9	598	595	0.81
JUL 17...	14	340	0	280	190	19	0.20	22	629	598	0.86

DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAY 07...	0.13	4	30	30	<1	40	20	1.1	<1	<1	290
JUL 17...	392	8	60	80	<1	40	60	0.6	1	<1	560

RED RIVER OF THE NORTH BASIN

137

05113750 EAST BRANCH SHORT CREEK RESERVOIR NEAR COLUMBUS, ND

LOCATION.--Lat 48°59'26", long 102°47'07", in SW¹/₄,NW¹/₄, sec.32, T.164 N., R.93 W., Burke County, Hydrologic Unit 09010001, on left bank of reservoir on East Branch Short Creek, 0.5 mi south of international boundary, and 6.0 mi north of Columbus.

DRAINAGE AREA.--280 mi², of which 175 mi² is probably noncontributing.

RESERVOIR-GAGE HEIGHT AND CONTENTS RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Reservoir is formed by earth-fill dam; storage began April 1963. Outlet of lake is a fixed-crest concrete dam; average crest elevation, 1,886.90 ft National Geodetic Vertical Datum of 1929. Reservoir capacity at crest elevation, 1,200 acre-ft. The reservoir is operated for water supply and recreation. Records of daily reservoir stage and contents are available from files at the Bismarck District office.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 1,850 acre-ft, Mar. 28, 1976, gage height, 32.13 ft; minimum, 770 acre-ft, Dec. 10, 1988, gage height, 22.57 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,070 acre-ft, July 6, gage height, 25.80 ft; minimum contents observed, 940 acre-ft, Jan. 8, gage height, 24.49 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	25.05	1,000	--
Oct. 31-----	24.78	970	-30
Nov. 30-----	--	*950	-20
Dec. 31-----	--	*940	-10
CAL YR 1990-----	--	--	-90
Jan. 31-----	24.56	950	+10
Feb. 28-----	24.65	960	+10
Mar. 31-----	24.87	980	+20
Apr. 30-----	24.89	980	0
May 31-----	24.92	980	0
June 30-----	25.25	1,020	+40
July 31-----	25.53	1,040	+20
Aug. 31-----	25.31	1,020	-20
Sept. 30-----	24.94	980	-40
WTR YR 1991-----	--	--	-20

* Estimated.

RED RIVER OF THE NORTH BASIN

05113800 SHORT CREEK BELOW INTERNATIONAL BOUNDARY NEAR ROCHE PERCEE, SASKATCHEWAN
(International gaging station)

LOCATION.--Lat 49°01'42", long 102°51'00", in SW $\frac{1}{4}$ sec.14, T.1, R.7 W., second meridian, Hydrologic Unit 09010001, 4 mi southwest of Roche Percee, Saskatchewan, and 5 mi upstream from mouth.

DRAINAGE AREA.--480 mi².

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder.

COOPERATION.--This station is one of the international gaging stations maintained by Canada under agreement with the United States.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.07	e.00	e.00	e.00	.04	.07	.18	21	9.6	.14
2	.00	.00	e.04	e.00	e.00	e.07	.00	.04	.14	17	8.1	.07
3	.00	.00	e.04	e.00	e.00	e.04	.00	.04	.11	15	7.0	.07
4	.00	.00	e.04	e.00	e.00	e.00	.00	2.3	.18	26	5.4	.04
5	.00	.00	e.04	e.00	e.00	e.04	.00	2.2	.14	34	5.2	.07
6	.00	.04	e.04	e.00	e.00	e.11	.00	1.8	.14	34	7.2	.00
7	.00	.04	e.04	e.00	e.18	e.00	.00	.88	.18	61	6.4	.00
8	.00	e.04	e.04	e.00	e.00	e.00	.00	.46	.21	90	10	.00
9	.00	e.04	e.04	e.00	e.00	e.11	.04	.92	.18	66	9.4	.00
10	.00	e.04	e.04	e.00	e.00	e.35	.04	1.1	.18	59	6.5	.00
11	.00	e.04	e.04	e.00	e.00	e.07	.04	.99	.14	55	5.0	.00
12	.00	e.00	e.04	e.00	e.00	e.07	.00	1.2	.11	42	4.6	.04
13	.00	e.00	e.04	e.00	e.00	e.07	.00	2.7	.14	36	4.6	.00
14	.00	e.00	e.04	e.00	e.04	e.11	.00	2.3	.14	31	4.2	.00
15	.00	e.00	e.00	e.00	e.04	e.07	.00	3.2	.14	27	3.5	.00
16	.00	e.00	e.00	e.00	e.00	e.07	.00	4.2	.11	22	2.8	.00
17	.00	e.00	e.00	e.00	e.00	e.07	.00	3.2	.07	19	2.2	.00
18	.00	e.00	e.00	e.00	e.00	e.07	.04	2.0	.07	15	1.8	.00
19	.00	e.00	e.00	e.00	e.00	e.07	.00	1.4	.07	12	1.5	.00
20	.00	e.00	e.00	e.00	e.04	e.11	.00	1.1	.04	9.8	1.3	.00
21	.00	e.04	e.00	e.00	e.04	e.14	.00	.88	.04	7.8	.99	.00
22	.00	e.04	e.00	e.00	e.04	e.11	.00	.71	.04	6.5	.71	.00
23	.00	e.04	e.00	e.00	e.00	e.11	.00	.56	.07	5.5	.53	.00
24	.00	e.04	e.00	e.00	e.00	e.18	.00	.49	.07	4.3	.49	.04
25	.00	e.04	e.00	e.00	e.00	e.07	.00	.42	.81	3.0	.42	.04
26	.00	e.04	e.00	e.00	e.00	e.00	.00	.35	1.2	2.6	.35	.00
27	.00	e.04	e.00	e.00	e.00	e.00	.07	.32	2.2	2.9	.32	.00
28	.00	e.04	e.00	e.00	e.00	e.00	.11	.25	2.2	2.4	.25	.00
29	.00	e.04	e.00	e.00	---	e.00	.04	.25	33	3.4	.21	.00
30	.00	e.04	e.00	e.00	---	.11	.07	.21	22	9.6	.18	.00
31	.00	---	e.00	e.00	---	.07	---	.21	---	12	.18	---
TOTAL	0.00	0.64	0.59	0.00	0.38	2.29	0.49	36.75	64.30	751.8	110.93	0.51
MEAN	.000	.021	.019	.000	.014	.074	.016	1.19	2.14	24.3	3.58	.017
MAX	.00	.04	.07	.00	.18	.35	.11	4.2	.33	.90	.10	.14
MIN	.00	.00	.00	.00	.00	.00	.00	.04	.04	2.4	.18	.00
AC-FT	.00	1.3	1.2	.00	.8	4.5	1.0	.73	128	1490	220	1.0

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1991, BY WATER YEAR (WY)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
MEAN	1.01	.42	.098	.029	1.71	28.2	65.8	21.9	8.35	5.36	2.80	1.14
MAX	10.9	6.00	1.42	.28	27.9	285	311	169	100	41.1	37.3	16.5
(WY)	1976	1976	1976	1976	1983	1976	1979	1975	1975	1986	1972	1975
MIN	.000	.000	.000	.000	.000	.000	.016	.010	.000	.000	.000	.000
(WY)	1962	1962	1961	1962	1962	1965	1991	1990	1980	1961	1961	1961

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1960 - 1991

ANNUAL TOTAL	97.62	968.68	11.1
ANNUAL MEAN	.27	2.65	51.9
HIGHEST ANNUAL MEAN			.029
LOWEST ANNUAL MEAN			1976
HIGHEST DAILY MEAN	7.9 Jul 11	90 Jul 8	1410 Apr 7 1969
LOWEST DAILY MEAN	.00 Jan 1	.00 Oct 1	.00 Mar 1 1960
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Oct 1	.00 Mar 1 1960
INSTANTANEOUS PEAK FLOW		102 Jul 7	1700 Apr 7 1969
INSTANTANEOUS PEAK STAGE		5.24 Jul 7	14.39 Mar 28 1960
ANNUAL RUNOFF (AC-FT)	194	1920	8050
10 PERCENT EXCEEDS	.39	5.3	12
50 PERCENT EXCEEDS	.00	.04	.05
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

05114000 SOURIS (MOUSE) RIVER NEAR SHERWOOD, ND
(International gaging station)

LOCATION.--Lat 48°59'24", long 101°57'28", in NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ sec.33, T.164 N., R.87 W., Renville County, Hydrologic Unit 09010001, on right bank 0.8 mi downstream from international boundary, 16 mi northwest of Sherwood, and at mile 511.4.

DRAINAGE AREA.--8,940 mi², approximately, of which about 5,900 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1930 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1308: 1934, 1945. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,603.73 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 8, 1935, nonrecording gage at same site and datum.

REMARKS.--Records good. Some regulation by reservoirs in Canada. Some small diversions for irrigation and municipal supply.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in 1927 reached a stage of about 22 ft and flood in 1904 reached a stage of about 25.8 ft from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	21	232	13	2.7	25	11
2	.00	.00	.00	.00	.00	.00	20	182	12	3.1	23	9.8
3	.00	.00	.00	.00	.00	.00	18	128	11	2.4	24	8.8
4	.00	.00	.00	.00	.00	.00	16	97	10	35	23	7.3
5	.00	.00	.00	.00	.00	.00	14	106	9.1	40	23	6.5
6	.00	.00	.00	.00	.00	.00	12	69	8.0	37	26	6.0
7	.00	.00	.00	.00	.00	.00	13	62	7.3	42	27	5.3
8	.00	.00	.00	.00	.00	.00	14	57	7.1	54	28	4.7
9	.00	.00	.00	.00	.00	.00	11	52	6.9	60	30	4.2
10	.00	.00	.00	.00	.00	.00	7.7	46	6.6	108	31	3.7
11	.00	.00	.00	.00	.00	.00	7.2	42	5.5	234	35	3.5
12	.00	.00	.00	.00	.00	.00	9.2	37	5.1	298	48	4.1
13	.00	.00	.00	.00	.00	.00	8.9	35	4.4	284	96	4.9
14	.00	.00	.00	.00	.00	.00	8.8	34	4.1	245	113	7.1
15	.00	.00	.00	.00	.00	.00	8.5	154	3.8	224	100	6.7
16	.00	.00	.00	.00	.00	.00	7.5	189	3.1	201	85	7.7
17	.00	.00	.00	.00	.00	.00	7.3	102	2.7	185	71	7.4
18	.00	.00	.00	.00	.00	.00	6.6	62	2.4	172	59	6.1
19	.00	.00	.00	.00	.00	.00	5.5	48	2.0	150	51	8.6
20	.00	.00	.00	.00	.00	.00	9.8	39	2.0	122	44	11
21	.00	.00	.00	.00	.00	.00	14	32	1.9	101	40	13
22	.00	.00	.00	.00	.00	.01	13	33	1.5	88	35	12
23	.00	.00	.00	.00	.00	.03	12	36	1.5	77	32	12
24	.00	.00	.00	.00	.00	.04	139	24	1.4	70	27	13
25	.00	.00	.00	.00	.00	.06	270	22	2.8	61	23	12
26	.00	.00	.00	.00	.00	.07	285	19	2.4	54	20	11
27	.00	.00	.00	.00	.00	.07	305	18	1.9	48	18	10
28	.00	.00	.00	.00	.00	.08	318	16	1.5	42	16	9.2
29	.00	.00	.00	.00	---	.07	313	14	1.4	37	14	8.2
30	.00	.00	.00	.00	---	9.2	289	12	1.7	32	13	7.1
31	.00	---	.00	.00	---	24	---	12	---	28	12	---
TOTAL	0.00	0.00	0.00	0.00	0.00	33.63	2184.0	2011	144.1	3137.2	1212	241.9
MEAN	.000	.000	.000	.000	.000	1.08	72.8	64.9	4.80	101	39.1	8.06
MAX	.00	.00	.00	.00	.00	24	318	232	13	298	113	13
MIN	.00	.00	.00	.00	.00	.00	5.5	12	1.4	2.4	12	3.5
AC-FT	.00	.00	.00	.00	.00	67	4330	3990	286	6220	2400	480

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1991, BY WATER YEAR (WY)

	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941
MEAN	11.1	9.23	4.72	3.03	5.73	118	713	410	129	83.5	21.7	13.1
MAX	80.8	65.4	47.7	44.5	143	1148	6739	3995	954	1050	179	146
(WY)	1976	1955	1976	1976	1981	1972	1976	1975	1953	1953	1953	1975
MIN	.000	.000	.000	.000	.000	.000	1.82	2.63	.17	.000	.000	.000
(WY)	1932	1935	1932	1931	1931	1936	1988	1988	1988	1937	1931	1931

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1930 - 1991

ANNUAL TOTAL	2960.18	8963.83	
ANNUAL MEAN	8.11	24.6	128
HIGHEST ANNUAL MEAN			878
LOWEST ANNUAL MEAN			.62
HIGHEST DAILY MEAN	240	318	13700
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		321	14800
INSTANTANEOUS PEAK STAGE		5.47	25.15
ANNUAL RUNOFF (AC-FT)	5870	17780	92580
10 PERCENT EXCEEDS	19	65	200
50 PERCENT EXCEEDS	.05	1.5	6.0
90 PERCENT EXCEEDS	.00	.00	.00

RED RIVER OF THE NORTH BASIN
05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1970, 1972 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: August 1983 to current year.

WATER TEMPERATURE: August 1983 to current year.

INSTRUMENTATION.--Water quality monitor since August 1983.

REMARKS.--No flow for several months (see table of daily mean discharge for this station).

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum daily, 3,490 microsiemens, Apr. 28, 1991; minimum, 94 microsiemens, Apr. 5, 1990.

WATER TEMPERATURE: Maximum, 28.6°C, June 7, 11, 1988; minimum, 0.0°C several days during winter months each year.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 3,490 microsiemens, Apr. 28; minimum, 993 microsiemens, Aug. 16.

WATER TEMPERATURE: Maximum, 27.6°C, June 24; minimum, 0.0°C on many days during winter months.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	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)	
APR													
03...	1715	18	1670	7.8	17.0	4.5	45	4.2	33	300	53	41	
10...	1845	6.9	2000	9.1	15.5	10.5	48	19.4	175	280	46	41	
23...	1750	12	1100	8.7	13.0	12.0	30	9.2	86	250	42	35	
26...	1100	282	2440	7.7	15.0	13.0	55	7.0	68	260	44	35	
30...	1315	290	2510	--	2.0	9.0	--	--	--	--	--	--	
MAY													
03...	1100	130	2460	8.9	0.0	5.5	28	11.0	88	290	52	39	
16...	1800	161	1770	8.3	22.0	18.5	2	8.0	86	460	83	61	
JUN													
05...	1045	9.3	1200	7.8	16.0	18.5	45	2.7	33	290	52	40	
12...	1150	5.3	1200	--	21.0	23.0	--	--	--	--	--	--	
JUL													
09...	1205	61	1640	8.6	27.5	22.5	35	6.8	79	310	53	42	
16...	1240	200	1180	--	29.0	25.0	--	--	--	--	--	--	
24...	1250	69	1240	--	22.0	22.5	--	--	--	--	--	--	
AUG													
14...	1315	116	1260	--	25.5	23.0	--	--	--	--	--	--	
SEP													
04...	1530	7.3	1300	8.9	22.0	18.5	55	8.6	92	360	63	49	
17...	1050	7.6	1350	--	--	13.5	--	--	--	--	--	--	
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, 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)
APR													
03...	270	65	7	15	453	320	120	0.30	14	1070	1110	1.46	
10...	360	72	9	15	361	480	130	0.40	7.1	1340	1300	1.82	
23...	130	51	4	14	236	240	73	0.20	1.0	711	678	0.97	
26...	470	79	13	14	495	650	140	0.60	3.8	1640	1660	2.23	
MAY													
03...	440	75	11	20	371	700	210	1.4	2.0	1630	1690	2.22	
16...	210	49	4	18	316	550	110	0.40	8.4	1250	1230	1.70	
JUN													
05...	140	49	4	15	262	290	65	0.40	3.8	790	765	1.07	
JUL													
09...	250	62	6	17	301	460	120	0.70	1.4	1110	1130	1.51	
SEP													
04...	160	48	4	15	346	330	47	0.40	0.60	908	874	1.23	

141

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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, 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)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS 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)
	APR											
	03...	52.6	<0.010	<0.010	<0.050	<0.050	2.50	1.70	1.00	0.730	0.750	--
10...	25.0	<0.010	<0.010	<0.050	<0.050	0.030	0.040	0.250	0.030	<0.010	--	--
23...	22.7	0.020	<0.010	<0.050	<0.050	0.040	0.020	0.100	0.010	<0.010	<10	1
26...	1250	0.020	0.010	<0.050	<0.050	0.020	0.020	0.270	0.030	<0.010	<10	3
MAY												
03...	572	<0.010	<0.010	<0.050	<0.050	0.010	<0.010	0.200	0.060	0.040	30	5
16...	543	0.020	<0.010	<0.050	<0.050	0.020	<0.010	0.130	0.040	0.040	<10	4
JUN												
05...	19.8	0.020	0.020	<0.050	<0.050	0.300	0.310	0.130	0.100	0.090	--	--
JUL												
09...	182	<0.010	0.010	<0.050	<0.050	<0.010	0.020	0.170	0.090	0.090	--	--
SEP												
04...	17.8	<0.010	<0.010	<0.050	<0.050	0.030	0.020	0.360	0.250	0.270	--	--
DATE	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM, DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM, DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY, DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)
	APR											
	03...	--	930	--	--	--	--	--	--	--	--	--
10...	--	1800	--	--	--	--	--	--	--	--	--	--
23...	51	580	<1.0	<1	1	2	15	2	43	2	<0.1	2
26...	200	1700	<1.0	<1	1	1	40	<1	80	<10	<0.1	6
MAY												
03...	200	5100	<1.0	<1	<1	1	20	<1	70	<10	<0.1	70
16...	130	1500	<1.0	<1	1	1	14	<1	85	5	<0.1	15
JUN												
05...	--	1100	--	--	--	--	--	--	--	--	--	--
JUL												
09...	--	2300	--	--	--	--	--	--	--	--	--	--
SEP												
04...	--	500	--	--	--	--	--	--	--	--	--	--
DATE	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)	ACETA- NALIDS SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (34757)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (34757)	
	APR											
	23...		5	1	<1	<1	300	4	10	<3	<0.010	--
26...		5	1	<1	<1	840	7	10	<10	<0.010	--	
MAY												
03...		6	4	4	<1	1700	12	10	<10	<0.010	--	
16...		11	2	<1	<1	800	7	<10	5	<0.010	--	
JUL												
09...	--	--	--	--	--	--	--	--	--	--	<0.1	

RED RIVER OF THE NORTH BASIN

05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	1580	1380	1500	2530	2510	2520
2	---	---	---	---	---	---	1500	1370	1430	2540	2500	2530
3	---	---	---	---	---	---	1690	1510	1630	2500	2400	2450
4	---	---	---	---	---	---	1610	1480	1540	2400	2330	2370
5	---	---	---	---	---	---	1470	1410	1430	2330	2280	2300
6	---	---	---	---	---	---	1620	1430	1510	2280	2210	2240
7	---	---	---	---	---	---	2080	1630	1830	2200	2150	2180
8	---	---	---	---	---	---	2310	2100	2240	2210	2160	2200
9	---	---	---	---	---	---	2310	2150	2250	2150	1860	2070
10	---	---	---	---	---	---	2140	2000	2070	1830	1560	1630
11	---	---	---	---	---	---	1980	1800	1890	1720	1580	1650
12	---	---	---	---	---	---	1790	1640	1710	1760	1730	1740
13	---	---	---	---	---	---	1630	1510	1570	1840	1750	1810
14	---	---	---	---	---	---	1500	1420	1460	1860	1820	1840
15	---	---	---	---	---	---	1420	1370	1400	2000	1860	1920
16	---	---	---	---	---	---	1380	1310	1350	2030	1660	1890
17	---	---	---	---	---	---	1310	1250	1280	1640	1350	1480
18	---	---	---	---	---	---	1240	1200	1220	1340	1300	1310
19	---	---	---	---	---	---	1210	1170	1190	1350	1310	1330
20	---	---	---	---	---	---	1180	1130	1160	1350	1300	1330
21	---	---	---	---	---	---	1120	1100	1100	1300	1240	1270
22	---	---	---	---	---	---	1090	1080	1080	1240	1150	1200
23	---	---	---	---	---	---	1120	1080	1100	1160	1120	1140
24	---	---	---	---	---	---	1650	1110	1230	1120	1110	1110
25	---	---	---	---	---	---	2950	1520	2120	1130	1100	1110
26	---	---	---	---	---	---	2630	2430	2480	1160	1120	1140
27	---	---	---	---	---	---	3080	2320	2480	1180	1160	1170
28	---	---	---	---	---	---	3490	2860	3270	1190	1170	1180
29	---	---	---	---	---	---	2820	2530	2630	1210	1180	1200
30	---	---	---	---	---	---	2530	2500	2520	1220	1200	1210
31	---	---	---	1910	1580	1650	---	---	---	1220	1190	1210
MONTH	---	---	---	---	---	---	3490	1080	1720	2540	1100	1670

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	1220	1200	1210	1170	1140	1150	1170	1150	1160	1270	1240	1250
2	1230	1190	1220	1200	1160	1190	1150	1130	1150	1290	1270	1270
3	1230	1210	1220	1210	1190	1200	1140	1120	1130	1310	1280	1300
4	1230	1200	1210	1210	1170	1190	1140	1120	1130	1320	1300	1310
5	1210	1180	1200	1280	1200	1240	1150	1130	1140	1320	1300	1310
6	1190	1150	1170	1360	1290	1340	1150	1130	1140	1330	1300	1310
7	1160	1130	1150	1420	1340	1370	1160	1130	1150	1340	1320	1330
8	1150	1120	1140	1560	1420	1520	1160	1140	1150	1340	1330	1330
9	1150	1130	1150	1830	1560	1650	1180	1160	1170	1370	1340	1350
10	1190	1150	1180	2440	1850	2170	1210	1180	1190	1370	1350	1360
11	1210	1180	1200	2470	2330	2420	1210	1200	1200	1370	1340	1360
12	1230	1200	1210	2270	1230	1630	1210	1190	1200	1380	1340	1370
13	1250	1190	1230	1220	1190	1200	1290	1200	1250	1380	1350	1370
14	1250	1200	1230	1240	1200	1210	1290	1210	1260	1370	1340	1360
15	1240	1200	1230	1240	1150	1190	1210	1080	1140	1360	1340	1350
16	1260	1220	1250	1240	1150	1180	1080	993	1040	1370	1340	1360
17	1270	1250	1260	1380	1250	1310	1000	994	999	1360	1350	1350
18	1290	1260	1270	1370	1320	1350	1030	1000	1020	1370	1360	1360
19	1290	1270	1280	1340	1260	1310	1030	1010	1020	1380	1350	1360
20	1290	1270	1280	1300	1230	1270	1040	1020	1020	1370	1350	1360
21	1310	1280	1290	1280	1200	1240	1040	1030	1040	1400	1340	1360
22	1300	1280	1290	1240	1210	1220	1060	1040	1050	1370	1330	1340
23	1300	1280	1290	1230	1210	1220	1070	1050	1060	1370	1340	1360
24	1300	1260	1290	1250	1220	1240	1100	1070	1090	1380	1350	1370
25	1300	1180	1240	1270	1240	1250	1130	1090	1110	1390	1360	1370
26	1220	1200	1210	1270	1240	1260	1150	1120	1130	1380	1350	1360
27	1230	1210	1220	1250	1220	1240	1170	1140	1160	1360	1340	1350
28	1250	1230	1240	1230	1190	1210	1190	1160	1170	1360	1350	1360
29	1240	1210	1240	1200	1180	1190	1210	1180	1200	1380	1360	1370
30	1230	1160	1200	1190	1170	1180	1230	1200	1220	1390	1380	1380
31	---	---	---	1180	1150	1160	1250	1220	1240	---	---	---
MONTH	1310	1120	1230	2470	1140	1340	1290	993	1130	1400	1240	1340

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

RED RIVER OF THE NORTH BASIN

05114000 SOURIS RIVER NEAR SHERWOOD, ND--CONTINUED

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	.3	.0	.1	7.9	6.2	7.0
2	---	---	---	---	---	---	1.9	.0	.7	6.2	5.6	5.9
3	---	---	---	---	---	---	4.2	1.3	2.5	5.8	4.7	5.4
4	---	---	---	---	---	---	5.3	2.6	3.8	5.5	4.1	4.8
5	---	---	---	---	---	---	8.2	5.4	6.7	5.5	4.5	5.0
6	---	---	---	---	---	---	9.9	7.5	8.6	8.5	4.7	6.4
7	---	---	---	---	---	---	10.3	7.8	8.9	10.8	6.6	8.5
8	---	---	---	---	---	---	9.8	7.9	8.9	13.0	9.4	11.0
9	---	---	---	---	---	---	10.5	7.7	9.0	16.8	11.6	14.1
10	---	---	---	---	---	---	11.2	8.2	9.7	17.9	15.0	16.5
11	---	---	---	---	---	---	9.6	7.9	8.8	20.2	16.2	18.1
12	---	---	---	---	---	---	9.1	7.1	8.1	20.0	17.3	18.7
13	---	---	---	---	---	---	7.6	4.8	6.3	19.4	16.3	17.9
14	---	---	---	---	---	---	5.0	4.2	4.6	20.6	15.8	18.2
15	---	---	---	---	---	---	5.9	4.2	5.0	19.4	17.2	18.6
16	---	---	---	---	---	---	8.4	4.9	6.6	19.1	17.0	18.2
17	---	---	---	---	---	---	8.5	6.8	7.7	19.9	17.5	18.6
18	---	---	---	---	---	---	8.6	6.2	7.5	19.3	16.3	17.8
19	---	---	---	---	---	---	9.5	5.3	7.6	17.6	16.3	16.9
20	---	---	---	---	---	---	10.8	7.4	9.1	19.9	15.9	17.7
21	---	---	---	---	---	---	11.7	9.3	10.4	22.8	17.6	19.9
22	---	---	---	---	---	---	11.8	8.6	10.1	23.2	19.6	21.5
23	---	---	---	---	---	---	12.3	8.6	10.4	23.8	19.8	21.9
24	---	---	---	---	---	---	12.5	9.4	11.2	22.6	19.7	20.6
25	---	---	---	---	---	---	13.3	11.7	12.5	21.5	18.4	20.1
26	---	---	---	---	---	---	13.1	12.5	12.8	21.9	19.3	20.7
27	---	---	---	---	---	---	12.7	11.5	12.2	22.1	19.1	20.7
28	---	---	---	---	---	---	11.6	10.7	11.2	21.2	19.4	20.3
29	---	---	---	---	---	---	11.1	10.4	10.8	21.8	18.1	19.9
30	---	---	---	---	---	---	10.4	8.1	9.3	21.8	18.9	20.4
31	---	---	---	.0	.0	.0	---	---	---	20.5	19.0	19.6
MONTH	---	---	---	---	---	---	13.3	.0	8.0	23.8	4.1	15.8

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	22.1	17.9	19.9	20.1	18.7	19.3	23.5	20.5	22.0	22.8	20.2	21.4
2	23.9	20.1	21.9	18.5	17.6	18.1	22.7	19.2	20.7	21.9	20.1	21.5
3	24.1	21.1	22.6	22.6	17.4	19.7	21.0	17.9	19.4	19.8	17.5	18.7
4	22.8	19.9	21.8	23.9	20.0	21.7	21.1	18.6	20.1	18.8	16.2	17.6
5	19.7	18.4	19.1	25.0	21.2	23.1	21.1	18.6	19.7	18.1	16.3	17.4
6	21.9	18.9	20.3	23.8	21.7	22.9	20.2	18.3	19.0	18.9	14.9	16.7
7	24.1	20.8	22.3	23.7	20.8	22.4	20.5	19.1	19.8	20.8	16.7	18.5
8	25.1	21.3	23.1	23.6	20.1	21.9	20.3	19.1	19.8	21.1	19.6	20.5
9	24.0	21.2	22.8	24.2	21.0	22.5	22.8	18.7	20.6	20.5	17.8	19.1
10	24.1	19.9	22.0	23.1	22.0	22.3	23.5	19.8	21.8	17.7	15.8	16.5
11	25.6	20.7	23.2	22.4	21.2	21.9	23.7	20.1	22.2	16.3	15.5	15.9
12	26.5	22.4	24.3	22.4	21.3	21.8	24.0	20.4	22.3	18.0	15.6	16.8
13	25.5	21.7	23.7	23.4	21.6	22.5	24.1	21.4	22.7	18.4	15.7	17.0
14	23.4	20.8	22.2	24.4	22.4	23.3	23.6	22.2	23.0	20.3	17.2	18.6
15	22.3	19.1	20.9	26.0	24.0	24.9	23.8	21.8	22.8	19.6	16.3	18.1
16	24.0	18.7	21.4	26.7	24.8	25.7	24.0	22.3	23.2	16.1	14.1	15.2
17	22.7	19.4	21.1	27.1	25.3	26.1	24.0	22.1	23.0	15.0	10.3	12.8
18	21.4	17.8	19.5	27.0	25.2	26.1	23.8	21.2	22.5	10.0	7.9	8.7
19	22.8	17.9	20.3	26.6	24.1	25.4	23.9	21.3	22.6	9.7	6.3	7.8
20	20.6	18.8	19.6	27.0	24.2	25.5	25.0	21.4	23.1	12.1	8.2	9.8
21	23.4	17.6	20.0	26.5	24.6	25.6	23.8	21.4	22.6	11.5	10.4	11.1
22	23.9	19.4	21.1	25.3	23.5	24.4	22.7	20.2	21.7	10.5	9.2	9.9
23	24.6	19.0	21.5	24.0	21.7	22.9	22.3	19.8	21.3	10.9	8.9	9.8
24	27.6	20.4	23.1	24.1	21.5	22.8	23.1	19.8	21.5	12.1	9.3	10.5
25	24.5	22.0	23.5	24.3	21.0	22.6	23.5	20.2	22.1	12.0	10.5	11.4
26	24.2	21.0	22.7	24.2	21.0	22.5	23.8	21.5	22.8	12.1	10.7	11.3
27	24.1	21.0	22.2	22.9	21.2	22.1	23.8	21.3	22.7	12.2	10.1	11.1
28	21.5	19.6	20.3	24.6	20.2	22.4	24.8	22.9	23.7	12.2	9.5	10.7
29	25.0	18.6	21.4	25.9	21.5	23.7	23.7	21.5	22.7	11.5	10.3	10.9
30	22.4	20.3	21.2	25.3	22.1	23.9	23.5	20.7	22.2	10.9	8.7	9.9
31	---	---	---	23.9	20.6	22.6	22.7	20.4	21.7	---	---	---
MONTH	27.6	17.6	21.6	27.1	17.4	23.0	25.0	17.9	21.8	22.8	6.3	14.5

05114700 LAKE DARLING NEAR GRANO, ND

LOCATION.--Lat 48°36'49", long 101°37'01", in NW¼ sec.11, T.159 N., R.85 W., Renville County, Hydrologic Unit 09010001, at highway bridge 1.3 mi west of Grano.

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1986 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		BARO-METRIC PRES-SURE (MM OF HG) (00025)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT-ANCE LAB (US/CM) (90095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE AIR (DEG C) (00020)	TEMPER-ATURE WATER (DEG C) (00010)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	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 25...	1430	751	1100	1080	8.6	26.0	13.5	25	9.8	96	260	54
30...	1500	759	1040	1040	8.7	3.0	5.5	33	10.7	85	230	47
JUN 11...	1310	758	1490	1520	8.8	26.0	22.5	25	--	--	300	57
JUL 24...	1530	768	1750	1790	9.6	26.5	21.5	55	12.4	140	290	52
SEP 04...	1230	768	--	1830	9.4	20.0	17.5	55	8.2	--	310	56
DATE		MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (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)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)
APR 25...	31	140	52	4	12	287	250	50	0.30	4.7	704	715
30...	28	120	51	3	12	283	200	55	0.30	3.8	659	637
JUN 11...	38	220	60	6	16	364	350	88	0.50	5.2	1010	996
JUL 24...	38	300	68	8	19	367	430	130	0.50	5.4	1200	1200
SEP 04...	42	290	65	7	20	384	450	120	0.70	9.8	1210	1220
DATE		SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	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 TOTAL (MG/L AS NH4) (71845)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00665)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (70507)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)
APR 25...	0.96	0.020	<0.010	<0.050	<0.050	<0.050	0.040	0.030	0.05	0.250	0.200	0.190
30...	0.90	0.020	<0.010	<0.050	<0.050	<0.050	0.060	0.020	0.08	0.700	0.280	0.160
JUN 11...	1.37	<0.010	<0.010	<0.050	<0.050	<0.050	0.020	0.010	0.03	0.710	0.550	0.530
JUL 24...	1.63	0.010	<0.010	<0.050	<0.050	<0.050	0.050	0.030	0.06	0.740	0.550	0.510
SEP 04...	1.65	<0.010	<0.010	0.063	<0.050	0.020	<0.010	0.03	1.10	0.840	0.820	--
DATE		ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)
APR 25...	--	--	--	280	--	--	--	--	--	--	--	--
30...	4	64	690	<1.0	<1	1	2	18	1	34	2	
JUN 11...	17	75	1100	<1.0	<1	1	3	7	<1	50	15	
JUL 24...	--	--	1800	--	--	--	--	--	--	--	--	--
SEP 04...	--	--	1900	--	--	--	--	--	--	--	--	--
DATE		MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
APR 30...	<0.1	4	20	3	<1	<1	280	6	70	4	<0.010	
JUN 11...	<0.1	10	8	3	<1	<1	420	8	<10	5	<0.010	

RED RIVER OF THE NORTH BASIN

05115500 LAKE DARLING NEAR FOXHOLM, ND

LOCATION.--Lat 48°27'27", long 101°35'14", in NE $\frac{1}{4}$,NE $\frac{1}{4}$, sec.1, T.157 N., R.85 W., Ward County, Hydrologic Unit 09010001, on control structure of Lake Darling Dam, reservoir of Fish and Wildlife Service, on Souris River about 6 mi north of Foxholm, and at mile 430.0.

DRAINAGE AREA.--9,450 mi², approximately, of which about 6,200 mi² is probably noncontributing.

RESERVOIR-GAGE HEIGHT AND CONTENTS RECORDS

PERIOD OF RECORD.--April 1936 to current year (no winter records 1936-39).

REVISED RECORDS.--WSP 1338: 1942. WSP 2113: Drainage area.

GAGE.--Nonrecording gage. Datum of gage is 1,577.00 ft National Geodetic Vertical Datum of 1929. April 1936 to Aug. 8, 1963, nonrecording gages at same site and datum.

REMARKS.--Reservoir is formed by earth dam; storage began in April 1936; dam completed in July 1936. Usable capacity, 108,500 acre-ft between gage heights of 0.0 ft, sill of control gages, and 21.0 ft, crest of spillway. Dead storage, 3,500 acre-ft. Figures given herein represent total contents based on capacity table dated June 7, 1943. Water is used during periods of low flow at wildlife refuges downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 145,400 acre-ft Apr. 17, 1976, gage height, 24.24 ft; minimum observed since April 1943 when reservoir was first filled to spillway level, 31,200 acre-ft, Feb. 18 and 25, 1963, gage height, 10.04 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 42,900 acre-ft, Jan. 31, gage height, 12.49 ft; minimum observed, 34,400 acre-ft, Apr. 09, gage height, 10.84 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	11.96	39,800	--
Oct. 31-----	11.90	39,500	-300
Nov. 30-----	11.86	39,300	-200
Dec. 31-----	12.04	40,200	+900
CAL YR 1990-----	--	--	-19,800
Jan. 31-----	12.49	42,900	+2,700
Feb. 28-----	12.29	41,700	-1,200
Mar. 31-----	10.93	34,700	-7,000
Apr. 30-----	11.42	37,100	+2,400
May 31-----	11.87	39,300	+2,200
June 30-----	12.04	40,200	+900
July 31-----	11.94	39,700	-500
Aug. 31-----	12.06	40,400	+700
Sept. 30-----	12.08	40,500	+100
WTR YR 1991-----	--	--	+700

05116000 SOURIS (MOUSE) RIVER NEAR FOXHOLM, ND

LOCATION.--Lat 48°22'20", long 101°30'18", in SW¹/₄,SE¹/₄, sec.34, T.157 N., R.84 W., Ward County, Hydrologic Unit 09010001, on left bank 30 ft upstream from county highway bridge, 3 mi east of Foxholm, 19 mi upstream from Des Lacs River, and at mile 414.5.

DRAINAGE AREA.--9,470 mi², approximately, of which about 6,200 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1904 to November 1905, March to July 1906 (gage heights only), October 1936 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River near Foxholm, 1904-6.

REVISED RECORDS.--WSP 1308: 1905. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and sheet piling weir. Datum of gage is 1,560.73 ft above National Geodetic Vertical Datum of 1929. June 23, 1904, to July 31, 1906, nonrecording gage at site 3.2 mi upstream at different datum. Apr. 1, 1937, to Mar. 25, 1938, nonrecording gage at site 600 ft downstream at datum about 0.5 ft higher.

REMARKS.--Records good. Flow almost completely regulated since 1936 by Lake Darling (station 05115500) 15 mi upstream and several small reservoirs, combined capacity, about 184,000 acre-feet. Some small diversions for irrigation and municipal supply.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	157	e.06	e.03	e.03	.00	.00
2	.00	.00	.00	.00	.00	.00	68	e.05	e.03	e.04	.00	.00
3	.00	.00	.00	.00	.00	.00	25	e.05	e.03	e.04	.00	.00
4	.00	.00	.00	.00	.00	.00	24	e.05	e.03	e.04	.00	.00
5	.00	.00	.00	.00	.00	.00	22	e.05	e.03	e.03	.00	.00
6	.00	.00	.00	.00	.00	.00	14	e.05	e.04	e.03	.00	.00
7	.00	.00	.00	.00	.00	.00	13	e.04	e.05	e.03	.00	.00
8	.00	.00	.00	.00	.00	.00	13	e.04	e.05	e.03	.00	.00
9	.00	.00	.00	.00	.00	.00	13	e.04	e.05	e.02	.00	.00
10	.00	.00	.00	.00	.00	.00	13	e.04	e.04	e.01	.00	.00
11	.00	.00	.00	.00	.00	.00	11	e.04	e.04	e.01	.00	.00
12	.00	.00	.00	.00	.00	.00	9.0	e.04	e.03	e.00	.00	.00
13	.00	.00	.00	.00	.00	.00	9.1	e.05	e.02	e.00	.00	.00
14	.00	.00	.00	.00	.00	e5.0	9.1	e.04	e.01	e.00	.00	.00
15	.00	.00	.00	.00	.00	e50	9.1	e.04	e.01	.00	.00	.00
16	.00	.00	.00	.00	.00	69	8.5	e.04	e.01	.00	.00	.00
17	.00	.00	.00	.00	.00	92	2.9	e.03	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	174	1.6	e.03	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	189	1.1	e.03	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	187	e.70	e.02	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	180	e.40	e.02	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	178	e.25	e.02	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	178	e.15	e.02	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	178	e.10	e.01	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	181	e.09	e.02	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	184	e.10	e.02	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	186	e.20	e.01	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	188	e.15	e.01	.00	.00	.00	.00
29	.00	.00	.00	.00	---	188	e.10	e.01	.00	.00	.00	.00
30	.00	.00	.00	.00	---	187	e.08	e.00	.00	.00	.00	.00
31	.00	---	.00	.00	---	175	---	e.03	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	2769.00	425.72	1.00	0.50	0.31	0.00	0.00
MEAN	.000	.000	.000	.000	.000	89.3	14.2	.032	.017	.010	.000	.000
MAX	.00	.00	.00	.00	.00	189	157	.06	.05	.04	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.08	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	5490	844	2.0	1.0	.6	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1991, BY WATER YEAR (WY)

MEAN	27.2	29.4	28.2	28.0	29.7	80.2	492	510	159	106	56.6	34.9
MAX	108	137	144	166	241	1058	5443	4242	1138	1238	435	162
(WY)	1973	1952	1976	1976	1976	1976	1976	1975	1975	1953	1976	1955
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.017	.010	.000	.000
(WY)	1937	1937	1937	1937	1937	1937	1937	1942	1942	1991	1991	1937

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1937 - 1991

ANNUAL TOTAL	7843.90	3196.53	
ANNUAL MEAN	21.5	8.76	
HIGHEST ANNUAL MEAN			132
LOWEST ANNUAL MEAN			948
HIGHEST DAILY MEAN	377	189	1.13
LOWEST DAILY MEAN	.00	.00	8500
ANNUAL SEVEN-DAY MINIMUM	.00	.00	a-5.0
INSTANTANEOUS PEAK FLOW		192	.00
INSTANTANEOUS PEAK STAGE		7.14	8600
INSTANTANEOUS LOW FLOW			17.17
ANNUAL RUNOFF (AC-FT)	15560	6340	b-25
10 PERCENT EXCEEDS	70	1.3	95670
50 PERCENT EXCEEDS	.22	.00	224
90 PERCENT EXCEEDS	.00	.00	17
			.00

e Estimated.

a Reverse flow caused by backwater from the Des Lacs River.

b No flow at times in many years.

05116000 SOURIS RIVER NEAR FOXHOLM, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED 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)
MAR												
19...	1400	192	1620	8.6	19.0	1.0	32	5.7	41	370	63	52
22...	1020	181	1700	--	4.0	2.0	--	--	--	--	--	--
28...	1500	185	1730	8.4	0.0	3.0	45	9.0	67	410	74	54
APR												
02...	0945	74	1840	--	11.0	7.5	--	--	--	--	--	--
03...	1200	25	1800	8.3	16.0	10.0	28	8.5	76	460	84	61
MAY												
02...	1120	0.05	1690	8.8	2.5	5.0	17	12.0	94	390	67	53
JUN												
11...	0915	0.04	1550	--	--	--	--	--	--	--	--	--
DATE		SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
MAR												
19...	230	56	5	23	462	350	72	0.40	7.4	1130	1080	1.54
28...	240	55	5	22	480	360	74	0.50	6.5	1200	1120	1.63
APR												
03...	260	53	5	25	527	390	81	0.40	9.2	1310	1230	1.78
MAY												
02...	230	55	5	22	483	350	75	0.40	2.3	1090	1090	1.48
DATE		SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, DIS-SOLVED (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00665)	PHOS-PHORUS ORTHO DIS-SOLVED (MG/L AS P) (70507)	PHOS-PHORUS ORTHO DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)
MAR												
19...	586	0.010	<0.010	<0.050	<0.050	0.320	0.330	1.20	0.950	0.860	--	--
28...	599	0.030	<0.010	<0.050	<0.050	0.340	0.360	0.990	0.890	0.860	<10	<10
APR												
03...	87.7	0.010	0.010	<0.050	<0.050	0.550	0.610	0.930	0.890	0.870	--	--
MAY												
02...	0.15	<0.010	<0.010	<0.050	<0.050	0.030	0.010	0.570	0.420	0.400	10	10
DATE		ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM, DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM, DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)
MAR												
19...	--	--	560	--	--	--	--	--	--	--	--	--
28...	17	97	590	<1.0	<1	<1	1	5	<1	68	120	120
APR												
03...	--	--	640	--	--	--	--	--	--	--	--	--
MAY												
02...	12	75	450	<1.0	<1	<1	<1	7	<1	66	31	31
DATE		MERCURY DIS-SOLVED (UG/L AS HG) (71890)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV-ERABLE (UG/L AS AG) (01077)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV-ERABLE (UG/L AS ZN) (01092)	ZINC, DIS-SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (UG/L AS CN) (00720)
MAR												
28...	<0.1	6	5	4	<1	<1	480	6	<10	7	<0.010	<0.010
MAY												
02...	<0.1	8	7	4	<1	<1	450	6	<10	4	<0.010	<0.010

RED RIVER OF THE NORTH BASIN

149

05116150 DES LACS RIVER NEAR KENMARE, ND

LOCATION.--Lat 48°35'23", long 101°59'49", in NE¹/₄, NE¹/₄, NE¹/₄, sec.23, T.159 N., R.88 W., Ward County, Hydrologic Unit 09010001, on right bank 500 ft upstream from crossing on U.S. Highway 52, 150 ft downstream from U.S. Fish and Wildlife Service Dam No. 8, 6.5 mi southeast of Kenmare.

DRAINAGE AREA.--687 mi², approximately, of which 354 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,777 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair. Flow slightly regulated by small upstream reservoirs.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY 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
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	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
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	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1991, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MEAN	.041	.026	.005	.000	.000	.44	1.75	2.94	2.40	1.90	.12	.029
MAX	.13	.080	.015	.000	.002	1.73	6.91	11.6	9.57	7.58	.50	.12
(WY)	1990	1990	1990	1988	1988	1989	1989	1989	1989	1989	1989	1989
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1989	1989	1989	1988	1989	1991	1991	1991	1990	1990	1988	1988

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1988 - 1991

ANNUAL TOTAL	3.36		
ANNUAL MEAN	.009		
HIGHEST ANNUAL MEAN		.81	
LOWEST ANNUAL MEAN		3.18	1989
HIGHEST DAILY MEAN	.40 Apr 2	.000	1991
LOWEST DAILY MEAN	.00 Jan 1	.00	Jul 12 1989
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00	Dec 15 1987
INSTANTANEOUS PEAK FLOW		.00	Dec 15 1987
INSTANTANEOUS PEAK STAGE		31	Jul 12 1989
ANNUAL RUNOFF (AC-FT)	6.7	3.85	Jul 12 1989
10 PERCENT EXCEEDS	.00	585	
50 PERCENT EXCEEDS	.00	.30	
90 PERCENT EXCEEDS	.00	.00	

RED RIVER OF THE NORTH BASIN

05116500 DES LACS RIVER AT FOXHOLM, ND

LOCATION.--Lat 48°22'14", long 101°34'11", in NW¹/₄NE¹/₄NW¹/₄ sec 2, T.156 N., R.85 W., Ward County, Hydrologic Unit 09010002, on left bank 200 ft upstream from county highway bridge in Foxholm, and at mile 23.0.

DRAINAGE AREA.--939 mi², of which about 400 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1904 to July 1906, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,632.98 ft above National Geodetic Vertical Datum of 1929. June 14 to Oct. 23, 1955, nonrecording gage at site 200 ft downstream from present gage at same datum. See WSP 1728 or 1913 for history of changes prior to June 14, 1955.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	.21	.26	e.00	e.00	e.00	2.2	e1.4	.70	.94	.04	.00
2	.07	e.20	.18	e.00	e.01	e.00	2.2	e1.6	.66	1.0	.03	.00
3	.07	e.20	.19	e.00	e.05	e.00	e2.1	e1.4	.75	.89	.07	.00
4	.07	e.25	.19	e.00	e.05	e.00	e2.0	e1.6	.85	.78	.08	.00
5	.07	e.30	.22	e.00	e.00	e.00	e1.9	e1.8	1.3	.76	.20	.00
6	.07	e.30	.25	e.00	e.00	e.00	e1.9	e1.7	1.3	.66	.37	.00
7	.07	e.25	.25	e.00	e.01	e.00	e1.9	e1.5	1.2	.73	.46	.00
8	.07	e.25	.29	e.00	e.03	e.00	e1.8	e1.1	1.1	.60	.44	.00
9	.10	e.25	.28	e.00	e.04	e.00	e1.8	e.70	1.3	.52	.42	.00
10	.13	e.20	.31	e.00	e.02	e.00	e1.8	e.90	.59	.39	.29	.00
11	.12	e.20	e.30	e.00	e.00	e.00	e2.5	e1.1	.27	.47	.22	.00
12	.12	e.20	e.27	e.00	e.00	e.01	1.8	e1.1	.22	.45	.19	.00
13	.12	e.25	e.24	e.00	e.00	e.01	2.0	e1.3	.19	.40	.14	.00
14	.14	e.40	e.21	e.00	e.00	e.03	2.3	e1.5	.15	.33	.10	.00
15	.14	e.50	e.19	e.00	e.00	e.05	2.5	e1.4	.19	.27	.06	.00
16	.13	.30	e.19	e.00	e.00	e.10	e2.3	e.90	.21	.25	.05	.00
17	.12	.25	e.14	e.00	e.00	e.15	e2.1	.71	.17	.29	.06	.00
18	.12	.23	e.10	e.00	e.00	e.20	e1.9	.69	.11	.33	.06	.00
19	.13	.23	e.07	e.00	e.00	e.50	e1.7	.64	.08	.27	.06	.00
20	e.12	.23	e.04	e.00	e.00	e.70	e1.5	.64	.11	.20	.06	.00
21	e.12	.28	e.00	e.00	e.00	e1.0	e2.0	1.3	.21	.18	.05	.00
22	e.12	.29	e.00	e.00	e.00	1.2	e1.8	1.2	.19	.18	.03	.00
23	e.24	.29	e.00	e.00	e.00	3.3	e1.6	.89	.14	.15	.01	.00
24	.41	.32	e.00	e.00	e.00	3.3	e1.4	.71	.13	.11	.00	.01
25	.22	.27	e.00	e.00	e.00	3.2	e1.9	.55	.14	.07	.00	.03
26	.23	.27	e.00	e.00	e.00	2.5	1.2	.47	.18	.06	.00	.06
27	.42	.28	e.00	e.00	e.00	2.7	1.5	.46	.18	.07	.00	.07
28	.49	.20	e.00	e.00	e.00	2.8	e1.8	.41	.15	.08	.00	.07
29	.32	.16	e.00	e.00	---	2.3	e1.7	.45	.14	.09	.00	.07
30	.22	.23	e.00	e.00	---	2.3	e1.5	.39	.36	.09	.00	.09
31	.21	---	e.00	e.00	---	2.2	---	.51	---	.06	.00	---
TOTAL	5.05	7.79	4.17	0.00	0.21	28.55	56.6	31.02	13.27	11.67	3.49	0.40
MEAN	.16	.26	.13	.000	.007	.92	1.89	1.00	.44	.38	.11	.013
MAX	.49	.50	.31	.00	.05	3.3	2.5	1.8	1.3	1.0	.46	.09
MIN	.07	.16	.00	.00	.00	.00	1.2	.39	.08	.06	.00	.00
AC-FT	10	15	8.3	.00	.4	57	112	62	26	23	6.9	.8

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1904 - 1991, BY WATER YEAR (WY)

	9.90	5.85	2.48	1.12	4.21	41.9	122	62.3	39.3	20.1	12.5	11.6
MEAN	9.90	5.85	2.48	1.12	4.21	41.9	122	62.3	39.3	20.1	12.5	11.6
MAX	83.5	50.7	15.2	8.10	76.1	362	730	399	228	111	108	97.9
(WY)	1976	1976	1976	1951	1981	1976	1976	1975	1975	1975	1972	1975
MIN	.021	.040	.000	.000	.000	.10	1.77	.60	.020	.000	.000	.000
(WY)	1989	1962	1959	1946	1946	1948	1963	1959	1961	1961	1961	1958

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1904 - 1991

ANNUAL TOTAL	508.92	162.22	27.8
ANNUAL MEAN	1.39	.44	148
HIGHEST ANNUAL MEAN			1976
LOWEST ANNUAL MEAN			1991
HIGHEST DAILY MEAN	84	Jul 3	3200
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW		4.7	4260
INSTANTANEOUS PEAK STAGE		a5.28	b21.23
ANNUAL RUNOFF (AC-FT)	1010	322	20110
10 PERCENT EXCEEDS	1.9	1.6	58
50 PERCENT EXCEEDS	.27	.15	2.5
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

a Backwater from debris.

b From high-water mark.

RED RIVER OF THE NORTH BASIN

151

05116500 DES LACS RIVER AT FOXHOLM, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-51, 1969-70, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	HARD-NESS TOTAL (MG/L CAC03) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)
NOV 15...	1600	0.40	1920	8.4	10.5	5.0	27	12.8	103	530	87	76
MAR 22...	1130	0.64	1110	--	9.0	1.0	--	--	--	--	--	--
APR 02...	1410	1.9	1270	8.7	23.0	2.5	25	16.1	119	280	49	37
11...	0930	1.8	1420	--	7.0	6.5	--	--	--	--	--	--
MAY 02...	1150	1.3	1550	8.7	2.5	4.5	26	11.4	88	340	65	44
JUN 11...	1400	0.24	1710	8.8	29.0	23.0	50	7.5	89	330	57	46
JUL 25...	1000	0.08	1800	9.2	22.5	20.5	65	2.2	24	330	53	49
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 CAC03) (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)	SOLIDS, SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C SOLVED (MG/L) (70300)	SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
NOV 15...	250	50	5	12	601	510	34	<0.10	3.1	1310	1330	1.78
APR 02...	180	58	5	7.5	300	360	27	0.30	6.0	842	847	1.15
MAY 02...	250	61	6	8.4	415	400	30	0.30	3.1	1010	1050	1.37
JUN 11...	270	63	6	9.2	518	430	37	0.50	2.9	1210	1170	1.65
JUL 25...	320	66	8	14	556	470	42	0.40	1.1	1280	1290	1.74
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, 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)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	
NOV 15...	1.41	<0.010	<0.010	<0.100	<0.100	0.050	0.050	0.240	0.160	0.120	--	
APR 02...	4.41	0.020	<0.010	<0.050	<0.050	0.010	<0.010	0.050	0.010	<0.010	10	
MAY 02...	3.68	<0.010	<0.010	<0.050	<0.050	0.020	<0.010	0.530	0.400	0.360	--	
JUN 11...	0.78	<0.010	<0.010	<0.050	<0.050	0.020	0.010	1.70	1.20	1.20	20	
JUL 25...	0.28	0.010	<0.010	<0.050	<0.050	<0.010	<0.010	1.20	1.10	1.00	--	
DATE	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	BORON, DIS-SOLVED (UG/L AS B) (01020)	CADMIUM DIS-SOLVED (UG/L AS CD) (01025)	CHRO-MIUM, DIS-SOLVED (UG/L AS CR) (01030)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	COPPER, DIS-SOLVED (UG/L AS CU) (01040)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LEAD, DIS-SOLVED (UG/L AS PB) (01049)	LITHIUM DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	
NOV 15...	--	--	150	--	--	--	--	--	--	--	--	
APR 02...	2	31	100	<1.0	<1	<1	1	10	<1	48	96	
MAY 02...	--	--	70	--	--	--	--	--	--	--	--	
JUN 11...	19	35	160	<1.0	1	1	1	11	<1	67	41	
JUL 25...	--	--	150	--	--	--	--	--	--	--	--	

RED RIVER OF THE NORTH BASIN

05116500 DES LACS RIVER AT FOXHOLM, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
APR 02...	<0.1	1	2	2	<1	<1	260	3	<10	<3	<0.010
JUN 11...	<0.1	1	9	3	<1	<1	350	9	<10	<3	<0.010

LOCATION.--Lat 48°14'45", long 101°22'15", in NW1/4,NW1/4,SE1/4, sec.17, T.155 N., R.83 W., Ward County, Hydrologic Unit 09010001, on right bank 180 ft downstream from county highway bridge, 3.5 mi west of Minot, 7 mi downstream from Des Lacs River, and at mile 388.5.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to current year. Monthly discharge only for some periods, published in WSP 1308. Published as Mouse River at Minot, 1903-24, Souris River at Minot, 1927-28, 1929-34, and Souris River near Minot. 1928-29.

REVISED RECORDS.--WSP 1308: 1905, 1909-14, 1918, 1924-25, 1927. WSP 1338: 1903-4, 1906, 1917, 1928, 1929(M).
WSP 2113: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,545.75 ft above National Geodetic Vertical Datum of 1929. May 5, 1903, to Sept. 30, 1928; Oct. 1, 1929, to Sept. 30, 1934; nonrecording gages at mile 377.6 in Minot, at datum 12.5 ft lower, Oct. 1, 1928, to Sept. 30, 1929, nonrecording gages at Saugstad bridge at mile 366.8, 5 mi southeast of Minot and at datum 19.2 ft lower than present datum. Records equivalent except those for periods of extreme low flow, as some industrial and sanitary waste enters river between the between the sites.

REMARKS.--Records good except those for period of estimated daily discharges, which are fair. Flow almost completely regulated by Lake Darling (station 05115500), 41 mi upstream and several smaller reservoirs; combined capacity, about 248,000 acre-ft. Some small diversions for irrigation and municipal supply.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage in Minot at least 3 ft higher than 1904 peak, in 1881, according to Apr. 20, 1904, issue of Minot Daily Optic. This peak probably occurred in 1882.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e1.5	e.10	e.10	e.10	159	.40	.89	.00	.00	.00
2	.00	.00	e1.2	e.12	e.12	e.08	147	.34	.50	.00	.00	.00
3	.00	.00	e1.1	e.12	e.14	e.08	86	.83	.30	.00	.00	.00
4	.00	.00	e1.0	e.12	e.16	e.09	27	1.5	1.3	.00	.00	.00
5	.00	.00	e1.1	e.14	e.16	e.10	14	1.4	1.3	.00	.00	.00
6	.00	.00	e1.1	e.12	e.16	e.10	13	1.2	1.3	.00	.00	.00
7	.00	.00	e1.2	e.12	e.15	e.10	11	1.0	1.4	.00	.00	.00
8	.00	.00	e1.3	e.10	e.14	e.11	9.7	.90	1.9	.00	.00	.00
9	.00	.00	e1.4	e.10	e.14	e.12	8.9	.33	1.9	.00	.00	.00
10	.00	.00	e1.5	e.10	e.12	e.12	9.9	.03	.87	.00	.00	.00
11	.00	.00	e1.4	e.10	e.12	e.12	11	.15	.11	.00	.00	.00
12	.00	.00	e1.4	e.12	e.12	e.14	9.0	.88	.00	.00	.00	.00
13	.00	.00	e1.3	e.12	e.12	e.14	9.9	1.6	.00	.00	.00	.00
14	.00	.13	e1.3	e.14	e.10	e.14	8.8	1.1	.00	.00	.00	.00
15	.00	.97	e1.3	e.14	e.08	e1.0	7.5	.88	.00	.00	.00	.00
16	.00	1.3	e1.3	e.12	e.10	e20	9.2	.52	.00	.00	.00	.00
17	.00	1.5	e1.3	e.12	e.10	e50	10	.20	.00	.00	.00	.00
18	.00	1.5	e1.2	e.12	e.12	e80	9.3	.07	.00	.00	.00	.00
19	.00	1.5	e1.1	e.14	e.12	e120	6.9	.00	.00	.00	.00	.00
20	.00	1.5	e1.0	e.12	e.14	223	4.3	.00	.00	.00	.00	.00
21	.00	1.8	e.90	e.12	e.14	288	3.3	.00	.00	.00	.00	.00
22	.00	1.9	e.80	e.12	e.14	285	2.9	.00	.00	.00	.00	.00
23	.00	1.7	e.70	e.10	e.12	265	1.9	.00	.00	.00	.00	.00
24	.00	1.6	e.70	e.10	e.12	242	.90	.00	.00	.00	.00	.00
25	.00	1.5	e.60	e.09	e.12	204	.13	.00	.00	.00	.00	.00
26	.00	1.5	e.50	e.09	e.10	171	.11	.00	.00	.00	.00	.00
27	.00	e1.4	e.40	e.08	e.10	170	1.1	.00	.00	.00	.00	.00
28	.00	e1.3	e.40	e.08	e.10	170	1.1	.00	.00	.00	.00	.00
29	.00	e1.2	e.30	e.08	---	167	.76	.00	.00	.00	.00	.00
30	.00	e1.4	e.20	e.07	---	166	.69	.00	.00	.00	.00	.00
31	.00	---	e.10	e.08	---	165	---	.90	---	.00	.00	---
TOTAL	0.00	23.70	30.60	3.39	3.45	2788.54	584.29	14.23	11.77	0.00	0.00	0.00
MEAN	.0000	.79	.99	.11	.12	90.0	19.5	.46	.39	.0000	.0000	.0000
MAX	.00	1.9	1.5	.14	.16	288	159	1.6	1.9	.00	.00	.00
MIN	.00	.00	.10	.07	.08	.08	.11	.00	.00	.00	.00	.00
AC-FT	.00	47	61	6.7	6.8	5530	1160	28	23	.00	.00	.00

MEAN	32.1	29.1	23.2	20.6	25.0	111	652	575	208	125	61.1	44.8
MAX	266	159	164	170	265	1272	6209	4916	1402	1393	435	748
(WY)	1904	1952	1976	1976	1976	1976	1976	1904	1975	1953	1976	1903
MIN	.000	.000	.000	.000	.000	.000	1.27	.41	.000	.000	.000	.000
(WY)	1935	1935	1935	1935	1935	1936	1937	1938	1938	1937	1937	1935

ANNUAL TOTAL	7811.93		3459.97				
ANNUAL MEAN	21.4		9.48			158	
HIGHEST ANNUAL MEAN						1105	1976
LOWEST ANNUAL MEAN						1.30	1931
HIGHEST DAILY MEAN	266	Apr 25	288	Mar 21		11400	Apr 22 1904
LOWEST DAILY MEAN	.00	Jan 31	.00	Oct 1		.00	Sep 26 1917
ANNUAL SEVEN-DAY MINIMUM	.00	Feb 16	.00	Oct 1		.00	Sep 26 1917
INSTANTANEOUS PEAK FLOW			295	Mar 21		a12000	Apr 20 1904
INSTANTANEOUS PEAK STAGE			5.83	Mar 21		a,b21.90	Apr 20 1904
ANNUAL RUNOFF (AC-FT)	15490		6860			114700	
10 PERCENT EXCEEDS	68		3.7			303	
50 PERCENT EXCEEDS	1.1		.10			23	
90 PERCENT EXCEEDS	.00		.00			.28	

a At site in Minot, from rating curve extended above 8.100 ft³/s.

b Maximum stage at present site, about 23 ft in April 1904.

RED RIVER OF THE NORTH BASIN
05117500 SOURIS RIVER ABOVE MINOT, ND--CONTINUED
WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
FEB												
28...	0845	0.10	2070	--	0.0	1.0	--	--	--	--	--	--
MAR												
19...	1720	123	890	--	18.0	0.5	--	--	--	--	--	--
28...	1200	172	1740	8.3	-1.0	1.5	420	72	58	240	54	5
APR												
03...	1035	94	1770	--	16.0	7.5	--	--	--	--	--	--
11...	0830	11	1810	--	5.5	10.0	--	--	--	--	--	--
MAY												
02...	0900	0.20	1830	--	2.5	5.5	--	--	--	--	--	--
JUN												
11...	0800	0.14	1690	--	22.5	19.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
28...	23	590	0	480	400	75	0.30	8.3	1210	1170	1.65	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
28...	562	14	530	10	<1	70	40	<0.1	6	<1	550	

05120000 SOURIS (MOUSE) RIVER NEAR VERENDRYE, ND

LOCATION.--Lat 48°09'35", long 100°43'45", in NW¹/₄, SW¹/₄, sec.17, T.154 N., R.78 W., McHenry County, Hydrologic Unit 09010003, on left bank 2.7 mi north of Verendrye, 19 mi upstream from mouth of Wintering River and at mile 302.0.

DRAINAGE AREA.--11,300 mi², approximately, of which about 6,900 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February to June 1933 (gage heights only), April 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,464.87 ft above National Geodetic Vertical Datum of 1929.

February to June 1933, at site 4 mi upstream at datum 1.65 ft higher. April 1, 1937, to Mar. 3, 1938, non-recording gage at present site, at datum 1.97 ft higher.

REMARKS.--Records good except those for period of estimated daily discharges, which are fair. Flow regulated by reservoirs on Souris and Des Lacs Rivers, the largest of which is Lake Darling (station 05115500), 128 mi upstream, combined capacity about 248,000 acre-ft. Some small diversions for irrigation and municipal supply.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.8	14	2.8	e1.5	e1.1	2.8	201	25	5.2	17	3.7	7.2
2	3.4	14	e2.7	e1.5	e1.1	2.8	223	27	4.4	13	4.2	7.2
3	4.4	14	e2.7	e1.5	e1.0	2.9	188	23	3.9	9.9	6.1	6.7
4	3.7	14	e2.6	e1.5	e1.3	2.7	160	22	3.5	10	6.2	6.4
5	4.5	13	e2.7	e1.5	e1.6	3.0	152	22	3.2	19	15	5.4
6	4.5	11	e2.8	e1.5	e1.8	2.9	108	21	11	27	22	4.4
7	4.1	8.3	e2.8	e1.6	e1.9	2.6	72	18	15	28	66	4.5
8	5.0	7.8	e2.9	e1.6	e2.0	2.9	47	25	29	23	171	5.6
9	5.4	7.2	e3.1	e1.6	e2.5	2.8	33	29	27	22	141	6.5
10	6.0	7.7	e3.3	e1.6	e3.0	3.1	26	28	28	17	99	6.0
11	9.5	7.5	e3.3	e1.5	e2.9	3.6	22	22	38	14	66	5.8
12	14	7.3	e3.3	e1.4	e2.8	3.8	18	18	39	13	44	5.3
13	11	7.0	e3.2	e1.4	e2.6	3.8	17	18	36	13	31	5.0
14	12	6.7	e3.1	e1.3	e2.5	3.9	17	20	36	16	21	6.9
15	15	7.2	e3.1	e1.3	e2.5	4.1	17	41	38	14	14	8.1
16	16	7.2	e3.2	e1.3	2.4	4.8	16	89	44	11	11	8.8
17	16	7.2	e3.2	e1.2	2.5	5.5	15	65	52	8.5	8.3	9.1
18	16	6.6	e3.1	e1.2	2.5	7.1	16	41	48	6.9	8.5	12
19	16	6.6	e3.1	e1.3	2.6	8.4	18	29	34	5.8	4.6	12
20	13	6.6	e3.0	e1.4	4.5	9.2	17	23	23	5.3	3.5	11
21	20	6.6	e2.8	e1.4	5.4	9.2	14	21	17	4.9	3.9	7.5
22	14	5.9	e2.6	e1.3	3.7	11	12	27	11	4.9	5.4	7.8
23	9.6	4.9	e2.4	e1.3	3.3	13	14	35	9.2	4.8	6.8	6.3
24	8.6	4.3	e2.3	e1.2	3.0	91	15	32	8.6	5.5	7.2	5.7
25	8.2	4.2	e2.2	e1.2	2.9	203	12	31	6.7	5.4	6.9	4.2
26	19	4.0	e2.0	e1.2	2.8	242	12	29	6.1	4.7	7.1	3.6
27	20	3.7	e2.0	e1.2	2.8	234	29	21	6.7	3.9	9.7	3.1
28	13	3.3	e2.0	e1.2	2.8	195	36	12	7.5	4.2	8.7	3.1
29	11	2.9	e1.9	e1.1	---	213	28	7.5	9.2	4.2	9.1	3.9
30	11	2.8	e1.7	e1.1	---	221	23	5.5	11	4.1	8.5	4.6
31	13	---	e1.5	e1.1	---	221	---	6.8	---	3.8	8.2	---
TOTAL	329.7	223.5	83.4	42.0	71.8	1735.9	1578	833.8	611.2	343.8	827.6	193.7
MEAN	10.6	7.45	2.69	1.35	2.56	56.0	52.6	26.9	20.4	11.1	26.7	6.46
MAX	20	14	3.3	1.6	5.4	242	223	89	52	28	171	12
MIN	2.8	2.8	1.5	1.1	1.0	2.6	12	5.5	3.2	3.8	3.5	3.1
AC-FT	654	443	165	83	142	3440	3130	1650	1210	682	1640	384

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1991, BY WATER YEAR (WY)

MEAN	48.5	45.4	35.1	32.0	46.1	185	654	697	275	166	84.8	54.5
MAX	199	169	160	171	277	1209	6280	4918	2122	1599	512	208
(WY)	1976	1976	1976	1976	1976	1976	1976	1975	1975	1953	1976	1955
MIN	1.50	1.00	1.00	.50	.50	2.25	11.7	6.80	2.33	.67	.42	.10
(WY)	1938	1938	1938	1938	1938	1940	1937	1938	1938	1937	1937	1937

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1937 - 1991

ANNUAL TOTAL	14211.7	6874.4	197
ANNUAL MEAN	38.9	18.8	1185
HIGHEST ANNUAL MEAN			18.8
LOWEST ANNUAL MEAN			9700
HIGHEST DAILY MEAN	892	Jul 5	242
LOWEST DAILY MEAN	1.3	Jan 18	1.0
ANNUAL SEVEN-DAY MINIMUM	1.3	Jan 16	1.1
INSTANTANEOUS PEAK FLOW			262
INSTANTANEOUS PEAK STAGE			5.00
ANNUAL RUNOFF (AC-FT)	28190	13640	17.84
10 PERCENT EXCEEDS	101	34	400
50 PERCENT EXCEEDS	7.5	6.9	38
90 PERCENT EXCEEDS	1.6	1.6	3.5

e Estimated.

RED RIVER OF THE NORTH BASIN
05120000 SOURIS RIVER NEAR VERENDRYE, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-51, 1957 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	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 13...	1415	6.8	2150	8.0	13.0	2.5	25	8.8	--	440	90	53
JAN 07...	1410	1.6	2150	--	-15.5	0.0	--	--	--	--	--	--
FEB 20...	1235	4.0	1840	7.5	10.0	1.5	20	5.3	39	520	120	53
MAR 21...	1420	9.2	1460	--	12.0	3.0	--	--	--	--	--	--
APR 01...	1845	200	1540	8.7	15.5	1.5	32	16.7	120	360	66	48
10...	0910	26	1680	8.6	9.0	9.0	28	8.3	72	420	80	53
MAY 01...	1720	29	1530	8.4	4.5	6.5	17	10.7	87	410	84	49
JUN 10...	1645	29	1550	8.3	27.0	24.0	28	7.1	84	370	72	45
JUL 25...	1645	5.2	1600	8.3	26.5	24.5	25	8.5	101	360	75	43
SEP 06...	0850	4.3	1770	8.3	16.0	17.0	27	6.5	67	360	71	44
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, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
NOV 13...	320	60	7	14	434	590	130	0.40	8.7	1450	1470	1.97
FEB 20...	220	47	4	10	390	520	66	0.30	21	1240	1250	1.69
APR 01...	210	54	5	21	423	340	68	0.40	6.6	1030	1020	1.40
10...	230	53	5	19	468	370	67	0.40	2.0	1190	1100	1.62
MAY 01...	200	50	4	13	415	370	58	0.30	5.8	990	1030	1.35
JUN 10...	210	54	5	14	431	360	75	0.50	12	1060	1050	1.44
JUL 25...	230	57	5	12	393	410	86	0.30	9.9	1100	1100	1.50
SEP 06...	260	60	6	16	404	410	120	0.50	7.4	1160	1170	1.58
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	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)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)
NOV 13...	26.6	--	0.020	<0.010	<0.100	<0.100	0.190	0.160	0.260	0.190	0.120	--
FEB 20...	13.5	0.110	0.010	0.010	0.160	0.120	0.590	0.600	0.200	0.120	0.070	<10
APR 01...	556	--	0.020	<0.010	<0.050	<0.050	0.040	0.010	0.660	0.400	0.330	<10
10...	82.3	--	<0.010	<0.010	<0.050	<0.050	0.030	0.020	0.350	0.210	0.230	--
MAY 01...	76.2	--	<0.010	<0.010	<0.050	<0.050	<0.010	0.010	0.320	0.220	0.180	--
JUN 10...	81.6	--	<0.010	<0.010	<0.050	<0.050	0.050	0.050	1.50	1.10	1.10	10
JUL 25...	15.4	--	0.020	<0.010	<0.050	<0.050	<0.010	<0.010	0.730	0.600	0.590	--
SEP 06...	13.6	--	<0.010	<0.010	<0.050	<0.050	0.010	0.030	0.390	0.270	0.280	--

RED RIVER OF THE NORTH BASIN

05120000 SOURIS RIVER NEAR VERENDRYE, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
NOV 13...	--	--	420	--	--	--	--	--	--	--	--
FEB 20...	2	81	380	1.0	<1	<1	<1	14	<1	85	1000
APR 01...	10	70	480	<1.0	<1	<1	<1	9	<1	60	21
10...	--	--	510	--	--	--	--	--	--	--	--
MAY 01...	--	--	250	--	--	--	--	--	--	--	--
JUN 10...	17	31	430	<1.0	20	<1	1	13	<1	68	150
JUL 25...	--	--	350	--	--	--	--	--	--	--	--
SEP 06...	--	--	410	--	--	--	--	--	--	--	--
DATE	MOLYB- MERCURY DIS- SOLVED (UG/L AS HG) (71890)	NICKEL, DENUM, DIS- SOLVED (UG/L AS MO) (01060)	TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	SELE- NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SILVER, NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	VANA- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	ZINC, DIUM, DIS- SOLVED (UG/L AS V) (01085)	TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
FEB 20...	0.1	4	3	2	<1	<1	670	3	10	7	<0.010
APR 01...	<0.1	5	3	4	<1	<1	420	4	<10	<5	<0.010
JUN 10...	<0.1	2	4	4	<1	<1	420	8	<10	4	<0.010

RED RIVER OF THE NORTH BASIN

05120500 WINTERING RIVER NEAR KARLSRUHE, ND

LOCATION.--Lat 48°10'14", long 100°32'20", on line between secs.10 and 11, T.154 N., R.77 W., McHenry County, Hydrologic Unit 09010003, on left bank 30 ft upstream from county highway bridge, 4 mi upstream from mouth, and 7 mi northeast of Karlsruhe.

DRAINAGE AREA.--705 mi², of which about 420 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Altitude of gage is 1,480 ft, from river-profile map.

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor. Some regulation by Fish and Wildlife Service dams on Cottonwood and Wintering Lakes, controlled capacity, about 850 acre-ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.07	1.0	.91	.00	.00	e.72	e4.1	6.1	e4.5	e4.0	e.04	.00
2	.08	.97	.83	.00	.00	e.70	e4.5	5.0	e4.3	e3.0	e.03	.00
3	.11	.93	.72	.00	e.01	e.70	e4.3	5.6	e4.0	e2.8	e.01	.00
4	.10	.98	e.65	.00	e.10	e.75	e4.0	6.7	e3.7	e1.9	e.00	.00
5	.11	1.0	e.68	.00	e.50	e.75	e3.8	e7.0	e3.4	e1.8	e.00	.00
6	.12	1.0	e.68	.00	e.70	e.75	4.4	e6.9	e3.1	e1.6	e.00	.00
7	.12	1.0	e.68	.00	e.80	e.75	3.4	e6.8	e2.7	e1.7	e.00	.00
8	.13	1.1	e.70	.00	e.85	e.70	3.6	e6.7	e2.6	e1.5	e.10	.00
9	.14	1.2	e.80	.00	e.90	e.75	4.4	e6.6	e3.0	e1.3	e.20	.00
10	.20	1.2	e.90	.00	e.85	e.80	3.4	e6.5	e2.2	e1.0	e.25	.00
11	.21	1.2	e.85	.00	e.80	e1.0	2.5	e6.4	e1.7	e.40	e.30	.00
12	.19	1.1	e.85	.00	e.70	e1.5	2.3	e6.3	e1.6	e.06	e.50	.00
13	.14	1.2	e.80	.00	e.60	e2.0	2.3	e6.3	e1.3	e.05	e.50	.00
14	.13	1.2	e.70	.00	e.50	e1.9	2.5	e6.2	e1.3	e.04	e.50	.00
15	.15	1.3	e.65	.00	e.45	e1.8	3.1	e6.1	e2.0	e.03	e.50	.00
16	.19	1.3	e.65	.00	e.50	e1.8	2.9	e6.0	e1.5	e.03	e.50	.00
17	.27	1.3	e.60	.00	e.55	e1.9	3.0	e5.9	e1.1	e.03	e.50	.00
18	.24	1.3	e.50	.00	e.60	e1.9	3.0	e5.8	e1.1	e.03	e.45	.00
19	.27	1.3	e.40	.00	e.70	e1.9	3.1	e5.8	e1.0	e.03	e.40	.00
20	.32	1.3	e.30	.00	e.80	e2.0	2.6	e5.7	e1.1	e.03	e.35	.00
21	.34	1.4	e.20	.00	e.90	e2.0	2.4	e5.6	e1.3	e.02	e.30	.00
22	.38	1.3	e.10	.00	e.85	e2.1	2.2	e5.4	e1.0	e.02	e.25	.10
23	.37	1.3	e.05	.00	e.80	e2.1	2.5	e5.3	e.80	e.03	e.25	.20
24	.33	1.2	e.05	.00	e.80	e2.2	2.2	e5.2	e.90	e.05	e.25	.30
25	.40	1.2	e.04	.00	e.78	e2.2	2.1	e5.2	e.80	e.06	e.25	.35
26	.54	1.2	e.02	.00	e.76	e2.0	2.6	e5.2	e.70	e.05	e.20	.35
27	.57	1.1	.00	.00	e.75	e1.7	9.2	e5.0	e.60	e.05	e.15	.50
28	.69	.92	.00	.00	e.75	e1.5	11	e4.9	e.50	e.06	e.10	.40
29	.76	.88	.00	.00	---	e1.4	8.8	e4.7	e.60	e.03	e.10	.35
30	.78	.91	.00	.00	---	e1.5	7.3	e4.4	e2.8	e.03	e.10	.40
31	.85	---	.00	.00	---	e3.0	---	e4.5	---	e.03	.00	---
TOTAL	9.30	34.29	14.31	0.00	17.30	46.77	117.5	179.8	57.20	21.76	7.08	2.95
MEAN	.30	1.14	.46	.000	.62	1.51	3.92	5.80	1.91	.70	.23	.098
MAX	.85	1.4	.91	.00	.90	3.0	11	7.0	4.5	4.0	.50	.50
MIN	.07	.88	.00	.00	.00	.70	2.1	4.4	.50	.02	.00	.00
AC-FT	18	68	28	.00	34	93	233	357	113	43	14	5.9

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1991, BY WATER YEAR (WY)

	MEAN	4.35	3.86	1.96	.92	1.14	17.2	59.4	26.7	13.8	9.41	5.32	4.08
MAX	15.3	10.7	7.29	4.51	9.13	149	386	183	92.4	46.9	66.1	29.7	
(WY)	1983	1983	1983	1976	1981	1976	1949	1970	1954	1954	1965	1952	
MIN	.30	.50	.000	.000	.000	.000	3.45	2.06	.83	.23	.006	.067	
(WY)	1991	1938	1938	1938	1938	1938	1951	1990	1939	1961	1989	1989	1939

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1937 - 1991

ANNUAL TOTAL	862.08	508.26	
ANNUAL MEAN	2.36	1.39	12.5
HIGHEST ANNUAL MEAN			37.1
LOWEST ANNUAL MEAN			1.39
HIGHEST DAILY MEAN	37 Jun 2	11 Apr 28	2500 Apr 7 1949
LOWEST DAILY MEAN	.00 Jan 1	.00 Dec 27	.00 Mar 1 1937
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Dec 27	.00 Mar 1 1937
INSTANTANEOUS PEAK FLOW		13 Apr 27	a3000 Apr 7 1949
INSTANTANEOUS PEAK STAGE		5.70 Mar 9	b12.00 Apr 7 1949
ANNUAL RUNOFF (AC-FT)	1710	1010	9060
10 PERCENT EXCEEDS	6.0	4.4	24
50 PERCENT EXCEEDS	.85	.70	3.1
90 PERCENT EXCEEDS	.05	.00	.10

e Estimated.

a By velocity-area studies.

b Channel choked by packed snow.

RED RIVER OF THE NORTH BASIN
05120500 WINTERING RIVER NEAR KARLSRUHE, ND--CONTINUED

159

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1954-56, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED 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													
14...	1400	1.2	720	7.9	17.0	2.5	25	11.2	85	320	71	34	
FEB													
28...	1240	0.75	860	7.4	0.5	0.0	25	1.6	11	380	92	36	
MAR													
21...	1145	2.0	417	--	11.0	0.0	--	--	--	--	--	--	
APR													
01...	1500	4.1	523	8.0	18.0	5.5	25	10.5	83	220	55	20	
10...	1050	3.3	613	7.9	13.5	9.0	25	7.3	63	250	62	24	
MAY													
01...	1450	6.1	688	8.2	4.0	4.5	27	11.0	85	290	68	29	
JUN													
10...	1430	2.2	675	7.9	23.0	23.0	60	6.5	75	280	61	30	
JUL													
25...	1505	0.06	710	7.6	22.5	22.0	50	2.8	32	270	62	27	
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, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED PER AC-FT) (70303)
NOV													
14...	39	21	1	5.1	354	42	15	0.20	16	427	435	0.58	
FEB													
28...	52	23	1	6.9	411	69	13	0.20	25	483	542	0.66	
APR													
01...	32	24	0.9	4.3	239	38	9.9	0.20	13	306	316	0.42	
10...	38	24	1	5.2	285	50	11	0.10	12	365	373	0.50	
MAY													
01...	46	26	1	1.1	312	63	12	0.10	15	419	421	0.57	
JUN													
10...	44	25	1	3.4	341	38	9.1	0.20	11	415	402	0.56	
JUL													
25...	52	29	1	8.0	385	10	13	0.20	29	445	433	0.61	
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, 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)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	
NOV													
14...	1.40	0.010	<0.010	<0.100	<0.100	0.050	0.040	0.040	0.020	0.010	--		
FEB													
28...	0.98	<0.010	<0.010	<0.050	<0.050	0.040	0.050	0.030	<0.010	<0.010	<10		
APR													
01...	3.38	0.020	<0.010	<0.050	<0.050	0.020	0.010	0.350	0.130	0.080	<10		
10...	3.28	<0.010	<0.010	<0.050	<0.050	0.030	0.010	0.050	0.020	<0.010	--		
MAY													
01...	6.87	<0.010	<0.010	<0.050	<0.050	<0.010	<0.010	0.070	0.030	0.010	--		
JUN													
10...	2.41	<0.010	<0.010	<0.050	<0.050	0.020	0.020	0.130	0.080	0.050	<10		
JUL													
25...	0.07	0.010	<0.010	<0.050	<0.050	0.210	0.230	0.130	0.050	0.040	--		

RED RIVER OF THE NORTH BASIN

05120500 WINTERING RIVER NEAR KARLSRUHE, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BORON, DIS- SOLVED (UG/L AS B) (01020)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
NOV 14...	--	--	60	--	--	--	--	--	--	--	--
FEB 28...	<1	270	110	1.0	<1	<1	1	33	<1	22	240
APR 01...	<1	160	80	<1.0	<1	<1	<1	31	<1	14	69
10...	--	--	90	--	--	--	--	--	--	--	--
MAY 01...	--	--	70	--	--	--	--	--	--	--	--
JUN 10...	3	190	120	<1.0	<1	<1	1	52	1	21	41
JUL 25...	--	--	140	--	--	--	--	--	--	--	--
DATE	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV- ERABLE (UG/L AS NI) (01067)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	ZINC, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE TOTAL (MG/L AS CN) (00720)
FEB 28...	<0.1	2	2	1	<1	<1	220	2	20	11	<0.010
APR 01...	<0.1	<1	<1	1	<1	<1	130	2	<10	12	<0.010
JUN 10...	0.1	<1	1	1	<1	<1	170	4	<10	<3	<0.010

05122000 SOURIS (MOUSE) RIVER NEAR BANTRY, ND

LOCATION.--Lat 48°30'20", long 100°26'04", in SE¹/₄NW¹/₄SE¹/₄, sec.14, T.158 N., R.76 W., McHenry County, Hydrologic Unit 09010003, on left bank 200 ft upstream from Nelson bridge, 8 mi east of Bantry, 18 mi upstream from Willow Creek, and at mile 228.0.

DRAINAGE AREA.--12,300 mi² approximately, of which about 7,600 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1937 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 2113: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,427.56 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 16, 1938, nonrecording gage at same site at datum 0.17 ft lower.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow regulated by reservoirs on Souris, Des Lacs, and Wintering Rivers, total capacity, about 249,000 acre-ft. Diversions for irrigation of about 7,600 acres at Eaton Dam about 42 mi above station and other small diversions for irrigation and municipal supply.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e2.1	e8.0	e4.5	e1.8	e2.3	e2.2	152	5.7	42	26	5.1	16
2	e3.5	e10	e4.0	e1.8	e2.3	e2.2	150	6.0	37	23	4.5	14
3	e4.0	e11	e3.5	e1.8	e2.1	e2.2	140	5.5	32	19	4.6	12
4	e4.5	e12	e3.0	e2.0	e2.2	e2.2	144	6.9	24	15	4.6	9.4
5	e4.6	e13	e3.5	e2.5	e2.3	e2.3	e145	7.3	18	13	5.3	8.3
6	e5.0	e12	e4.0	e3.0	e2.3	e2.4	e145	7.1	14	14	7.5	6.7
7	e5.5	e11	e4.5	e3.2	e2.4	e4.0	e145	7.4	11	16	7.6	5.5
8	e5.0	e12	e5.0	e3.2	e2.4	e8.0	e140	7.7	8.9	20	7.3	4.5
9	e4.8	e13	e5.5	e3.2	e2.8	e5.0	e130	7.4	8.9	22	6.0	6.3
10	e4.8	e12	e6.0	e3.2	e3.5	e5.5	e120	8.1	7.9	23	5.2	7.2
11	e4.8	e12	e5.8	e3.0	e3.3	e7.0	88	15	6.7	25	4.4	4.1
12	e4.8	e14	e5.5	e2.8	e3.1	e10	51	28	8.1	26	4.1	2.5
13	e4.8	e16	e5.3	e2.8	e3.0	e9.0	30	27	9.5	27	23	1.6
14	e6.0	e19	e5.0	e2.6	e2.8	e6.0	18	30	11	28	123	1.3
15	e6.0	e16	e4.8	e2.6	e2.8	e4.0	9.2	31	13	28	167	1.6
16	e6.0	e14	e4.8	e2.6	e2.7	e4.0	3.8	31	14	27	178	3.0
17	e7.0	e13	e4.6	e2.5	e2.7	e4.5	2.7	26	17	26	172	4.3
18	e8.0	e12	e4.4	e2.5	e2.8	e5.0	2.5	21	18	25	157	4.3
19	e7.5	e9.8	e4.2	e2.6	e2.8	e5.8	2.3	16	19	25	142	4.0
20	e7.0	e9.6	e4.0	e2.7	e3.0	e6.5	2.5	57	22	24	127	2.3
21	e6.0	e8.4	e3.8	e2.6	e3.5	e6.2	2.6	156	26	22	113	2.4
22	e5.5	e8.0	e3.5	e2.6	e2.7	e5.8	2.7	169	26	20	98	4.9
23	e6.0	e7.5	e3.3	e2.5	e2.5	e5.5	2.7	147	28	17	85	5.9
24	e4.5	e7.0	e3.0	e2.4	e2.3	e5.0	3.0	123	30	16	72	6.6
25	e3.5	e7.0	e2.8	e2.4	e2.2	e5.5	3.0	98	30	13	62	8.2
26	e5.0	e6.5	e2.6	e2.4	e2.2	e5.4	3.9	78	28	12	53	9.3
27	e6.0	e6.0	e2.4	e2.4	e2.2	e5.4	7.0	66	25	10	44	11
28	e6.0	e5.5	e2.2	e2.4	e2.2	e10	8.4	58	21	9.7	37	11
29	e5.5	e5.0	e2.0	e2.3	---	e30	6.7	53	18	9.0	30	12
30	e5.0	e4.5	e1.8	e2.3	---	106	6.0	48	21	8.1	24	12
31	e5.0	---	e1.8	e2.3	---	132	---	47	---	6.5	20	---
TOTAL	163.7	314.8	121.1	79.0	73.4	414.6	1667.0	1394.1	595.0	595.3	1793.2	202.2
MEAN	5.28	10.5	3.91	2.55	2.62	13.4	55.6	45.0	19.8	19.2	57.8	6.74
MAX	8.0	19	6.0	3.2	3.5	132	152	169	42	28	178	16
MIN	2.1	4.5	1.8	1.8	2.1	2.2	2.3	5.5	6.7	6.5	4.1	1.3
AC-FT	325	624	240	157	146	822	3310	2770	1180	1180	3560	401

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1991, BY WATER YEAR (WY)

	MEAN	59.4	57.3	41.3	34.2	38.7	115	573	806	412	216	108	66.6
MAX	255	219	172	175	247	890	5666	5161	2821	1616	547	288	
(WY)	1976	1976	1976	1976	1976	1976	1976	1979	1975	1953	1953	1975	
MIN	.68	.50	1.00	.50	.000	.44	5.60	3.04	12.3	4.92	1.08	.010	
(WY)	1941	1941	1938	1938	1938	1937	1990	1937	1938	1988	1937	1939	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1937 - 1991

ANNUAL TOTAL	14453.65	7413.4	
ANNUAL MEAN	39.6	20.3	215
HIGHEST ANNUAL MEAN			1226
LOWEST ANNUAL MEAN			15.9
HIGHEST DAILY MEAN	448	Jul 12	9260
LOWEST DAILY MEAN	.70	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.75	Jan 1	.00
INSTANTANEOUS PEAK FLOW			179
INSTANTANEOUS PEAK STAGE			4.53
ANNUAL RUNOFF (AC-FT)	28670	14700	155500
10 PERCENT EXCEEDS	127	52	487
50 PERCENT EXCEEDS	6.0	6.3	50
90 PERCENT EXCEEDS	2.0	2.4	5.0

e Estimated.

RED RIVER OF THE NORTH BASIN
05122000 SOURIS RIVER NEAR BANTRY, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV												
14...	1150	18	1450	--	--	--	--	--	--	--	--	--
JAN												
07...	1745	3.3	1750	--	-15.0	0.0	--	--	--	--	--	--
FEB												
22...	1255	2.7	1940	--	-9.5	0.5	--	--	--	--	--	--
MAR												
20...	1645	6.5	1660	--	14.0	1.0	--	--	--	--	--	--
APR												
04...	1500	145	1350	8.5	21.5	4.5	360	78	41	160	48	4
10...	1440	117	1350	--	17.5	10.0	--	--	--	--	--	--
24...	1640	2.7	1340	--	26.0	15.5	--	--	--	--	--	--
MAY												
01...	1055	5.4	1230	--	1.5	5.5	--	--	--	--	--	--
JUN												
03...	1500	32	--	--	27.0	25.5	--	--	--	--	--	--
JUL												
a26...	1320	12	1320	8.9	25.5	23.5	350	64	47	180	51	4
AUG												
13...	1300	20	1320	--	30.0	25.0	--	--	--	--	--	--
SEP												
05...	1700	8.0	1650	--	17.0	20.0	--	--	--	--	--	--

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR											
04...	9.4	360	0	290	390	42	0.10	7.1	913	904	1.24
JUL											
a26...	13	390	35	380	300	56	0.30	0.70	936	889	1.27
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR											
04...	357	2	160	10	<1	60	70	0.2	3	<1	450
JUL											
a26...	29.3	6	290	20	<1	70	20	0.2	2	<1	470

a Replicate sample also collected for quality-assurance purposes.

RED RIVER OF THE NORTH BASIN

163

05123400 WILLOW CREEK NEAR WILLOW CITY, ND

LOCATION.--Lat 48°35'20", long 100°26'30", in NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.23, T.159 N., R.76 W., McHenry County, Hydrologic Unit 09010004, on left bank 50 ft downstream from bridge on county road, 1.5 mi upstream from Snake Creek, and 7 mi west of Willow City.

DRAINAGE AREA.--1,160 mi², approximately, of which about 430 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Altitude of gage is 1,430 ft, from topographic map. Prior to Oct. 5, 1956, non-recording gage at site 50 ft upstream at same datum.

REMARKS.--Records fair.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY 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	e1.3	.00	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	e16	.00	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	.00	e27	.00	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	.00	e17	.00	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	.00	e3.5	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	e1.9	.00	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	e1.0	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.66	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.21	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	e4.2	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	e3.3	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.86	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.00	.00	e.07	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
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	77.00	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.000	.000	2.48	.000	.000
MAX	.00	.00	.00	.00	.00	.00	.00	.00	.00	.27	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	.00	.00	153	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1991, BY WATER YEAR (WY)

	MEAN	6.92	5.23	1.76	.28	.69	27.6	225	119	41.2	16.5	12.6	8.90
MAX	71.8	39.6	24.8	4.39	16.4	305	1242	787	350	128	146	75.5	
(WY)	1981	1960	1960	1960	1981	1972	1969	1975	1974	1974	1965	1980	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1957	1957	1957	1957	1958	1959	1977	1959	1959	1958	1957	1957	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1956 - 1991

ANNUAL TOTAL	2.00	77.00	
ANNUAL MEAN	.005	.21	38.7
HIGHEST ANNUAL MEAN			182
LOWEST ANNUAL MEAN			.005
HIGHEST DAILY MEAN	.85 Jun 28	27 Jul 8	5310 Apr 12 1969
LOWEST DAILY MEAN	.00 Jan 1	.00 Oct 1	.00 Sep 23 1956
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Oct 1	.00 Sep 23 1956
INSTANTANEOUS PEAK FLOW		28 Jul 8	5900 Apr 12 1969
INSTANTANEOUS PEAK STAGE		9.06 Jul 8	16.76 Apr 12 1969
ANNUAL RUNOFF (AC-FT)	4.0	153	28040
10 PERCENT EXCEEDS	.00	.00	78
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

RED RIVER OF THE NORTH BASIN

05123500 STONE CREEK NEAR KRAMER, ND

LOCATION.--Lat 48°40'42", long 100°42'40", in NW¹/₄NW¹/₄NW¹/₄ sec.23, T.160 N., R.78 W., Bottineau County, Hydrologic Unit 09010003, on left bank 60 ft upstream from bridge on State Highway 14, 1.0 mi south of Kramer.

DRAINAGE AREA.--168 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1986 to current year (seasonal record only).

GAGE.--Water-stage recorder. Datum of gage is 1,425 ft above National Geodetic Vertical Datum of 1929, from topographic map. Prior to September 16, 1986, nonrecording gage at same site and datum.

REMARKS.--Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1.4 ft³/s, July 6, gage height, 1.61 ft; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	.00	.00	.00	.00	.00	.02	.00	.00
2	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
3	---	---	---	---	.00	.00	.00	.00	.00	.31	.00	.00
4	---	---	---	---	.00	.00	.00	.00	.00	.59	.00	.00
5	---	---	---	---	.00	.00	.00	.00	.00	1.1	.00	.00
6	---	---	---	---	.00	.00	.00	.00	.00	1.3	.00	.00
7	---	---	---	---	.00	.00	.00	.00	.00	1.0	.00	.00
8	---	---	---	---	.00	.00	.00	.00	.00	.77	.00	.00
9	---	---	---	---	.00	.00	.00	.00	.00	.56	.00	.00
10	---	---	---	---	.00	.00	.00	.00	.00	.43	.00	.00
11	---	---	---	---	.00	.00	.00	.00	.00	.39	.00	.00
12	---	---	---	---	.00	.00	.00	.00	.00	.31	.00	.00
13	---	---	---	---	.00	.00	.00	.00	.00	.22	.00	.00
14	---	---	---	---	.00	.00	.00	.00	.00	.15	.00	.00
15	---	---	---	---	.00	.00	.00	.00	.00	.10	.00	.00
16	---	---	---	---	.00	.00	.00	.00	.00	.04	.00	.00
17	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
18	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
19	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
20	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
21	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
22	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
23	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
24	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
25	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
26	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
27	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
28	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
29	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
30	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
31	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	---	---	---	---	0.00	0.00	0.00	0.00	0.00	7.29	0.00	0.00
MEAN	---	---	---	---	.000	.000	.000	.000	.000	.24	.000	.000
MAX	---	---	---	---	.00	.00	.00	.00	.00	1.3	.00	.00
MIN	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	.00	.00	.00	14	.00	.00
AC-FT	---	---	---	---	.00	.00	.00	.00	.00	14	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1986	.000	.000	1988	.000	1988
1987	14.3	72.5	1987	.000	1988
1988	18.4	88.5	1988	.000	1988
1989	.69	2.92	1989	.000	1988
1990	.64	3.79	1989	.000	1987
1991	.47	2.27	1989	.000	1986
1992	.000	.000	1986	.000	1986
1993	.000	.000	1986	.000	1986

SUMMARY STATISTICS

WATER YEARS 1986 - 1991

HIGHEST DAILY MEAN	620	Apr 6 1989
LOWEST DAILY MEAN	.00	Mar 1 1986
ANNUAL SEVEN-DAY MINIMUM	.00	Jun 8 1986
INSTANTANEOUS PEAK FLOW	a636	Apr 6 1989
INSTANTANEOUS PEAK STAGE	a5.89	Apr 6 1989
10 PERCENT EXCEEDS	2.4	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

a Maximum observed.

05123510 DEEP RIVER NEAR UPHAM, ND

LOCATION.--Lat 48°35'03", long 100°51'44", in SW¹/₄NW¹/₄, sec.22, T.159 N., R.79 W., McHenry County, Hydrologic Unit 09010005, 60 ft downstream from county highway bridge, 0.8 mi downstream from Little Deep River, and 6.3 mi west of Upham.

DRAINAGE AREA.--975 mi², of which about 605 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1957 to September 1980, March 1985 to current year (seasonal records only since 1985).

GAGE.--Water-stage recorder. Elevation of gage is 1,430 ft, from topographic map.

REMARKS.--Records good.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1951 reached a stage of about 16 ft, discharge, 2,700 ft³/s, from information by local residents.

EXTREMES FOR CURRENT YEAR.--No flow for the period of operation, Feb. 1 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
2	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
3	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
4	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
5	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
6	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
7	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
8	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
9	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
10	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
11	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
12	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
13	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
14	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
15	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
16	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
17	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
18	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
19	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
20	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
21	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
22	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
23	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
24	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
25	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
26	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
27	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
28	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
29	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
30	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
31	---	---	---	---	---	.00	---	.00	---	.00	.00	---
TOTAL	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	---	---	---	---	.000	.000	.000	.000	.000	.000	.000	.000
MAX	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
MIN	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1991, BY WATER YEAR (WY)

	MEAN	.12	.72	.24	.034	.093	22.6	140	39.7	4.91	1.71	.49	.025
MAX	1.99	16.1	5.08	.77	2.37	276	1300	367	44.5	22.3	8.37	.39	
(WY)	1976	1976	1976	1976	1976	1976	1976	1975	1974	1975	1969	1969	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
(WY)	1958	1958	1958	1958	1958	1959	1959	1959	1958	1958	1958	1958	

SUMMARY STATISTICS

WATER YEARS 1958 - 1991

ANNUAL MEAN	a20.5	
HIGHEST ANNUAL MEAN	a140	1976
LOWEST ANNUAL MEAN	.000	1959
HIGHEST DAILY MEAN	5700	Apr 12 1969
LOWEST DAILY MEAN	.00	Oct 1 1957
ANNUAL SEVEN-DAY MINIMUM	.00	Oct 1 1957
INSTANTANEOUS PEAK FLOW	6760	Apr 12 1969
INSTANTANEOUS PEAK STAGE	18.18	Apr 12 1969
ANNUAL RUNOFF (AC-FT)	a14820	
10 PERCENT EXCEEDS	8.6	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

a Based on complete water years only (1958-80).

RED RIVER OF THE NORTH BASIN

05123750 CUT BANK CREEK AT UPHAM, ND

LOCATION.--Lat 48°34'29", long 100°44'39", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ SW $\frac{1}{4}$ sec.21, T.159 N., R.78 W., McHenry County, Hydrologic Unit 09010005, on left bank 50 ft downstream from county highway bridge, and 0.5 mi southwest of Upham.

DRAINAGE AREA.--722 mi², of which about 450 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to September 1980. March 1986 to current year (seasonal records only since 1986).

GAGE.--Water-stage recorder. Datum of gage is 1,422.77 ft above National Geodetic Vertical Datum of 1929. From March to September 1986 nonrecording gage at same site and datum.

REMARKS.--Records good.

EXTREMES FOR CURRENT YEAR.--No flow for the period of operation, Feb. 1 to Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
2	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
3	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
4	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
5	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
6	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
7	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
8	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
9	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
10	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
11	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
12	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
13	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
14	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
15	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
16	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
17	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
18	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
19	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
20	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
21	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
22	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
23	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
24	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
25	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
26	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
27	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
28	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
29	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
30	---	---	---	---	---	.00	.00	.00	.00	.00	.00	.00
31	---	---	---	---	---	.00	---	.00	---	.00	.00	---
TOTAL	---	---	---	---	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MEAN	---	---	---	---	.000	.000	.000	.000	.000	.000	.000	.000
MAX	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
MIN	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1991, BY WATER YEAR (WY)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
MEAN	1.65	1.55	.32	.096	.10	1.73	35.3	38.6	11.3	5.05	2.09	1.44
MAX	7.66	8.15	1.42	.56	.89	10.3	299	227	95.0	45.1	10.2	7.27
(WY)	1976	1976	1976	1976	1976	1986	1976	1975	1975	1975	1975	1979
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1975	1975	1975	1975	1975	1975	1990	1990	1990	1977	1976	1976

SUMMARY STATISTICS

WATER YEARS 1975 - 1991

ANNUAL MEAN	a13.7
HIGHEST ANNUAL MEAN	a34.7
LOWEST ANNUAL MEAN	a.086
HIGHEST DAILY MEAN	800
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	820
INSTANTANEOUS PEAK STAGE	b7.24
ANNUAL RUNOFF (AC-FT)	a9900
10 PERCENT EXCEEDS	15
50 PERCENT EXCEEDS	.00
90 PERCENT EXCEEDS	.00

a Based on complete water years only (1975-80).

b From high-water mark.

RED RIVER OF THE NORTH BASIN

167

05123900 BOUNDARY CREEK NEAR LANDA, ND

LOCATION.--Lat 48°48'46", long 100°51'46" at east line sec.35, T.162 N., R.79 W., Bottineau County, Hydrologic Unit 09010003, on right bank 80 ft downstream from bridge on county road, 5 mi upstream from mouth, and 6 mi southeast of Landa.

DRAINAGE AREA.--230 mi², of which about 60 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1957 to September 1981, March 1985 to current year (seasonal records only from 1985 to current year).

REVISED RECORDS.--WSP 1728: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,420.03 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, about 2.0 ft³/s, July 13, gage height, 8.37 ft, backwater from beaver dam; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	.00	.00	.00	.00	e.20	.00	.00	.00
2	---	---	---	---	.00	.00	.00	.00	e.10	.00	.00	.00
3	---	---	---	---	.00	.00	.00	.00	e.00	.00	.00	.00
4	---	---	---	---	.00	.00	.00	.00	e.00	.00	.00	.00
5	---	---	---	---	.00	.00	.00	.00	e.00	.00	.00	.00
6	---	---	---	---	.00	.00	.00	.00	e.00	.00	.00	.00
7	---	---	---	---	.00	.00	.00	e.03	e.00	.00	.00	.00
8	---	---	---	---	.00	.00	.00	e.17	e.00	.00	.00	.00
9	---	---	---	---	.00	.00	.00	e.28	e.07	e.33	.00	.00
10	---	---	---	---	.00	.00	.00	e.28	e.20	e1.2	.00	.00
11	---	---	---	---	.00	.00	.00	e.31	e.14	e1.5	.00	.00
12	---	---	---	---	.00	.00	.00	e.13	e.02	e1.7	.00	.00
13	---	---	---	---	.00	.00	.00	e.29	.00	e1.8	.00	.00
14	---	---	---	---	.00	.00	.00	e.28	.00	e1.6	.00	.00
15	---	---	---	---	.00	.00	.00	e.36	.00	e1.3	.00	.00
16	---	---	---	---	.00	.00	.00	e.67	.00	e1.0	.00	.00
17	---	---	---	---	.00	.00	.00	e.58	.00	e.88	.00	.00
18	---	---	---	---	.00	.00	.00	e.60	.00	e.96	.00	.00
19	---	---	---	---	.00	.00	.00	e.57	.00	e.83	.00	.00
20	---	---	---	---	.00	.00	.00	e.59	.00	e.66	.00	.00
21	---	---	---	---	.00	.00	.00	e.56	.00	e.54	.00	.00
22	---	---	---	---	.00	.00	.00	e.41	.00	e.49	.00	.00
23	---	---	---	---	.00	.00	.00	e.30	.00	e.38	.00	.00
24	---	---	---	---	.00	.00	.00	e.24	.00	e.26	.00	.00
25	---	---	---	---	.00	.00	.00	e.36	.00	e.13	.00	.00
26	---	---	---	---	.00	.00	.00	e.33	.00	e.01	.00	.00
27	---	---	---	---	.00	.00	.00	e.29	.00	.00	.00	.00
28	---	---	---	---	.00	.00	.00	e.25	.00	.00	.00	.00
29	---	---	---	---	.00	.00	.00	e.17	.00	.00	.00	.00
30	---	---	---	---	.00	.00	.00	e.05	.00	.00	.00	.00
31	---	---	---	---	.00	.00	.00	e.11	.00	.00	.00	.00
TOTAL	---	---	---	---	0.00	0.00	0.00	8.21	0.73	15.57	0.00	0.00
MEAN	---	---	---	---	.000	.000	.000	.26	.024	.50	.000	.000
MAX	---	---	---	---	.00	.00	.00	.67	.20	1.8	.00	.00
MIN	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	.00	16	1.4	31	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1991, BY WATER YEAR (WY)

	MEAN	3.19	1.06	.060	.006	.10	26.4	80.4	10.9	6.66	4.36	4.56	1.69
MAX	46.3	11.2	1.23	.14	2.24	167	537	81.5	75.2	35.5	52.3	22.2	
(WY)	1960	1976	1976	1976	1981	1985	1976	1975	1972	1989	1981	1973	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
(WY)	1958	1958	1958	1958	1959	1965	1991	1958	1959	1958	1958	1958	

SUMMARY STATISTICS

WATER YEARS 1958 - 1991

ANNUAL MEAN	a12.3	
HIGHEST ANNUAL MEAN	a53.9	1976
LOWEST ANNUAL MEAN	a.041	1977
HIGHEST DAILY MEAN	2690	Apr 10 1969
LOWEST DAILY MEAN	.00	Oct 1 1957
ANNUAL SEVEN-DAY MINIMUM	.00	Oct 1 1957
INSTANTANEOUS PEAK FLOW	3580	Apr 9 1969
INSTANTANEOUS PEAK STAGE	b12.70	Apr 9 1969
ANNUAL RUNOFF (AC-FT)	a8920	
10 PERCENT EXCEEDS	14	
50 PERCENT EXCEEDS	.00	
90 PERCENT EXCEEDS	.00	

e Estimated.

a Based on complete water years only (1958-81).

b Backwater from ice and snow.

RED RIVER OF THE NORTH BASIN

05124000 SOURIS (MOUSE) RIVER NEAR WESTHOPE, ND

(International gaging station)

(National stream quality accounting network station and radiochemical program station)

LOCATION.--Lat 48°59'47", long 100°57'29", in SW¹/₄SE¹/₄, sec.30, T.164 N., R.79 W., Bottineau County, Hydrologic Unit 09010003, on left bank 1,200 ft upstream from second crossing of international boundary, 1 mi downstream from Fish and Wildlife Service Dam 357, 7 mi northeast of Westhope, 11 mi downstream from Boundary Creek, and at mile 154.5.

DRAINAGE AREA.--16,900 mi², approximately, of which about 10,300 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July to October 1929, April 1930 to current year. Monthly discharge only for some periods, published in WSP 1308.

REVISED RECORDS.--WSP 1338: 1932. WSP 2113: Drainage area.

GAGE.--Water-stage recorder and control. Datum of gage is 1,402.45 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 28, 1938, nonrecording gage at site 6.3 mi upstream at datum 2.52 ft higher.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by dams on Souris River and tributaries, combined capacity, about 321,000 acre-ft. Diversion at Eaton Dam for irrigation of about 7,600 acres and other small diversions for irrigation and municipal supply upstream from station.

COOPERATION.--This station is one of the international gaging stations maintained by the United States under agreement with Canada.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	23	e.07	.00	.00	.50	e.55	e.10	26	e23	24	25
2	25	23	e.06	.00	.00	.50	e.55	e.10	25	e23	25	25
3	25	23	e.06	.00	.00	.50	e.55	e.10	26	e23	27	26
4	25	23	e.06	.00	e.10	.48	e.57	e.11	26	e23	28	26
5	25	23	e.07	.00	e3.0	.48	e.58	e.11	25	e22	26	27
6	25	23	e.07	.00	e.80	.50	e.56	e.11	25	e22	e25	26
7	25	23	e.07	.00	e.60	.50	e.54	e.11	24	e23	e27	26
8	25	19	e.08	.00	e.55	.50	e.50	e.11	21	e23	28	26
9	25	e2.0	e.09	.00	e.50	.49	e.48	e.40	21	22	28	27
10	25	e.40	e.09	.00	e.48	.50	e.45	e.40	21	22	27	27
11	25	e.20	e.09	.00	e.47	.51	e.42	e.40	22	22	26	25
12	26	e.12	e.09	.00	.47	.55	e.40	e.40	22	22	26	26
13	25	e.11	e.08	.00	.44	e.55	e.38	e.50	22	24	26	26
14	25	e.10	e.08	.00	.42	e.55	e.35	e.50	22	23	25	25
15	25	.16	e.07	.00	.44	e.55	e.32	e12	23	21	25	26
16	25	.15	e.07	.00	.44	e.55	e.30	6.7	22	20	26	26
17	25	.13	e.07	.00	.44	e.55	e.28	6.4	22	20	27	e25
18	25	.12	e.06	.00	.43	e.55	e.25	6.4	22	20	27	e24
19	25	.11	e.06	.00	.42	e.55	e.23	6.7	22	21	25	e25
20	24	.11	e.05	.00	.41	e.55	e.20	6.7	22	20	25	23
21	24	.14	e.04	.00	.43	e.55	e.18	6.7	23	20	25	e22
22	24	.12	e.04	.00	.46	e.55	e.16	6.7	23	19	25	e21
23	24	.09	e.04	.00	.51	e.55	e.14	6.7	23	20	27	e22
24	24	.09	e.03	.00	.50	e.55	e.12	6.7	23	20	25	24
25	24	e.09	e.03	.00	.50	e.45	e.10	7.2	23	21	24	e19
26	24	e.08	e.02	.00	.50	e.50	e.10	6.9	24	22	25	e23
27	23	e.07	e.01	.00	.51	e.55	e.11	7.4	23	22	24	23
28	24	e.06	e.00	.00	.50	e.55	e.11	7.6	23	22	23	22
29	23	e.06	.00	.00	---	e.55	e.11	15	23	23	23	21
30	23	e.07	.00	.00	---	e.55	e.10	36	e24	24	26	22
31	23	---	.00	.00	---	e.55	---	27	---	24	26	---
TOTAL	760	184.58	1.65	0.00	14.32	16.31	9.69	182.25	693	676	796	731
MEAN	24.5	6.15	.053	.000	.51	.53	.32	5.88	23.1	21.8	25.7	24.4
MAX	26	23	.09	.00	3.0	.55	.58	36	26	24	28	27
MIN	23	.06	.00	.00	.00	.45	.10	.10	21	19	23	19
AC-FT	1510	366	3.3	.00	28	32	19	361	1370	1340	1580	1450

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1991, BY WATER YEAR (WY)

	MEAN	62.8	48.9	27.9	24.2	25.6	62.3	748	937	550	263	112	62.6
MAX	473	360	201	191	190	779	8850	5967	4216	1682	1014	402	
(WY)	1976	1976	1976	1976	1976	1983	1976	1976	1975	1975	1953	1983	
MIN	.000	.000	.000	.000	.000	.000	.010	.000	.000	.000	.000	.000	
(WY)	1933	1935	1935	1935	1935	1936	1941	1937	1937	1937	1931	1931	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1929 - 1991

ANNUAL TOTAL	4035.89	4064.80	
ANNUAL MEAN	11.1	11.1	246
HIGHEST ANNUAL MEAN			1697
LOWEST ANNUAL MEAN			.15
HIGHEST DAILY MEAN	28	May 31	36
LOWEST DAILY MEAN	.00	Dec 28	.00
ANNUAL SEVEN-DAY MINIMUM	.01	Dec 25	.00
INSTANTANEOUS PEAK FLOW			43
INSTANTANEOUS PEAK STAGE			a6.13
INSTANTANEOUS LOW FLOW			Aug 6
ANNUAL RUNOFF (AC-FT)	8010	8060	178300
10 PERCENT EXCEEDS	25	25	569
50 PERCENT EXCEEDS	.40	.58	24
90 PERCENT EXCEEDS	.07	.00	.00

e Estimated.

a Backwater from a Canadian dam and wind.

b Reverse flow caused by backwater from downstream tributary inflow.

05124000 SOURIS RIVER NEAR WESTHOPE, ND--CONTINUED
(National stream quality accounting network station and radiochemical program station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1954-64, 1966 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	
NOV 14...	0815	0.10	1500	--	-1.0	2.0	--	--	--	--	--	--	
FEB 18...	1300	0.46	1930	--	-6.5	0.5	--	--	--	--	--	--	
21...	0945	0.43	2650	7.5	1.5	0.5	130	10	0	0	K180	390	
APR 05...	0915	0.58	1820	--	16.0	2.5	--	--	--	--	--	--	
JUN 04...	1230	26	1270	8.4	19.5	20.0	35	6.9	6.3	69	K21	48	
JUL 08...	1935	23	1070	9.1	24.0	22.0	45	5.0	12.4	142	K14	K23	
16...	1525	22	1040	--	36.0	26.0	--	--	--	--	--	--	
24...	0815	20	1040	--	16.5	21.0	--	--	--	--	--	--	
AUG 14...	0850	25	1030	--	23.0	21.0	--	--	--	--	--	--	
SEP 05...	1220	27	1080	--	16.5	15.0	--	--	--	--	--	--	
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 AD-SORP-TION RATIO PERCENT (00932)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CaCO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	
FEB 21...	840	140	120	340	46	5	30	883	877	1070	0	560	
JUN 04...	370	69	48	150	45	3	17	436	436	493	19	240	
JUL 08...	280	41	44	150	52	4	15	355	348	308	58	220	
DATE		CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (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, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)
FEB 21...	120	0.40	21	1900	1870	2.58	2.21	--	<0.010	0.010	<0.050	<0.050	
JUN 04...	53	0.30	14	866	856	1.18	60.8	0.050	0.040	0.030	0.081	0.080	
JUL 08...	50	0.30	5.0	786	736	1.07	48.2	--	<0.010	0.020	<0.050	<0.050	
DATE		NITRO-GEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (70507)	PHOS-PHORUS 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)	BORON, DIS-SOLVED (UG/L AS B) (01020)
FEB 21...	2.40	2.50	2.5	1.50	1.10	1.30	1.20	<10	7	200	<10	460	
JUN 04...	0.180	0.170	2.4	0.420	0.370	0.380	0.380	<10	7	120	<0.5	270	
JUL 08...	<0.010	0.010	1.9	0.350	0.310	0.300	0.290	<10	6	54	<0.5	220	
DATE		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)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, TOTAL RECOV-ERABLE (UG/L AS NI) (01067)	
FEB 21...	<1.0	<1	<1	<1	<1	380	<1	150	2900	0.1	4	7	
JUN 04...	<1.0	<1	<1	<3	5	8	<1	65	240	0.2	<10	8	
JUL 08...	<1.0	<1	<1	<3	1	5	<1	60	10	<0.1	<10	5	

RED RIVER OF THE NORTH BASIN

05124000 SOURIS RIVER NEAR WESTHOPE, ND--CONTINUED
(National stream quality accounting network station and radiochemical program station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, TOTAL RECOV- ERABLE (UG/L AS AG) (01077)	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, TOTAL RECOV- ERABLE (UG/L AS ZN) (01092)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT) (80040)	GROSS BETA, DIS- SOLVED (PCI/L AS CS-137) (03515)
FEB 21...	5	<1	<1	<1.0	760	10	10	<10	--	--	--
JUN 04...	3	<1	<1	<1.0	350	<6	<10	8	2.1	<0.6	25
JUL 08...	2	<1	<1	<1.0	260	<6	<10	3	<0.6	<0.6	20
DATE	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)	CYANIDE TOTAL (MG/L AS CN) (00720)	ACETA- NALIDS SCREEN (ELISA) WAT,WH REC,AS ATRAZIN (UG/L) (34757)	TRIAZIN SCREEN (ELISA) WAT,WH REC,AS ATRAZIN (UG/L) (34757)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
FEB 21...	--	--	--	--	--	<0.010	--	--	165	0.19	12
JUN 04...	0.7	19	0.7	0.06	1.4	<0.010	--	--	65	4.6	37
JUL 08...	<0.6	15	<0.6	0.04	0.93	<0.010	<0.1	<0.1	27	1.7	37
DATE	TIME	DEPTH TO TOP OF SAMPLE INTER- VAL (FT) (72015)	SAMPLE LOC- ATION, CROSS SECTION (FT FM L BANK) (00009)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)			
JUN											
04...	1300	0.50	55.0	1270	8.4	20.0	6.7	74			
04...	1303	0.50	52.0	1270	8.4	20.0	6.6	73			
04...	1306	0.50	48.0	1270	8.4	20.0	6.5	71			
04...	1309	0.50	44.0	1270	8.4	20.0	6.5	71			
04...	1312	0.50	40.0	1270	8.4	20.0	6.3	69			
04...	1315	0.50	36.0	1270	8.4	20.0	6.3	69			
04...	1318	0.50	32.0	1270	8.4	20.0	6.3	69			
04...	1321	0.50	28.0	1270	8.4	20.0	6.2	68			
04...	1324	0.50	24.0	1270	8.4	20.0	6.1	67			
04...	1327	0.50	20.0	1270	8.4	20.0	6.1	67			
04...	1330	0.50	16.0	1270	8.4	20.0	6.1	67			
04...	1333	0.50	12.0	1270	8.4	20.0	6.0	66			
04...	1336	0.50	8.00	1270	8.4	20.0	6.0	65			
JUL											
08...	1936	0.50	7.50	1100	9.0	22.0	12.2	139			
08...	1940	0.50	17.5	1100	9.0	22.0	12.4	142			
08...	1945	0.50	27.5	1100	9.1	22.0	12.4	142			
08...	1950	0.50	37.5	1060	9.1	22.0	12.5	143			
08...	1955	0.50	47.5	1060	9.2	22.5	12.7	145			

MISSOURI RIVER MAIN STEM

171

06185500 MISSOURI RIVER NEAR CULBERTSON, MT

LOCATION.--Lat 48°07'30", long 104°28'20", in SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.3, T.27 N., R.56 E., Richland County, Hydrologic Unit 10060005, on right bank at upstream side of bridge on State Highway 16, 2.5 mi southeast of Culbertson, 10 mi downstream from Big Muddy Creek, and at river mile 1,620.76.

DRAINAGE AREA.--91,557 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1941 to December 1951, April 1958 to current year.

REVISED RECORDS.--WSP 1729: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,883.4 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers bench mark). July 1 to Nov. 6, 1941, water-stage recorder at site 400 ft upstream at datum 0.11 ft higher. Nov. 7, 1941, to Aug. 17, 1950, water-stage recorder at site 580 ft downstream at present datum. Aug. 18, 1950, to Dec. 31, 1951, nonrecording gage on bridge at present datum. Apr. 1, 1958, to Nov. 1, 1967, water-stage recorder at site 580 ft downstream at present datum.

REMARKS.--Estimated daily discharges: Nov. 26 to Mar. 19. Records good except those for estimated daily discharges, which are poor. Flow partly regulated by Fort Peck Lake (station number 06131500) and many other reservoirs upstream from station. Diversions for irrigation of about 1,030,400 acres upstream from station. U.S. Army Corps of Engineers satellite telemeter at stations. Several observations of water temperature and specific conductance were made during the year. These records have been provided by the Montana District office. The table shown below is in the format used in past years and optional for the 1991 water year. Beginning with the 1992 water year, the new format will be mandatory for all daily discharge records published in this report series.

AVERAGE DISCHARGE.--42 years (1943-51, 1959-91, after operational level at Fort Peck Lake was reached), 10,570 ft³/s, 7,658,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,200 ft³/s, Mar. 26, 1943, gage height, 14.80 ft, from rating curve extended above 30,000 ft³/s; maximum gage height observed, 19.66 ft, Apr. 14, 1979, backwater from ice jam; minimum daily discharge, 575 ft³/s, Nov. 22, 1941.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,500 ft³/s, July 2, gage height, 8.13 ft; maximum gage height, 9.70 ft, Dec. 27, backwater from ice; minimum daily discharge, 3,570 ft³/s, Apr. 19.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8430	8690	e5000	e8000	e8000	e8000	8960	8600	7950	14400	7740	8120
2	8380	8620	e5000	e8000	e8000	e8000	8810	8410	7890	16100	7700	8150
3	8340	8600	e4500	e8000	e8000	e8000	8730	8410	8020	13800	7560	8200
4	8330	8590	e6000	e8000	e8000	e8500	8610	8420	8070	12400	7510	8250
5	8370	8600	e8000	e8500	e8000	e8500	8540	8480	8100	11900	7530	8240
6	8310	8750	e8500	e8500	e8000	e9000	8400	8550	8220	11500	7490	8250
7	8350	8250	e8500	e8500	e8000	e8500	8310	8510	8230	11000	7340	8000
8	8410	6000	e8500	e8500	e8000	e8500	8320	8440	8390	10300	7380	6330
9	8460	5120	e8500	e8500	e8000	e8500	7740	8380	8490	9980	7480	5490
10	8480	4900	e8500	e8500	e8000	e8500	5430	8360	8830	9800	7520	5330
11	8430	4730	e8000	e8500	e8000	e8500	4430	8430	8960	10200	7560	5260
12	8430	5580	e8000	e8500	e8000	e8500	4060	8680	8740	10800	7580	5230
13	8430	7790	e8000	e8500	e8000	e8500	3910	8820	8690	10300	7580	5940
14	8460	8680	e7500	e8500	e8000	e8500	3880	8840	8680	9520	7670	7830
15	8450	8870	e7000	e8000	e8000	e8500	3840	8780	8630	8790	7750	8360
16	8450	8910	e8000	e8000	e8000	e8500	3760	8430	8730	8380	7730	8460
17	8440	8890	e7500	e8000	e8000	e9000	3660	8230	8720	7830	7760	8410
18	8580	8840	e7500	e8000	e8000	e9500	3610	8220	8570	7660	7790	8240
19	8620	8830	e7500	e8000	e8000	e9800	3570	8250	8600	7880	7770	8240
20	8500	8880	e7500	e8000	e8000	9670	5040	8260	8840	8540	7790	8250
21	8540	8840	e7500	e8000	e8000	9460	7010	8280	8900	8580	7810	8320
22	8600	8830	e7500	e8000	e8000	9430	7550	8410	8970	8420	7730	8390
23	8630	8840	e7500	e8000	e8000	9520	7740	8180	9060	8490	7850	8390
24	8700	8770	e7500	e8000	e8000	9380	7830	8280	9050	8430	8000	8420
25	8770	8740	e7500	e8000	e8000	9340	7880	8430	9250	8250	7920	8440
26	8730	e7000	e7500	e8000	e8000	9290	8020	8690	9120	8080	7900	8430
27	8670	e8400	e8000	e8000	e8000	9220	8280	8710	9330	8000	7900	8330
28	8730	e7000	e8000	e8000	e8000	9280	8720	8500	10800	7950	7950	8290
29	8800	e5500	e8000	e8000	---	9260	8960	8290	10500	7970	8070	8500
30	8850	e4500	e8000	e8000	---	9130	8850	8110	11000	7850	8220	8470
31	8830	---	e8000	e8000	---	9050	---	7980	---	7790	8150	---
TOTAL	264500	232540	232500	253000	224000	275830	202450	261360	265330	300890	239730	232560
MEAN	8532	7751	7500	8161	8000	8898	6748	8431	8844	9706	7733	7752
MAX	8850	8910	8500	8500	8000	9800	8960	8840	11000	16100	8220	8500
MIN	8310	4500	4500	8000	8000	8000	3570	7980	7890	7660	7340	5230
AC-FT	524600	461200	461200	501800	444300	547100	401600	518400	526300	596800	475500	461300

CAL YR 1990 TOTAL 3078490 MEAN 8434 MAX 14000 MIN 4500 AC-FT 6106000
WTR YR 1991 TOTAL 2984690 MEAN 8177 MAX 16100 MIN 3570 AC-FT 5920000

e Estimated

MISSOURI RIVER MAIN STEM

06185600 MISSOURI RIVER STAGE GAGE NO. 4 NEAR NOHLY, MT

LOCATION.--Lat 48°02'10", long 104°09'40", in NE $\frac{1}{4}$, sec.1, T.26 N., R.58 E., Richland County, Hydrologic Unit 10060005, on right bank 4.5 mi northwest of Nohly, and at mile 1,595.7.

DRAINAGE AREA.--93,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--March 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 18, 1962, at datum 60.00 ft lower.

REMARKS.--Stage regulated by Fort Peck Reservoir.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 21.20 ft, Mar. 23, 1960, present datum; minimum daily recorded, 6.87 ft, Apr. 18, 1963.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.30	11.59	---	---	---	---	---	11.79	11.48	13.76	11.48	11.43
2	11.35	11.55	---	---	---	---	---	11.68	11.42	14.71	11.48	11.45
3	11.32	11.52	---	---	---	---	---	11.64	11.45	14.41	11.41	11.44
4	11.31	11.52	---	---	---	---	---	11.67	11.55	13.73	11.37	11.46
5	11.36	11.54	---	---	---	---	---	11.68	11.48	13.47	11.41	11.47
6	11.33	11.58	---	---	---	---	---	11.71	11.55	13.33	11.27	11.46
7	11.33	---	---	---	---	---	---	11.70	11.57	13.10	11.31	11.47
8	11.37	---	---	---	---	---	---	11.67	11.67	12.85	11.31	10.95
9	11.37	---	---	---	---	---	---	11.66	11.73	12.64	11.35	10.29
10	11.40	---	---	---	---	---	---	11.64	11.85	12.51	11.37	10.12
11	11.38	---	---	---	---	---	---	11.67	12.00	12.57	11.37	10.09
12	11.37	---	---	---	---	---	---	11.75	11.94	12.82	11.37	10.05
13	11.39	---	---	---	---	---	---	11.85	11.89	12.85	11.38	10.13
14	11.38	---	---	---	---	---	---	11.86	11.85	12.52	11.40	10.92
15	11.38	---	---	---	---	---	---	11.87	11.83	12.20	11.43	11.52
16	11.39	---	---	---	---	---	---	11.77	11.79	11.90	11.43	11.60
17	11.42	---	---	---	---	---	---	11.63	11.91	11.69	11.43	11.62
18	11.46	---	---	---	---	---	---	11.59	11.83	11.47	11.44	11.53
19	11.51	---	---	---	---	---	---	11.63	11.77	11.56	11.43	11.48
20	11.49	---	---	---	---	---	---	11.63	11.86	11.77	11.42	11.49
21	11.46	---	---	---	---	---	---	11.65	11.88	11.95	11.41	11.52
22	11.49	---	---	---	---	---	---	11.66	11.92	11.84	11.38	11.57
23	11.50	---	---	---	---	---	---	11.57	12.00	11.82	11.38	11.58
24	11.52	---	---	---	---	---	---	11.57	11.99	11.84	11.46	11.59
25	11.57	---	---	---	---	---	11.42	11.63	12.20	11.75	11.46	11.62
26	11.60	---	---	---	---	---	11.47	11.74	12.34	11.65	11.41	11.63
27	11.54	---	---	---	---	---	11.55	11.82	12.17	11.61	11.40	11.60
28	11.57	---	---	---	---	---	11.70	11.77	12.53	11.58	11.40	11.53
29	11.60	---	---	---	---	---	11.82	11.66	12.75	11.58	11.42	11.63
30	11.61	---	---	---	---	---	11.86	11.60	12.86	11.57	11.50	11.67
31	11.62	---	---	---	---	---	---	11.52	---	11.51	11.48	---
MEAN	11.44	---	---	---	---	---	---	11.69	11.90	12.41	11.41	11.26
MAX	11.62	---	---	---	---	---	---	11.87	12.86	14.71	11.50	11.67
MIN	11.30	---	---	---	---	---	---	11.52	11.42	11.47	11.27	10.05

MISSOURI RIVER MAIN STEM

173

06185650 MISSOURI RIVER STAGE GAGE NO. 5 AT NOHLY, MT

LOCATION.--Lat 48°00'10", long 104°05'30", in SE 1/4 sec.16, T.26 N., R.59 E., Richland County, Hydrologic Unit 10060005, at downstream side of bridge, 0.2 mi northwest of Nohly, and at mile 1,587.7.

DRAINAGE AREA.--93,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,800.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated by Fort Peck Reservoir.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 77.22 ft, Mar. 15, 1972; minimum daily recorded, 59.12 ft, Nov. 22, 1964.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64.19	64.34	---	---	---	---	---	---	65.99	67.83	64.48	64.43
2	64.22	64.30	---	---	---	---	---	---	65.71	68.54	64.49	64.47
3	64.21	64.28	---	---	---	---	---	---	65.58	68.29	64.42	64.45
4	64.19	64.26	---	---	---	---	---	---	65.51	67.52	64.38	64.46
5	64.23	64.27	---	---	---	---	---	---	65.47	67.14	64.44	64.48
6	64.22	64.32	---	---	---	---	---	---	65.83	66.92	64.41	64.47
7	64.21	---	---	---	---	---	---	---	66.47	66.57	64.34	64.50
8	64.24	---	---	---	---	---	---	---	67.09	66.26	64.35	64.19
9	64.24	---	---	---	---	---	---	---	67.57	66.01	64.38	63.49
10	64.27	---	---	---	---	---	---	---	68.05	65.86	64.39	63.29
11	64.25	---	---	---	---	---	---	---	68.24	65.83	---	63.26
12	64.23	---	---	---	---	---	---	---	68.13	65.94	---	63.20
13	64.25	---	---	---	---	---	---	---	67.92	65.96	---	63.24
14	64.24	---	---	---	---	---	---	---	67.60	65.60	---	63.89
15	64.24	---	---	---	---	---	---	---	67.51	65.26	---	64.46
16	64.25	---	---	---	---	---	---	---	67.70	64.96	---	64.63
17	64.27	---	---	---	---	---	---	---	67.84	64.77	---	64.70
18	64.30	---	---	---	---	---	---	---	67.56	64.55	---	64.58
19	64.33	---	---	---	---	---	---	---	66.94	64.59	---	64.52
20	64.31	---	---	---	---	---	---	---	66.78	64.73	---	64.51
21	64.29	---	---	---	---	---	---	---	67.04	64.92	---	64.55
22	64.31	---	---	---	---	---	---	---	67.33	64.82	---	64.59
23	64.30	---	---	---	---	---	---	66.11	67.10	64.79	64.37	64.60
24	64.31	---	---	---	---	---	---	66.41	67.13	64.80	64.45	64.60
25	64.34	---	---	---	---	---	64.94	66.64	67.62	64.72	64.46	64.62
26	64.34	---	---	---	---	---	64.99	66.91	67.92	64.64	64.41	64.61
27	64.30	---	---	---	---	---	---	67.15	67.87	64.59	64.41	64.59
28	64.32	---	---	---	---	---	---	67.14	67.66	64.56	64.40	64.53
29	64.34	---	---	---	---	---	---	67.13	67.35	64.55	64.42	64.61
30	64.36	---	---	---	---	---	---	67.09	67.41	64.56	64.48	64.65
31	64.37	---	---	---	---	---	---	66.56	---	64.49	64.48	---
MEAN	64.27	---	---	---	---	---	---	---	67.13	65.63	---	64.31
MAX	64.37	---	---	---	---	---	---	---	68.24	68.54	---	64.70
MIN	64.19	---	---	---	---	---	---	---	65.47	64.49	---	63.20

YELLOWSTONE RIVER BASIN

06329500 YELLOWSTONE RIVER NEAR SIDNEY, MT
(National stream quality accounting network station)

LOCATION.--Lat 47°40'42", long 104°09'22", in SW¹/₄, NE¹/₄, SW¹/₄, sec.9, T.22 N., R.59 E., Richland County, Hydrologic Unit 10100004, on left bank at Montana-Dakota Utilities Company powerplant, 0.2 mi downstream from bridge on State Highway 23, 2.5 mi south of Sidney, 3.0 mi downstream from Fox Creek, and at river mile 29.2.

DRAINAGE AREA.--69,103 mi². Area at site 4.5 mi upstream, 68,812 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1910 to September 1931 (published as "at Intake"), October 1933 to current year. If monthly figures of diversions to Lower Yellowstone Canal at Intake are added to records at this site, records equivalent to those published as Yellowstone River at Glendive (1898-1910, 1931-34) can be obtained. Monthly discharge only for some periods, published in WSP 1309. Monthly figures of diversions into Lower Yellowstone Canal prior to 1951 published in WSP 1309, 1951-60 published in WSP 1729, 1961-65 published in WSP 1916, 1966-70 published in WSP 2116, and 1971 to current year are published in annual reports.

GAGE.--Water-stage recorder. Datum of gage is 1,881.3 ft National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Jan. 1, 1911, to Sept. 30, 1931, nonrecording gage at site 32 miles upstream at different datum. Apr. 9, 1934, water-stage recorder at two sites within 500 ft of highway bridge 0.2 mi upstream and May 17, 1945, to Apr. 3, 1952, nonrecording gage on same bridge at datum 1.36 ft higher. Apr. 4, 1952, to Nov. 19, 1967, water-stage recorder at site 4.5 mi upstream at different datum.

REMARKS.--Estimated daily discharges: Nov. 27 to Mar. 20. Water-discharge records good except those for estimated daily discharges, which are poor. Some regulation on tributary streams. Diversion for irrigation of about 1,250,000 acres upstream from station. Lower Yellowstone Project Main Canal diverts from left bank in NW¹/₄, sec.36, T.18 N., R.56 E., at Lower Yellowstone diversion dam at Intake about 36.6 mi upstream for irrigation of about 52,000 acres of which about one-third lies upstream from station. U.S. Army Corps of Engineers satellite telemeter at station. These records have been provided by the Montana District office. The table shown below is in the format used in past years and optional for the 1991 water year. Beginning with the 1992 water year, the new format will be mandatory for all daily discharge records published in this report series.

AVERAGE DISCHARGE.--79 years, 12,790 ft³/s, 9,266,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge observed, 159,000 ft³/s, June 2, 1921, gage height, 12.6 ft, site and datum then in use; maximum gage height observed, 21.85 ft, Mar. 22, 1947, site and datum then in use (backwater from ice); minimum discharge, 470 ft³/s, May 17, 1961, gage height, 2.73 ft, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 62,700 ft³/s, June 12, gage height, 15.72 ft; minimum daily, 1,800 ft³/s, Dec. 26, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5090	6850	e6000	e6000	e6500	e7000	5880	11400	34300	45700	7340	3630
2	5060	6850	e5500	e6000	e7000	e6500	5760	9700	32500	42600	7140	3700
3	5240	6840	e4500	e6000	e7500	e6000	5660	8890	30900	36900	6690	3700
4	5530	6870	e4000	e6000	e7500	e5500	8420	29500	34200	6540	3900	
5	5570	6840	e5000	e5500	e7500	e6000	5470	8000	31600	32400	6600	3970
6	6340	6870	e6000	e5500	e7500	e6500	5400	7790	37400	30500	6600	3960
7	6150	6890	e6500	e5500	e7500	e6800	5380	7730	44400	28200	7050	3890
8	5960	6720	e7000	e5500	e8000	e7000	5420	7580	49000	27200	6520	4940
9	6070	6710	e7500	e5000	e8000	e7000	5550	7410	54600	26300	6140	5660
10	6370	6900	e7500	e5000	e8500	e7000	5850	7140	60200	25400	5570	4650
11	6570	6810	e7000	e5000	e8500	e7000	6360	7060	61800	23400	5290	4690
12	6630	6590	e6800	e5500	e8500	e7200	6920	8110	62200	22100	5100	5220
13	6620	6560	e6800	e6500	e8000	e7400	7900	12100	58900	20100	4890	5870
14	6490	6680	e6800	e7000	e7500	e7200	8040	14500	56600	18700	4780	7200
15	6560	6720	e6500	e7000	e7500	e7000	7970	15300	58000	17700	4830	11100
16	6730	6710	e6500	e7000	e7500	e6800	8090	16900	61300	16300	4680	21700
17	6940	6590	e6500	e7000	e7500	e6600	8570	16200	61300	15700	4520	16400
18	6990	6540	e6000	e7000	e7500	e6400	8100	17500	53100	14500	4530	11800
19	6870	6500	e5500	e7500	e7500	e6300	7590	19700	45700	13600	4720	10500
20	6830	6550	e5000	e7500	e7500	e6200	7830	20400	46100	12900	4820	9860
21	6890	6580	e4000	e7000	e7500	6150	7810	25200	48600	11900	4750	9540
22	6950	6550	e3500	e7000	e7500	6060	7750	32700	51800	11100	4660	9760
23	6980	6550	e3000	e7000	e8000	6030	8150	37400	46000	10700	4650	9980
24	6940	6670	e2500	e7000	e7500	6030	8200	39300	52500	10500	4310	9620
25	6990	6580	e2000	e7000	e7500	6070	8380	42400	55900	10000	4100	9980
26	6870	6420	e1800	e7000	e7500	6130	8490	45600	58900	9170	3990	9940
27	6780	e6000	e2500	e6500	e7000	6030	9160	47200	56600	8920	3940	9610
28	6810	e5500	e4000	e6000	e7000	6010	11100	48000	49500	8490	3950	9640
29	6770	e6000	e5000	e6000	---	5940	13700	50000	44300	8020	3900	9650
30	6720	e6000	e6000	e5500	---	5940	14300	47800	43800	7970	3740	9550
31	6740	---	e6000	e6000	---	5960	---	39400	---	7730	3590	---
TOTAL	200050	197440	163200	195000	212500	199750	230330	686830	1477300	608900	159930	243610
MEAN	6453	6581	5265	6290	7589	6444	7678	22160	49240	19640	5159	8120
MAX	6990	6900	7500	7500	8500	7400	14300	50000	62200	45700	7340	21700
MIN	5060	5500	1800	5000	6500	5500	5380	7060	29500	7730	3590	3630
AC-FT	396800	391600	323700	386800	421500	396200	456900	1362000	2930000	1208000	317200	483200
CAL YR 1990	TOTAL 3402060		MEAN 9321	MAX 36600	MIN 1800	AC-FT 6748000						
WTR YR 1991	TOTAL 4574840		MEAN 12530	MAX 62200	MIN 1800	AC-FT 9074000						

e Estimated

175

LOCATION.--Lat 47°48'34", long 104°02'36", sec. 18, T.150 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on left bank 3 mi south of Fairview, and at mile 15.2.

GAGE-HEIGHT RECORDS

GAGE.--Water-stage recorder. Datum of gage is 1,860.00 ft above National Geodetic Vertical Datum of 1929.
Prior to Feb. 19, 1962, at datum 60.00 ft lower.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 23.78 ft, Mar. 21, 1960, present datum; minimum daily recorded, 7.92 ft, Aug. 17, 1988, present datum.

[illegible]

YELLOWSTONE RIVER BASIN

06329610 YELLOWSTONE RIVER STAGE GAGE NO. 2 NEAR CARTWRIGHT, ND

LOCATION.--Lat 47°51'50", long 103°58'06", on south line sec.26, T.151 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on bridge on State Highway 23, 2 mi west of Cartwright, and at mile 8.6.

DRAINAGE AREA.--70,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,800.00 ft above National Geodetic Vertical Datum of 1929.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 87.08 ft, Mar. 23, 1978; minimum daily recorded, 58.58 ft, July 26, 1974.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64.53	65.12	---	---	---	---	---	66.96	72.15	73.70	65.27	63.99
2	64.53	65.13	---	---	---	---	---	66.21	71.78	73.38	65.16	63.98
3	64.53	65.08	---	---	---	---	---	65.89	71.51	72.49	65.07	63.95
4	64.65	65.10	---	---	---	---	---	65.73	71.21	71.93	64.96	64.00
5	64.69	65.09	---	---	---	---	---	65.55	71.36	71.62	64.97	64.02
6	64.78	65.06	---	---	---	---	---	65.43	72.32	71.33	65.01	64.08
7	64.93	65.11	---	---	---	---	---	65.37	73.46	70.81	65.08	64.08
8	64.79	---	---	---	---	---	---	65.31	74.17	70.56	65.04	64.41
9	64.81	---	---	---	---	---	---	65.24	74.86	70.38	64.88	64.83
10	64.94	---	---	---	---	---	---	65.12	75.48	70.23	64.68	64.45
11	65.02	---	---	---	---	---	---	65.08	75.68	69.87	64.54	64.37
12	65.05	---	---	---	---	---	---	65.22	75.63	69.41	64.49	64.58
13	65.07	---	---	---	---	---	---	66.12	75.33	69.06	64.41	64.83
14	65.02	---	---	---	---	---	---	67.31	74.96	68.66	64.32	65.09
15	65.01	---	---	---	---	---	---	67.52	75.00	68.40	64.31	65.94
16	65.08	---	---	---	---	---	---	68.01	75.31	68.07	64.30	68.64
17	65.12	---	---	---	---	---	---	68.05	75.41	67.83	64.22	68.15
18	65.16	---	---	---	---	---	---	68.12	74.72	67.54	64.24	66.68
19	65.16	---	---	---	---	---	---	68.96	73.76	67.24	64.29	66.19
20	65.08	---	---	---	---	---	---	69.12	73.58	67.05	64.34	65.95
21	65.11	---	---	---	---	---	---	70.01	73.94	66.82	64.30	65.83
22	65.17	---	---	---	---	---	---	71.58	74.36	66.50	64.31	65.82
23	65.15	---	---	---	---	---	---	72.55	73.60	66.33	64.28	65.85
24	65.14	---	---	---	---	---	---	72.75	74.30	66.24	64.21	65.78
25	65.20	---	---	---	---	---	---	73.12	74.87	66.13	64.16	65.90
26	65.18	---	---	---	---	---	65.61	73.58	75.14	65.90	64.11	65.83
27	65.11	---	---	---	---	---	65.74	73.86	74.97	65.81	64.10	65.86
28	65.14	---	---	---	---	---	66.18	73.90	74.24	65.71	64.06	65.83
29	65.13	---	---	---	---	---	66.97	74.11	73.51	65.54	64.03	65.94
30	65.10	---	---	---	---	---	67.67	73.95	73.45	65.49	64.01	66.07
31	65.11	---	---	---	---	---	---	73.01	---	65.41	63.99	---
MEAN	64.98	---	---	---	---	---	---	68.80	74.00	68.56	64.49	65.36
MAX	65.20	---	---	---	---	---	---	74.11	75.68	73.70	65.27	68.64
MIN	64.53	---	---	---	---	---	---	65.08	71.21	65.41	63.99	63.95

YELLOWSTONE RIVER BASIN

177

06329620 YELLOWSTONE RIVER STAGE GAGE NO. 3 NEAR BUFORD, ND

LOCATION.--Lat 47°55'14", long 103°57'56", in SW $\frac{1}{4}$ sec.2, T.151 N., R.104 W., McKenzie County, Hydrologic Unit 10100004, on left bank 4 mi south of Buford, and 6.5 mi southeast of Nohly.

DRAINAGE AREA.--70,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,850.00 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 19, 1962, at datum 50.00 ft lower. Prior to Apr. 23, 1987, gage was located 1 mi downstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 29.55 ft, Mar. 15, 1972; minimum daily recorded, 6.18 ft, Aug. 24, 1961, present datum.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	---	13.48	18.58	---	11.37	---
2	---	---	---	---	---	---	---	12.59	18.17	---	11.26	---
3	---	---	---	---	---	---	---	12.15	17.92	---	11.15	---
4	---	---	---	---	---	---	---	11.93	17.65	---	10.99	---
5	---	---	---	---	---	---	---	11.71	17.71	---	10.95	---
6	---	---	---	---	---	---	---	11.57	18.59	---	10.98	---
7	---	---	---	---	---	---	---	11.51	19.68	---	11.03	---
8	---	---	---	---	---	---	---	11.44	20.43	---	11.04	---
9	---	---	---	---	---	---	---	11.37	21.09	---	10.82	10.66
10	---	---	---	---	---	---	---	11.23	21.70	---	10.58	10.12
11	---	---	---	---	---	---	---	11.13	21.90	---	10.36	9.85
12	---	---	---	---	---	---	---	11.31	21.84	---	10.24	10.00
13	---	---	---	---	---	---	---	12.28	21.54	---	10.10	10.33
14	---	---	---	---	---	---	---	13.75	21.08	---	10.02	10.63
15	---	---	---	---	---	---	---	14.09	21.05	---	9.99	11.64
16	---	---	---	---	---	---	---	14.56	21.28	---	9.97	14.51
17	---	---	---	---	---	---	---	14.71	21.47	---	9.85	14.46
18	---	---	---	---	---	---	---	14.66	20.88	---	9.83	13.05
19	---	---	---	---	---	---	---	15.46	20.00	---	9.86	12.36
20	---	---	---	---	---	---	---	15.66	---	---	9.96	12.02
21	---	---	---	---	---	---	---	16.40	---	---	9.94	11.87
22	---	---	---	---	---	---	---	17.97	---	---	9.90	11.84
23	---	---	---	---	---	---	---	19.03	---	---	9.88	11.88
24	---	---	---	---	---	---	11.43	19.33	---	---	9.78	11.86
25	---	---	---	---	---	---	11.48	19.66	---	12.34	9.65	11.85
26	---	---	---	---	---	---	11.58	20.07	---	12.12	9.57	11.93
27	---	---	---	---	---	---	11.77	20.32	---	11.98	---	11.85
28	---	---	---	---	---	---	12.34	20.35	---	11.86	---	11.78
29	---	---	---	---	---	---	13.17	20.48	---	11.65	---	11.81
30	---	---	---	---	---	---	14.09	20.34	---	11.57	---	11.79
31	---	---	---	---	---	---	---	19.41	---	11.51	---	---
MEAN	---	---	---	---	---	---	---	15.16	---	---	---	---
MAX	---	---	---	---	---	---	---	20.48	---	---	---	---
MIN	---	---	---	---	---	---	---	11.13	---	---	---	---

MISSOURI RIVER MAIN STEM

06329640 MISSOURI RIVER STAGE GAGE NO. 5A AT BUFORD, ND

LOCATION.--Lat 47°59'06", long 103°59'05", in SE¹/₄ sec.15, T.152 N., R.104 W., Williams County, Hydrologic Unit 10110101, on left bank 1.5 mi southwest of Buford, and at mile 1,580.7.

DRAINAGE AREA.--164,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1960 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,850.00 ft above National Geodetic Vertical Datum of 1929. Prior to Mar. 8, 1962, at datum 50.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 19.37 ft, Mar. 23, 1978; minimum daily recorded, 2.63 ft, Aug. 15, 16, 1966.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.32	8.02	---	---	---	11.52	7.81	10.56	14.87	16.47	8.28	6.75
2	7.29	8.01	---	---	---	11.48	7.73	9.72	14.43	16.71	8.17	6.80
3	7.30	7.99	---	---	---	11.23	7.62	9.25	14.19	16.24	8.08	6.81
4	7.43	8.00	---	---	---	10.55	7.55	9.04	13.97	15.54	7.92	6.87
5	7.48	8.01	---	---	---	10.31	7.49	8.81	13.96	15.13	7.98	6.95
6	7.56	8.02	---	---	---	11.07	7.43	8.67	14.67	14.85	7.95	6.99
7	7.86	8.07	---	---	---	11.74	7.38	8.60	15.66	14.37	7.95	7.01
8	7.71	---	---	---	---	11.74	7.41	8.50	16.41	13.98	7.96	7.33
9	7.71	---	---	---	---	11.46	7.47	8.37	17.01	13.70	7.81	7.19
10	7.77	---	---	---	---	11.53	7.09	8.23	17.59	13.52	7.66	6.69
11	7.91	---	---	---	---	11.60	6.52	8.16	17.78	13.28	7.51	6.40
12	7.97	---	---	---	---	11.65	6.50	8.29	17.67	12.87	7.41	6.47
13	7.98	---	---	---	---	11.86	6.73	9.10	17.39	12.67	7.30	6.71
14	7.92	---	---	---	---	11.98	6.99	10.43	16.99	12.10	7.26	7.37
15	7.89	---	---	---	---	11.97	7.01	10.83	16.91	11.68	7.24	8.64
16	7.95	---	---	---	---	12.04	7.01	11.20	17.10	11.21	7.22	10.93
17	8.03	---	---	---	---	12.14	7.09	11.37	17.25	10.83	7.15	11.14
18	8.11	---	---	---	---	11.99	7.19	11.22	16.84	10.48	7.13	10.04
19	8.11	---	---	---	---	12.11	6.89	11.90	16.01	10.20	7.13	9.41
20	8.06	---	---	---	---	12.15	6.90	12.16	15.79	10.07	7.17	9.11
21	8.06	---	---	---	---	11.15	7.73	12.66	16.12	9.99	7.15	8.98
22	8.08	---	---	---	---	8.79	8.18	14.04	16.49	9.69	7.09	8.95
23	8.08	---	---	---	---	8.09	8.48	15.10	16.14	9.49	7.04	9.00
24	8.08	---	---	---	---	8.04	8.60	15.49	16.31	9.42	7.04	8.94
25	8.12	---	---	---	---	8.00	8.60	15.80	16.87	9.27	6.98	8.87
26	8.07	---	---	---	---	8.01	8.70	16.14	17.21	9.04	6.90	9.26
27	8.03	---	---	---	---	7.97	8.95	16.40	17.15	8.88	6.85	9.24
28	8.02	---	---	---	11.59	7.94	9.47	16.39	16.69	8.75	6.80	9.12
29	8.05	---	---	---	---	7.93	10.15	16.42	16.15	8.59	6.80	9.14
30	8.03	---	---	---	---	7.88	10.92	16.36	16.19	8.50	6.84	9.18
31	8.03	---	---	---	---	7.87	---	15.64	---	8.41	6.80	---
MEAN	7.87	---	---	---	---	10.44	7.79	11.77	16.26	11.80	7.37	8.21
MAX	8.12	---	---	---	---	12.15	10.92	16.42	17.78	16.71	8.28	11.14
MIN	7.29	---	---	---	---	7.87	6.50	8.16	13.96	8.41	6.80	6.40

MISSOURI RIVER MAIN STEM

179

06329650 MISSOURI RIVER STAGE GAGE NO. 6 NEAR BUFORD, ND

LOCATION.--Lat 47°57'18", long 103°54'36", in SE 1/4 sec.30, T.152 N., R.103 W., Williams County, Hydrologic Unit 10110101, on right bank 5 mi southeast of Buford, and at mile 1,576.0.

DRAINAGE AREA.--164,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--December 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,840.00 ft above National Geodetic Vertical Datum of 1929. Prior to Apr. 17, 1962, at datum 40.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 24.61 ft, June 11, 1991; minimum daily recorded, 8.23 ft, Aug. 15, 22, 1963.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14.49	15.30	---	---	---	---	---	17.84	22.15	23.56	15.19	13.78
2	14.47	15.30	---	---	---	---	---	17.03	21.77	23.80	15.09	13.82
3	14.48	15.30	---	---	---	---	---	16.53	21.56	23.37	15.00	13.81
4	14.58	15.29	---	---	---	---	---	16.33	21.37	22.71	14.83	13.84
5	14.67	15.30	---	---	---	---	---	16.13	21.33	22.36	14.93	13.92
6	14.71	15.29	---	---	---	---	---	15.99	21.96	22.10	14.89	13.94
7	15.01	---	---	---	---	---	---	15.92	22.88	21.64	14.89	13.97
8	14.90	---	---	---	---	---	---	15.82	23.60	21.24	14.91	14.22
9	14.86	---	---	---	---	---	---	15.72	24.11	20.96	14.77	14.09
10	14.92	---	---	---	---	---	---	15.60	24.52	20.76	14.62	13.64
11	15.05	---	---	---	---	---	---	15.53	24.61	20.54	14.47	13.33
12	15.11	---	---	---	---	---	---	15.63	24.47	20.09	14.36	13.37
13	15.13	---	---	---	---	---	---	16.34	24.25	19.90	14.26	13.57
14	15.11	---	---	---	---	---	---	17.73	23.87	19.29	14.22	14.12
15	15.07	---	---	---	---	---	---	18.20	23.79	18.86	14.18	15.37
16	15.12	---	---	---	---	---	---	18.54	23.96	18.37	14.19	17.82
17	15.19	---	---	---	---	---	---	18.77	24.10	17.95	14.11	18.50
18	15.28	---	---	---	---	---	---	18.60	23.81	17.58	14.09	17.23
19	15.30	---	---	---	---	---	---	19.19	23.14	17.27	14.10	16.38
20	15.28	---	---	---	---	---	---	19.54	22.96	17.11	14.16	16.00
21	15.25	---	---	---	---	---	---	19.97	23.21	17.03	14.15	15.86
22	15.29	---	---	---	---	---	---	21.30	23.53	16.72	14.11	15.85
23	15.30	---	---	---	---	---	---	22.37	23.29	16.48	14.06	15.91
24	15.31	---	---	---	---	---	15.66	22.79	23.34	16.41	14.07	15.92
25	15.33	---	---	---	---	---	15.68	23.01	23.90	16.25	14.03	15.87
26	15.32	---	---	---	---	---	15.78	23.30	24.14	16.00	13.95	15.96
27	15.29	---	---	---	---	---	15.98	23.50	24.07	15.83	13.91	15.92
28	15.27	---	---	---	---	---	16.49	23.46	23.68	15.69	13.86	15.83
29	15.30	---	---	---	---	---	17.25	23.44	23.22	15.51	13.86	15.85
30	15.30	---	---	---	---	---	18.08	23.38	23.29	15.41	13.90	15.89
31	15.30	---	---	---	---	---	---	22.78	---	15.32	13.87	---
MEAN	15.06	---	---	---	---	---	---	19.04	23.33	18.91	14.36	15.12
MAX	15.33	---	---	---	---	---	---	23.50	24.61	23.80	15.19	18.50
MIN	14.47	---	---	---	---	---	---	15.53	21.33	15.32	13.86	13.33

MISSOURI RIVER MAIN STEM

06329660 MISSOURI RIVER STAGE GAGE NO. 7 NEAR TRENTON, ND

LOCATION.--Lat 47°59'21", long 103°47'57", in NE $\frac{1}{4}$ sec.13, T.152 N., R.103 W., McKenzie County, Hydrologic Unit 10110101, on right bank 5 mi south of Trenton, and at mile 1,566.7.

DRAINAGE AREA.--164,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--March 1959 to current year (seasonal).

GAGE.--Water-stage recorder. Datum of gage is 1,840.00 ft above National Geodetic Vertical Datum of 1929. Prior to Aug. 7, 1962, at site 0.8 mi upstream. Prior to May 29, 1963, at datum 40.00 ft lower.

REMARKS.--Stage regulated by upstream reservoirs.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 21.56 ft, July 10, 1975; minimum daily recorded, 4.34 ft, Aug. 19, 22, 1963.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10.90	11.67	---	---	---	---	---	13.98	17.86	19.47	12.16	10.70
2	10.92	11.67	---	---	---	---	---	13.31	17.59	19.63	12.07	10.72
3	10.91	11.65	---	---	---	---	---	12.78	17.49	19.31	11.98	10.72
4	10.97	11.63	---	---	---	---	---	12.55	17.42	18.81	11.82	10.74
5	11.09	11.64	---	---	---	---	---	12.34	17.38	18.52	11.93	10.81
6	11.07	11.66	---	---	---	---	---	12.17	17.81	18.29	11.87	10.85
7	11.35	11.68	---	---	---	---	---	12.08	18.62	18.04	11.85	10.87
8	11.28	---	---	---	---	---	---	11.99	19.30	17.66	11.86	11.16
9	11.24	---	---	---	---	---	---	11.92	19.71	17.39	11.74	11.06
10	11.32	---	---	---	---	---	---	11.81	20.04	17.21	11.60	10.62
11	11.44	---	---	---	---	---	---	11.71	20.17	17.07	11.43	10.33
12	11.49	---	---	---	---	---	---	11.76	20.07	16.63	11.33	10.33
13	11.52	---	---	---	---	---	---	12.31	19.88	16.44	11.24	10.50
14	11.49	---	---	---	---	---	---	13.55	19.54	15.93	11.18	11.00
15	11.45	---	---	---	---	---	---	14.12	19.46	---	11.16	12.22
16	11.50	---	---	---	---	---	---	14.45	19.60	---	11.17	14.34
17	11.58	---	---	---	---	---	---	14.77	19.79	---	11.09	15.13
18	11.64	---	---	---	---	---	---	14.64	19.58	---	11.06	14.09
19	11.69	---	---	---	---	---	---	15.08	18.99	---	11.07	13.30
20	11.67	---	---	---	---	---	---	15.51	18.83	---	11.11	12.92
21	11.63	---	---	---	---	---	---	15.85	19.03	---	11.10	12.75
22	11.66	---	---	---	---	---	---	16.97	19.27	---	11.04	12.70
23	11.67	---	---	---	---	---	---	17.97	19.24	---	10.98	12.72
24	11.66	---	---	---	---	---	11.78	18.42	19.21	---	11.00	12.73
25	11.70	---	---	---	---	---	11.80	18.57	19.64	13.06	10.94	12.66
26	11.73	---	---	---	---	---	11.90	18.85	19.86	12.86	10.87	12.70
27	11.66	---	---	---	---	---	12.09	19.00	19.84	12.69	10.81	12.66
28	11.64	---	---	---	---	---	12.53	19.01	19.54	12.57	10.78	12.55
29	11.67	---	---	---	---	---	13.17	19.00	19.17	12.43	10.76	12.56
30	11.65	---	---	---	---	---	13.99	18.96	19.23	12.35	10.79	12.59
31	11.66	---	---	---	---	---	---	18.46	---	12.28	10.75	---
MEAN	11.45	---	---	---	---	---	---	14.96	19.11	---	11.31	11.97
MAX	11.73	---	---	---	---	---	---	19.01	20.17	---	12.16	15.13
MIN	10.90	---	---	---	---	---	---	11.71	17.38	---	10.75	10.33

MISSOURI RIVER MAIN STEM

181

06330000 MISSOURI RIVER NEAR WILLISTON, ND

LOCATION.--Lat 48°06'45", long 103°43'04", in SE $\frac{1}{4}$, sec.31, T.154 N., R.101 W., Williams County, Hydrologic Unit 10110101, at city waterplant on left bank, 5 mi southwest of Williston, 29.3 mi downstream from Yellowstone River, and at mile 1,552.7.

DRAINAGE AREA.--164,500 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1966 to current year. Operated as a stage-discharge station October 1897 to July 1965.

GAGE.--Water-stage recorder. Datum of gage is 1,830.20 ft above National Geodetic Vertical Datum of 1929. See WSP 1917 for history of changes prior to April 1966.

REMARKS.--Stage regulated by upstream reservoirs and backwater from Lake Sakakawea.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 26.46 ft, Mar. 26, 1978; minimum daily recorded, 7.80 ft, Nov. 2, 1966.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13.87	---	---	15.94	16.80	17.72	13.99	16.33	18.96	19.85	14.77	13.41
2	13.81	---	---	16.02	16.75	17.65	13.91	16.00	18.72	20.02	14.66	13.39
3	13.81	---	---	16.36	16.71	17.55	13.80	15.49	18.69	19.87	14.61	13.43
4	13.88	---	---	16.56	16.69	17.22	13.75	15.16	18.65	19.46	14.47	13.45
5	13.93	---	---	16.54	16.85	16.82	13.70	14.97	18.67	19.30	14.54	13.53
6	13.97	---	16.60	16.63	16.99	16.94	13.62	14.82	18.84	19.26	14.49	13.58
7	14.17	---	17.40	16.82	17.06	17.54	13.61	14.78	19.26	19.15	14.46	13.61
8	14.21	---	17.94	16.92	17.12	17.90	13.62	14.71	19.67	18.95	14.47	13.78
9	14.15	---	18.16	16.99	17.21	17.87	13.64	14.57	19.93	18.84	14.39	13.86
10	14.16	13.32	18.32	17.04	17.34	17.81	13.61	14.45	20.24	18.80	14.25	13.59
11	14.25	13.25	18.42	17.05	17.45	17.87	13.07	14.41	20.54	18.74	14.10	13.20
12	14.36	13.20	18.41	17.02	17.53	17.91	12.83	14.39	20.62	18.52	14.00	13.12
13	14.35	13.35	18.24	17.04	17.60	18.03	12.88	14.70	20.58	18.45	13.91	13.20
14	14.35	13.79	17.88	17.10	17.66	18.18	13.10	15.66	20.43	18.16	13.85	13.57
15	14.33	14.05	17.39	17.12	17.70	18.27	13.15	16.33	20.30	17.85	13.83	14.55
16	14.36	14.19	16.78	17.20	17.69	18.35	13.16	16.66	20.32	17.48	13.83	16.22
17	14.40	14.25	16.37	17.30	17.67	18.46	13.15	17.00	20.44	17.11	13.76	17.27
18	14.48	14.24	16.00	17.34	17.57	18.52	13.29	17.01	20.33	16.78	13.72	16.66
19	14.47	14.23	15.69	17.34	17.60	18.59	13.17	17.15	19.87	16.47	13.72	16.02
20	14.43	14.22	15.45	17.33	17.69	18.73	12.99	17.52	19.52	16.30	13.73	15.61
21	14.44	14.18	14.93	17.31	17.77	18.78	13.38	17.72	19.63	16.25	13.75	15.41
22	14.43	14.23	14.17	17.28	17.85	18.38	13.90	18.29	19.78	16.02	13.70	15.32
23	14.44	14.24	13.69	17.21	17.97	15.28	14.19	18.89	19.85	15.81	13.66	15.36
24	14.48	14.22	13.66	17.14	18.05	14.59	14.38	19.10	19.73	15.69	13.65	15.36
25	14.47	14.31	13.88	17.15	17.98	14.39	14.43	19.15	20.01	15.59	13.61	15.29
26	14.47	14.95	14.31	17.11	17.93	14.31	14.49	19.22	20.35	15.43	13.55	15.33
27	14.43	---	14.73	17.08	17.86	14.21	14.63	19.39	20.50	15.25	13.48	15.31
28	14.46	---	15.09	17.05	17.80	14.15	14.93	19.57	20.35	15.14	13.44	15.23
29	14.45	---	15.37	17.01	---	14.12	15.41	19.68	19.96	15.00	13.41	15.18
30	---	---	15.46	16.91	---	14.09	16.08	19.76	19.77	14.89	13.45	15.22
31	---	---	15.72	16.82	---	14.02	---	19.49	---	14.84	13.47	---
MEAN	---	---	---	16.96	17.46	16.91	13.80	16.85	19.82	17.40	13.96	14.60
MAX	---	---	---	17.34	18.05	18.78	16.08	19.76	20.62	20.02	14.77	17.27
MIN	---	---	---	15.94	16.69	14.02	12.83	14.39	18.65	14.84	13.41	13.12

MISSOURI RIVER MAIN STEM

06330110 MISSOURI RIVER STAGE GAGE NO. 9 AT WILLISTON, ND

LOCATION.--Lat 48°08'13", long 103°36'16", in NE¹/₄NE¹/₄ sec.25, T.154 N., R.101 W., Williams County, Hydrologic Unit 10110101, on left bank levee at southeast edge of Williston 0.5 mi upstream from Little Muddy Creek, and at mile 1,546.2.

DRAINAGE AREA.--164,500 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--April 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,820.00 ft above National Geodetic Vertical Datum of 1929. Prior to May 13, 1969, at site 900 ft downstream. At datum 20.00 ft lower prior to Apr. 7, 1962.

REMARKS.--Stage regulated by upstream reservoirs and backwater from Lake Sakakawea.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 34.22 ft, July 25, 28, 1975; minimum daily recorded, 5.44 ft, Aug. 20, 1961, present datum.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21.76	22.05	24.26	23.76	24.53	25.11	21.96	23.18	25.48	26.13	22.14	21.44
2	21.70	22.01	24.13	23.83	24.50	25.03	21.87	23.09	25.14	26.21	22.25	21.31
3	21.69	22.02	23.90	24.02	24.47	24.97	21.75	22.84	25.04	26.22	22.10	21.27
4	21.74	22.05	23.62	24.20	24.44	24.83	21.69	22.58	24.99	25.91	22.14	21.28
5	21.77	22.00	23.50	24.25	24.49	24.53	21.64	22.45	25.01	25.58	22.06	21.31
6	21.73	22.04	23.74	24.30	24.61	24.37	21.55	22.37	25.06	25.44	22.17	21.36
7	21.82	22.20	24.28	24.42	24.67	24.62	21.52	22.38	25.36	25.28	22.24	21.44
8	21.91	22.08	24.65	24.52	24.69	24.94	21.54	22.37	25.70	25.16	22.14	21.43
9	21.87	21.69	24.90	24.57	24.73	25.01	21.56	22.27	26.00	25.04	22.07	21.47
10	21.85	21.49	25.03	24.62	24.78	24.99	21.63	22.15	26.34	25.01	21.94	21.56
11	21.89	21.42	25.14	24.65	24.83	24.99	21.65	22.13	26.71	24.94	21.85	21.35
12	22.01	21.43	25.22	24.66	24.88	25.00	21.56	22.14	26.86	24.77	21.75	21.26
13	22.03	21.41	25.20	24.67	24.92	25.02	21.51	22.32	26.84	24.70	21.71	21.40
14	22.00	21.56	25.03	24.68	24.95	25.10	21.47	22.81	26.76	24.55	21.64	21.39
15	21.98	21.82	24.73	24.70	24.99	25.11	21.44	23.26	26.61	24.29	21.63	21.78
16	21.99	21.94	24.35	24.74	25.01	25.14	21.45	23.54	26.58	24.06	21.61	22.77
17	22.00	22.00	24.02	24.81	25.02	25.14	21.43	23.86	26.67	23.81	21.57	23.61
18	22.12	22.00	23.80	24.87	25.00	25.15	21.45	23.90	26.74	23.57	21.55	23.30
19	22.12	22.01	23.65	24.93	24.95	25.09	21.47	24.01	26.40	23.30	21.55	22.84
20	22.04	21.99	23.64	24.98	25.04	25.03	21.46	24.09	25.97	23.17	21.52	22.69
21	22.04	21.92	23.38	24.99	25.07	24.94	21.43	24.27	25.91	23.07	21.52	22.53
22	22.06	22.00	22.83	24.97	25.15	24.55	21.66	24.56	26.08	22.91	21.52	22.51
23	22.05	21.99	22.42	24.91	25.17	23.36	21.93	24.98	26.19	22.83	21.49	22.44
24	22.08	21.98	22.26	24.84	25.20	22.51	22.14	25.22	26.05	22.81	21.47	22.47
25	22.10	22.06	22.18	24.82	25.23	22.31	22.16	25.46	26.17	22.73	21.42	22.50
26	22.01	22.18	22.16	24.80	25.23	22.16	22.21	25.47	26.52	22.61	21.39	22.58
27	22.00	22.27	22.68	24.77	25.20	22.13	22.29	25.68	26.73	22.64	21.37	22.61
28	22.12	23.40	23.02	24.73	25.16	22.08	22.43	25.86	26.73	22.54	21.33	22.61
29	22.07	24.05	23.28	24.69	---	22.00	22.65	25.96	26.46	22.28	21.30	22.56
30	22.08	24.10	23.41	24.64	---	21.82	22.95	26.04	26.17	22.26	21.35	22.55
31	22.09	---	23.58	24.56	---	21.87	---	25.92	---	22.22	21.50	---
MEAN	21.96	22.11	23.81	24.61	24.89	24.16	21.78	23.78	26.11	24.07	21.72	22.05
MAX	22.12	24.10	25.22	24.99	25.23	25.15	22.95	26.04	26.86	26.22	22.25	23.61
MIN	21.69	21.41	22.16	23.76	24.44	21.82	21.43	22.13	24.99	22.22	21.30	21.26

LOCATION.--Lat 48°17'04", long 103°34'21", in NE¹/₄, NW¹/₄, sec.5, T.155 N., R.100 W., Williams County, Hydrologic Unit 10110102, on left bank 37 ft downstream from centerline of highway, 1 mi downstream from Cow Creek, 4 mi upstream from Camp Creek, 10 mi northeast of Williston, and 13 mi upstream from mouth.

WATER-DISCHARGE RECORDS

GAGE.--Water-stage recorder. Datum of gage is 1.863.18 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for period of estimated dally discharges, which are poor. Some small diversions for irrigation. Some regulation by Lake Zuhl, Fish and Wildlife Service reservoir 22 mi upstream and Blacktail Dam about 15 mi upstream.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 556 ft³/s, June 26, gage height, 6.73 ft; minimum daily discharge, 2.0 ft³/s, Sept. 6, but may have been less during period of nonoperation.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e5.0	e6.2	11	24	8.2	228	5.4	2.4
2	---	---	---	---	e5.2	e6.3	11	19	7.9	189	6.0	2.5
3	---	---	---	---	e5.4	e6.1	12	17	7.0	105	6.2	2.6
4	---	---	---	---	e5.4	e6.9	11	16	6.8	63	6.1	2.7
5	---	---	---	---	e5.5	e8.2	11	15	6.7	50	7.0	2.6
6	---	---	---	---	e5.6	e7.2	11	14	6.5	40	7.4	2.0
7	---	---	---	---	e5.6	e6.9	12	13	6.1	32	7.9	2.5
8	---	---	---	---	e5.7	e6.7	11	12	6.0	25	7.2	3.5
9	---	---	---	---	e6.5	e7.0	11	11	6.2	21	6.5	4.5
10	---	---	---	---	e6.4	e7.8	10	10	5.9	18	6.1	5.2
11	---	---	---	---	e6.2	e9.0	9.8	9.2	5.4	17	5.8	12
12	---	---	---	---	e6.0	e9.9	9.3	8.9	4.7	15	5.5	11
13	---	---	---	---	e5.5	10	8.9	11	4.3	13	5.3	9.6
14	---	---	---	---	e5.0	11	9.3	11	4.2	13	6.8	8.3
15	---	---	---	---	e4.5	12	9.6	11	5.0	17	7.0	9.7
16	---	---	---	---	e4.7	12	9.6	12	5.1	16	7.2	9.8
17	---	---	---	---	e4.8	13	9.3	12	5.1	17	7.0	8.4
18	---	---	---	---	e4.9	13	8.8	10	4.8	15	6.1	6.9
19	---	---	---	---	e5.0	13	8.8	9.1	4.3	13	6.5	6.9
20	---	---	---	---	e5.1	15	9.4	11	4.2	12	6.8	6.5
21	---	---	---	---	e5.8	17	9.9	11	4.5	11	6.2	6.7
22	---	---	---	---	e6.0	18	9.2	11	4.0	10	5.4	7.9
23	---	---	---	---	e6.0	17	8.5	11	3.7	9.7	4.6	7.6
24	---	---	---	---	e6.0	17	7.8	11	4.0	9.1	4.2	7.4
25	---	---	---	---	e6.3	14	7.3	11	13	8.1	4.1	7.0
26	---	---	---	---	e6.2	13	7.5	11	262	7.3	3.8	6.6
27	---	---	---	---	e6.1	11	13	11	189	7.0	3.5	6.5
28	---	---	---	---	e6.1	11	20	10	122	7.2	3.3	6.1
29	---	---	---	---	---	11	28	10	92	6.9	2.9	6.2
30	---	---	---	---	---	11	29	9.5	113	6.2	2.7	6.3
31	---	---	---	---	---	11	---	9.0	---	5.6	2.4	---
TOTAL	---	---	---	---	156.5	338.2	344.0	371.7	921.6	1007.1	172.9	187.9
MEAN	---	---	---	---	5.59	10.9	11.5	12.0	30.7	32.5	5.58	6.26
MAX	---	---	---	---	6.5	18	29	24	262	228	7.9	12
MIN	---	---	---	---	4.5	6.1	7.3	8.9	3.7	5.6	2.4	2.0
AC-FT	---	---	---	---	310	671	682	737	1830	2000	343	373

MEAN	10.2	11.0	8.62	6.98	18.6	158	119	28.0	18.0	19.9	7.56	7.55
MAX	17.4	17.7	12.1	24.5	180	1018	996	114	91.4	170	49.1	18.9
(WY)	1973	1973	1955	1974	1981	1976	1979	1965	1965	1978	1972	1954
MIN	5.28	4.66	3.55	2.33	.91	6.21	10.6	8.44	3.77	2.80	2.51	2.54
(WY)	1962	1961	1961	1962	1959	1965	1990	1958	1988	1988	1988	1990

WATER YEARS 1954 - 1991

ANNUAL MEAN	a38.8	
HIGHEST ANNUAL MEAN	a110	1976
LOWEST ANNUAL MEAN	a9.24	1961
HIGHEST DAILY MEAN	6610	Apr 18 1979
LOWEST DAILY MEAN	.50	Feb 17 1959
ANNUAL SEVEN-DAY MINIMUM	.50	Feb 17 1959
INSTANTANEOUS PEAK FLOW	9180	Apr 18 1979
INSTANTANEOUS PEAK STAGE	13.57	Mar 27 1960
ANNUAL RUNOFF (AC-FT)	a28120	
10 PERCENT EXCEEDS	38	
50 PERCENT EXCEEDS	9.3	
90 PERCENT EXCEEDS	4.3	

a Based on complete water years only (1955-83).

LITTLE MUDDY RIVER BASIN

06331000 LITTLE MUDDY RIVER BELOW COW CREEK NEAR WILLISTON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 15...	1240	6.2	2350	--	8.5	4.0	--	--	--	--	--	--
FEB 27...	1045	6.0	2350	--	-4.5	1.0	--	--	--	--	--	--
MAR 19...	1420	13	1900	8.3	18.0	3.5	380	63	54	290	62	6
MAY 08...	1210	12	1880	--	18.5	11.5	--	--	--	--	--	--
JUN 10...	1405	5.9	2410	--	25.5	23.0	--	--	--	--	--	--
JUL 18...	0805	15	1720	--	20.5	25.0	--	--	--	--	--	--
AUG 20...	1155	6.9	2000	8.2	30.5	23.5	380	47	64	380	67	8
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 19...	7.5	660	0	380	520	7.1	0.30	13	1310	1280	1.78	
AUG 20...	14	740	0	610	630	12	0.40	7.8	1560	1520	2.12	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 19...	45.6	2	350	20	1	70	20	<0.1	3	<1	780	
AUG 20...	29.1	6	340	20	<1	80	10	<0.1	<1	2	820	

BEAR DEN CREEK BASIN

185

06332515 BEAR DEN CREEK NEAR MANDAREE, ND

(Hydrologic bench-mark station)

(National stream quality accounting network station and radiochemical program station)

LOCATION.--Lat 47°47'14", long 102°46'05", in NW¼ sec.30, T.150 N., R.94 W., McKenzie County, Hydrologic Unit 10110101, on right bank 0.5 mi upstream from county highway culvert, and 5.5 mi northwest of Mandaree.

DRAINAGE AREA.--74 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,947.58 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.13	e.18	.17	e.00	e.00	e.06	e.55	e.23	e.26	e.36	.37	.09
2	e.12	e.17	.12	e.00	e.00	e.05	e.50	e.22	e.24	e.33	e.39	.10
3	e.13	e.16	.10	e.00	e.02	e.07	e.45	e.21	e.23	e.30	e.42	.10
4	e.12	e.15	.11	e.00	e.05	e.12	e.40	e.22	e.21	e.33	e.37	.11
5	e.14	e.14	.15	e.00	e.10	e.15	e.34	e.21	e.24	e.71	e5.0	.09
6	e.13	e.12	.11	e.00	e.16	e.12	e.30	e.20	e.23	e.39	e1.7	.09
7	e.12	e.11	.11	e.00	e.20	e.15	e.28	e.23	e.28	e.29	e.89	.10
8	e.12	e.12	.12	e.00	e.25	e.20	e.25	e.22	e.31	e.24	e.64	.13
9	e.12	e.13	.11	e.00	e.22	e.30	e.22	e.22	e.28	e.21	e.52	.14
10	e.13	e.14	.11	e.00	e.17	e.42	e.20	e.23	e.25	e.19	e.40	.17
11	e.16	e.16	.16	e.00	e.15	e.54	e.22	e.22	e.22	e.21	e.31	e.20
12	e.18	e.17	e.18	e.00	e.14	e.65	e.23	e.36	e.21	e.19	e.33	e.19
13	e.17	e.20	e.17	e.00	e.12	e.60	e.26	e.42	e.21	e.15	e.36	e.17
14	e.17	.19	e.15	e.00	e.09	e.58	e.24	e.40	e.29	e.12	e.42	e.15
15	e.16	.20	e.13	e.00	e.07	e.56	e.24	e.37	e.31	e.50	e.46	8.3
16	e.17	.19	e.11	e.00	e.08	e.52	e.22	e.33	e.26	e.25	e.39	5.2
17	e.19	.17	e.09	e.00	e.10	e.50	e.21	e.30	e.23	e.20	e.30	1.1
18	e.17	.17	e.07	e.00	e.12	e.56	e.23	e.27	e.21	e.16	e.27	.88
19	e.18	.17	e.05	e.00	e.13	e.65	e.24	e.26	e.33	e.15	e.29	.50
20	e.16	.17	e.02	e.00	e.16	e1.4	e.22	e.26	e.71	.15	e.24	.37
21	e.16	.20	e.01	e.00	e.18	e1.2	e.21	e.28	e.64	6.0	e.22	.62
22	e.17	.16	e.00	e.00	e.17	e1.1	e.20	e.26	e.40	9.1	e.29	.64
23	e.17	.17	e.00	e.00	e.15	e.90	e.18	e.25	e.46	2.7	e.24	.50
24	e.16	.17	e.00	e.00	e.13	e.75	e.18	e.25	e.39	1.4	e.21	.36
25	e.17	.17	e.00	e.00	e.12	e.65	e.20	e.24	e.42	.95	e.20	.30
26	e.20	.16	e.00	e.00	e.10	e.52	e.21	e.23	e.37	.67	e.17	.30
27	e.19	.15	e.00	e.00	e.09	e.48	e.24	e.21	e.26	.52	e.13	.27
28	e.18	.15	e.00	e.00	e.07	e.44	e.25	e.23	e.24	.50	.14	.26
29	e.19	.15	e.00	e.00	---	e.54	e.28	e.24	e.26	.39	.12	.35
30	e.18	.19	e.00	e.00	---	e.58	e.25	e.29	e.25	.31	.12	.25
31	e.19	---	e.00	e.00	---	e.60	---	e.27	---	.34	.10	---
TOTAL	4.93	4.88	2.35	0.00	3.34	15.96	8.00	8.13	9.20	28.31	16.01	22.03
MEAN	.16	.16	.076	.000	.12	.51	.27	.26	.31	.91	.52	.73
MAX	.20	.20	.18	.00	.25	1.4	.55	.42	.71	9.1	5.0	8.3
MIN	.12	.11	.00	.00	.00	.05	.18	.20	.21	.12	.10	.09
AC-FT	9.8	9.7	4.7	.00	6.6	32	16	16	18	56	32	44

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1991, BY WATER YEAR (WY)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.80	.29	.15	.16	7.33	38.5	24.8	4.54	2.34	2.20	.31	.71														
MAX	23.0	.95	.33	1.51	41.7	217	243	42.0	13.2	25.2	1.52	5.12														
(WY)	1963	1972	1974	1974	1983	1982	1975	1970	1969	1969	1974	1973														
MIN	.13	.13	.031	.000	.000	.51	.27	.15	.12	.076	.075	.091														
(WY)	1985	1968	1985	1967	1967	1991	1991	1981	1987	1968	1988	1990														

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1966 - 1991

ANNUAL TOTAL	220.72	123.14	
ANNUAL MEAN	.60	.34	6.93
HIGHEST ANNUAL MEAN			22.7
LOWEST ANNUAL MEAN			.27
HIGHEST DAILY MEAN	87	Jul 3	1110
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			2840
INSTANTANEOUS PEAK STAGE			10.03
ANNUAL RUNOFF (AC-FT)	438	244	5020
10 PERCENT EXCEEDS	.92	.53	4.5
50 PERCENT EXCEEDS	.17	.20	.23
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated

a Backwater from beaver dam.

BEAR DEN CREEK BASIN

06332515 BEAR DEN CREEK NEAR MANDAREE, ND--CONTINUED
(Hydrologic bench-mark station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1968 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	
OCT	01...	0950	0.11	2970	--	11.5	9.0	--	--	--	--	
NOV	13...	1310	0.17	3000	--	20.0	3.0	--	--	--	--	
	26...	1040	0.16	3350	8.3	-7.0	1.0	23	14.1	109	140 K46	
DEC	11...	1015	0.16	3260	8.4	-0.5	1.0	16	13.4	104	--	
FEB	28...	1045	0.07	2950	--	-4.5	0.5	--	--	--	--	
MAR	11...	1030	0.52	1560	8.4	2.0	0.5	47	12.7	97	K23 820	
	29...	1410	0.56	2120	--	6.0	2.0	--	--	--	--	
JUN	17...	1215	0.23	2460	8.6	19.5	22.0	22	8.0	100	K180 140	
JUL	15...	1045	0.09	2120	--	30.0	25.5	--	--	--	--	
AUG	27...	0915	0.11	2420	8.6	26.0	19.0	55	7.7	91	K300 870	
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 AD- SORP- TION RATIO (00932)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD CO3 (00452)	
NOV	26...	240	46	31	750	87	21	5.9	1050	970	1110 36	
DEC	11...	240	48	29	720	86	20	6.0	981	1080	1170 72	
MAR	11...	170	34	20	360	82	12	8.2	489	467	545 12	
JUN	17...	140	26	19	560	89	20	6.9	747	700	659 96	
AUG	27...	140	23	20	540	89	20	7.7	704	600	586 72	
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
NOV	26...	930	8.5	0.70	14	2300	2370	3.13	0.99	--	0.020	<0.010
DEC	11...	830	8.2	0.20	14	2220	2300	3.02	0.96	--	0.020	<0.010
MAR	11...	520	<0.10	0.40	12	1220	--	--	--	0.160	0.040	0.020
JUN	17...	560	0.30	1.0	7.2	1680	1600	2.28	1.04	--	0.030	<0.010
AUG	27...	650	1.0	0.90	10	1630	1610	2.22	0.48	--	<0.010	<0.010

BEAR DEN CREEK BASIN

187

06332515 BEAR DEN CREEK NEAR MANDAREE, ND--CONTINUED
(Hydrologic bench-mark station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTH- THO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)
NOV 26...	<0.100	<0.100	0.040	0.050	0.40	--	0.080	0.010	0.020	<0.010	30
DEC 11...	<0.100	<0.100	0.040	0.020	0.60	--	0.050	<0.010	0.020	<0.010	--
MAR 11...	0.170	0.180	0.120	0.080	1.0	--	0.100	0.030	0.020	<0.010	230
JUN 17...	<0.050	<0.050	0.060	0.020	1.1	--	0.070	0.020	0.020	<0.010	170
AUG 27...	<0.050	<0.050	<0.010	0.020	0.70	0.90	0.110	0.010	<0.010	<0.010	100

DATE	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)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	
NOV 26...		1	<100	<10	<1.0	<1	<1	1	40	<1	80
MAR 11...		<1	36	<0.5	<1.0	1	<3	2	420	<1	43
JUN 17...		4	<100	<10	<1.0	<1	1	5	130	<1	70
AUG 27...		3	<100	<10	<1.0	2	2	3	100	<1	60

DATE	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)	GROSS ALPHA, DIS- SOLVED (UG/L AS U-NAT) (80030)
NOV 26...	130	<0.1	<4	<1	<1	<1.0	460	4	<10	14
MAR 11...	190	<0.1	<10	3	<1	<1.0	300	<6	13	--
JUN 17...	10	<0.1	2	<1	1	<1.0	350	16	<10	6.7
AUG 27...	<10	<0.1	3	8	<1	<1.0	380	9	<10	--

DATE	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- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 26...	1.4	10	1.9	7.6	1.8	0.10	3.5	121	0.05	79
DEC 11...	--	--	--	--	--	--	--	83	0.04	80
MAR 11...	--	--	--	--	--	--	--	132	0.19	89
JUN 17...	2.8	12	3.5	9.4	3.3	0.11	3.4	68	0.04	82
AUG 27...	--	--	--	--	--	--	--	102	0.03	80

LITTLE MISSOURI RIVER BASIN

06335500 LITTLE MISSOURI RIVER AT MARMARTH, ND

LOCATION.--Lat 46°17'44", long 103°55'06", in SW¼ sec.30, T.133 N., R.105 W., Slope County, Hydrologic Unit 10110203, on left bank 90 ft downstream from bridge on U.S. Highway 12 in Marmarth, and 1.5 mi downstream from Little Beaver Creek.

DRAINAGE AREA.--4,640 mi², approximately.

WATER-DISCHARGE RECORDS

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

REVISED RECORDS (WATER YEARS).--WSP 896: 1938-39. WSP 1086: 1943-44. WSP 1279: 1943(M), 1945-46, 1948. WSP 1439: 1950 (calendar year figures).

GAGE.--Water-stage recorder. Datum of gage is 2,686.32 ft above National Geodetic Vertical Datum of 1929. Prior to June 23, 1950, various nonrecording gages on former highway bridge at present site and datum. June 23, 1950, to Sept. 2, 1957, nonrecording gage at site 90 ft upstream at present datum.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Small diversions for irrigation upstream from station.

EXTREMES OUTSIDE PERIOD OF RECORD.--According to local residents, the greatest known flood prior to 1953 occurred in June 1907 (stage unknown). Other major floods occurred in March 1913, May 1929, and March 1920 and reached stages of about 21.5 ft, 20.2 ft, and 19.7 ft, respectively. These stages are not comparable to stages during period of record, owing to construction of levees.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	2.5	e4.0	e.00	e.00	e75	19	378	158	88	8.3	.02
2	.00	2.1	e4.0	e.00	e.00	e75	15	339	169	69	6.8	.02
3	.00	2.0	e4.0	e.00	e.00	e80	14	265	163	59	5.2	.01
4	.00	e2.5	e4.0	e.00	e.00	e80	14	259	130	46	4.1	.01
5	.00	e3.0	e3.5	e.00	e.00	e75	12	196	117	35	2.9	.01
6	.00	e3.5	e3.5	e.00	e.00	e75	7.9	149	106	26	3.9	.01
7	.00	e4.0	e3.5	e.00	e.00	e75	5.9	129	93	20	12	.01
8	.00	e6.0	e3.0	e.00	e5.0	e70	3.1	116	81	16	12	.02
9	.00	7.7	e3.0	e.00	e35	e85	11	104	110	12	10	.02
10	.00	6.7	e3.0	e.00	e45	e90	12	93	91	e130	5.9	.04
11	.01	6.4	e2.5	e.00	e50	e85	35	86	75	e200	3.4	.03
12	.06	6.5	e2.5	e.00	e60	e80	65	743	57	e170	1.8	.01
13	.16	6.7	e2.5	e.00	e65	e75	87	612	46	66	1.2	.01
14	.59	6.4	e2.0	e.00	e60	e75	80	234	45	38	.88	.00
15	.76	5.4	e2.0	e.00	e58	72	123	145	58	25	1.3	.41
16	1.2	4.9	e1.5	e.00	e54	52	245	161	60	17	13	4.2
17	8.0	6.7	e1.5	e.00	e50	86	166	138	53	12	e15	3.9
18	7.8	7.8	e1.0	e.00	e50	26	122	148	46	8.2	e5.0	3.3
19	4.5	7.4	e1.0	e.00	e52	38	103	181	40	6.3	1.0	4.7
20	4.0	6.5	e.50	e.00	e54	40	85	190	88	4.8	.70	4.9
21	5.2	e6.0	e.00	e.00	e54	50	67	193	121	3.6	.51	4.8
22	5.4	e5.5	e.00	e.00	e56	47	64	153	89	2.4	.37	7.6
23	4.1	e5.0	e.00	e.00	e58	44	73	127	236	1.9	.32	8.1
24	3.9	e4.8	e.00	e.00	e58	40	68	107	e1800	1.5	.27	7.4
25	3.7	e4.6	e.00	e.00	e60	38	63	101	e700	1.5	.23	6.4
26	3.3	e4.4	e.00	e.00	e60	38	118	118	149	2.1	.15	6.5
27	2.7	e4.4	e.00	e.00	e65	31	365	126	136	17	.13	7.8
28	3.0	e4.2	e.00	e.00	e70	30	562	114	490	57	.07	6.7
29	2.6	e4.2	e.00	e.00	---	29	822	105	699	40	.05	5.6
30	1.8	e4.0	e.00	e.00	---	31	274	110	158	22	.04	4.9
31	2.3	---	e.00	e.00	---	35	---	135	---	12	.03	---
TOTAL	65.08	151.8	52.50	0.00	1119.00	1822	3700.9	6055	6364	1209.3	116.55	87.43
MEAN	2.10	5.06	1.69	.000	40.0	58.8	123	195	212	39.0	3.76	2.91
MAX	8.0	7.8	4.0	.00	70	90	822	743	1800	200	15	8.1
MIN	.00	2.0	.00	.00	.00	26	3.1	86	40	1.5	.03	.00
AC-FT	129	301	104	.00	2220	3610	7340	12010	12620	2400	231	173

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1991, BY WATER YEAR (WY)

	MEAN	104	30.7	15.0	18.3	181	895	824	584	701	198	73.2	74.0
MAX	1489	241	107	260	2207	5079	6691	3840	4705	807	343	526	
(WY)	1972	1947	1952	1973	1943	1978	1952	1975	1944	1962	1953	1941	
MIN	.87	.37	.000	.000	.000	24.7	10.7	4.75	3.51	.10	.16	.000	
(WY)	1959	1956	1956	1939	1939	1981	1981	1980	1961	1980	1988	1955	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1938 - 1991

ANNUAL TOTAL	39306.18	20743.56	
ANNUAL MEAN	108	56.8	310
HIGHEST ANNUAL MEAN			986
LOWEST ANNUAL MEAN			20.5
HIGHEST DAILY MEAN	4440	1800	28600
LOWEST DAILY MEAN	.00 Oct 1	.00 Oct 1	.00 Dec 18 1938
ANNUAL SEVEN-DAY MINIMUM	.00 Oct 1	.00 Oct 1	.00 Dec 18 1938
INSTANTANEOUS PEAK FLOW		3740	45000
INSTANTANEOUS PEAK STAGE		a6.76	23.40
ANNUAL RUNOFF (AC-FT)	77960	41140	224600
10 PERCENT EXCEEDS	286	135	610
50 PERCENT EXCEEDS	6.4	6.7	30
90 PERCENT EXCEEDS	.04	.00	.50

e Estimated.

a From floodmark.

LITTLE MISSOURI RIVER BASIN

189

06335500 LITTLE MISSOURI RIVER AT MARMARTH, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-51, 1970 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 28...	1325	4.2	3350	--	2.0	0.5	--	--	--	--	--	--
FEB 13...	1135	63	1270	--	1.0	0.5	--	--	--	--	--	--
MAR 27...	1235	40	1580	8.6	-2.0	2.0	170	36	20	300	78	10
MAY 08...	1125	129	1050	--	19.0	14.0	--	--	--	--	--	--
JUN 19...	1110	40	1380	--	23.0	21.0	--	--	--	--	--	--
JUN 25...	1310	463	860	--	22.0	21.0	--	--	--	--	--	--
AUG 14...	1150	0.98	2580	9.2	32.0	29.0	92	22	9.0	530	91	24
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 27...	5.2	440	7	380	450	9.6	0.30	6.3	1050	1050	1.43	
AUG 14...	15	650	32	580	680	14	0.70	6.0	1700	1630	2.31	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 27...	113	1	220	80	<1	50	30	<0.1	1	1	430	
AUG 14...	4.50	5	450	30	<1	80	20	<0.1	4	1	360	

LITTLE MISSOURI RIVER BASIN

06336600 BEAVER CREEK NEAR TROTTERS, ND

LOCATION.--Lat 47°09'47", long 103°59'32", in SW¹/₄SW¹/₄NE¹/₄ sec.33, T.143 N., R.105 W., Golden Valley County, Hydrologic Unit 10110204, on left bank 100 ft upstream from bridge on county road, 2.4 mi east of Montana-North Dakota State line, 13 mi southwest of Trotters, 17 mi north of Beach, 20 mi upstream from Elk Creek, and 27 mi above mouth.

DRAINAGE AREA.--616 mi², revised.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1977 to current year (seasonal records only since 1984).

REVISED RECORDS.--1977: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 2,370 ft, from topographic map.

REMARKS.--Records fair except those for period of estimated daily discharges, which are poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 194 ft³/s, July 10, gage height, 5.85 ft; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e.00	e.00	.95	4.6	2.3	112	.00	.00
2	---	---	---	---	e.00	e.02	.66	4.0	2.8	75	.00	.00
3	---	---	---	---	e.01	e.09	.47	3.6	4.2	45	.00	.00
4	---	---	---	---	e.01	e2.4	.29	3.6	6.4	27	.00	.00
5	---	---	---	---	e.02	e2.7	.22	3.6	4.6	17	.00	.00
6	---	---	---	---	e.02	e2.5	.12	3.5	3.2	11	.00	.00
7	---	---	---	---	e.02	e1.5	.06	2.8	2.5	7.0	.00	.00
8	---	---	---	---	e.03	e2.2	.05	2.4	1.9	5.0	.00	.75
9	---	---	---	---	e.02	e2.4	.06	1.9	2.0	3.7	.00	.00
10	---	---	---	---	e.02	e3.1	.04	1.3	1.9	26	.00	.00
11	---	---	---	---	e.02	e2.8	.05	1.2	1.5	12	.00	.00
12	---	---	---	---	e.02	e2.1	.17	2.1	.89	7.6	.00	.00
13	---	---	---	---	e.03	e1.5	.60	3.2	.68	8.6	.00	.00
14	---	---	---	---	e.01	e1.4	.82	4.2	.52	5.3	.00	.00
15	---	---	---	---	e.00	e1.1	1.3	4.5	1.5	3.3	.00	3.8
16	---	---	---	---	e.03	e1.0	2.0	4.0	1.2	2.3	.00	6.3
17	---	---	---	---	e.00	e.81	1.9	3.7	27	1.2	.00	1.2
18	---	---	---	---	e.00	e.52	1.7	3.3	27	1.0	.00	.21
19	---	---	---	---	e.01	e.45	1.7	2.4	16	.59	.00	.00
20	---	---	---	---	e.02	e.64	1.4	1.9	13	.47	.00	.00
21	---	---	---	---	e.03	e.64	1.0	1.6	11	.28	.00	.00
22	---	---	---	---	e.03	e.54	.91	3.6	14	.09	.00	.00
23	---	---	---	---	e.02	e.58	.89	4.7	13	.05	.00	.00
24	---	---	---	---	e.00	e.45	.67	4.1	17	.02	.00	.00
25	---	---	---	---	e.00	e.36	.55	3.7	19	.00	.00	.00
26	---	---	---	---	e.00	e.25	.81	4.1	19	.00	.00	.00
27	---	---	---	---	e.00	e.50	1.4	5.8	13	.00	.00	.00
28	---	---	---	---	e.00	1.3	3.4	5.1	9.1	.00	.00	.00
29	---	---	---	---	---	1.4	4.4	4.0	6.9	.00	.00	.00
30	---	---	---	---	---	1.3	4.6	3.2	12	.00	.00	.00
31	---	---	---	---	---	1.1	---	2.5	---	.00	.00	---
TOTAL	---	---	---	---	0.37	37.65	33.19	104.2	255.09	371.50	0.00	12.26
MEAN	---	---	---	---	.013	1.21	1.11	3.36	8.50	12.0	.000	.41
MAX	---	---	---	---	.03	3.1	4.6	5.8	27	112	.00	6.3
MIN	---	---	---	---	.00	.00	.04	1.2	.52	.00	.00	.00
AC-FT	---	---	---	---	.7	75	66	207	506	737	.00	24

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1978 - 1991, BY WATER YEAR (WY)

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.10	2.62	2.59	4.40	40.4	113	61.6	17.1	20.7	7.06	1.45	.67		
MAX	3.29	6.34	5.13	14.7	141	609	406	45.7	125	48.5	8.00	4.72		
(WY)	1983	1983	1979	1983	1983	1978	1979	1979	1982	1978	1978	1986		
MIN	.006	.010	.032	.000	.000	1.21	1.11	1.05	.30	.000	.000	.000		
(WY)	1982	1982	1982	1982	1989	1991	1991	1981	1988	1988	1985	1981		

SUMMARY STATISTICS

WATER YEARS 1978 - 1991

ANNUAL MEAN	a33.3	
HIGHEST ANNUAL MEAN	a79.7	1978
LOWEST ANNUAL MEAN	a2.77	1981
HIGHEST DAILY MEAN	2500	Mar 22 1978
LOWEST DAILY MEAN	.00	Aug 1 1981
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 10 1981
INSTANTANEOUS PEAK FLOW	2720	Mar 29 1978
INSTANTANEOUS PEAK STAGE	b19.27	Mar 22 1978
ANNUAL RUNOFF (AC-FT)	a24110	
10 PERCENT EXCEEDS	36	
50 PERCENT EXCEEDS	2.4	
90 PERCENT EXCEEDS	.00	

e Estimated.

a Based on complete water years only (1978-83).

b Backwater from ice.

LITTLE MISSOURI RIVER BASIN

06336600 BEAVER CREEK NEAR TROTTERS, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1978 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 CAO3) (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)
MAR 20...	1020	0.64	2180	--	11.5	1.0	--	--	--	--	--	--
APR a01...	1035	1.0	1800	8.4	13.0	4.5	400	61	59	300	62	7
MAY 06...	1000	3.9	2180	--	5.5	9.0	--	--	--	--	--	--
JUN 10...	1010	2.3	2450	--	22.0	20.5	--	--	--	--	--	--
JUL 19...	1045	0.66	2130	8.6	26.5	22.0	410	45	72	350	64	8
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CAO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR a01...	8.0	400	0	330	740	7.5	0.20	3.6	1400	1380	1.90	
JUL 19...	12	330	24	310	840	11	0.20	0.70	1520	1520	2.07	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR a01...	3.93	2	360	20	1	40	50	<0.1	<1	1	890	
JUL 19...	2.71	3	680	30	<1	50	10	<0.1	2	<1	1100	

a Replicate sample also collected for quality-assurance purposes.

LITTLE MISSOURI RIVER BASIN

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND

LOCATION.--Lat 47°35'45", long 103°15'45", in SE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.35, T.148 N., R.99 W., McKenzie County, Hydrologic Unit 10110205, 0.8 mi upstream from U.S. Highway 85 crossing, 17 mi upstream from Cherry Creek, and 17.5 mi south of Watford City.

DRAINAGE AREA.--8,310 mi² approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1934 to current year.

REVISED RECORDS (WATER YEARS).--WSP 926: 1935. WSP 1270: 1943.

GAGE.--Water-stage recorder. Datum of gage is 1,929.03 ft above National Geodetic Vertical Datum of 1929. From Oct. 2, 1959, to June 17, 1963, and Nov. 28, 1964, to Sept. 30, 1990, water-stage recorder at site at U.S. Highway 85 crossing, 0.8 mi downstream. From June 18, 1963, to Nov. 28, 1964, at site 0.6 mi downstream at present datum. See WSP 1729 or 1917 for history of changes prior to Oct. 2, 1959.

REMARKS.--Records fair except those for periods of estimated daily discharges and those for periods with discharges greater than 400 ft³/s, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.90	9.1	e1.6	e.00	e.01	e20	64	381	237	469	20	14
2	.20	5.8	e1.7	e.00	e.10	e25	65	716	231	512	21	13
3	.05	8.5	e1.8	e.00	e.11	e35	62	608	225	726	21	14
4	.90	7.4	e1.7	e.00	e.12	e40	57	473	218	517	17	14
5	.50	6.3	e1.5	e.00	e1.0	e50	53	432	269	349	163	14
6	.20	e6.2	e1.5	e.00	e3.7	e80	49	440	393	275	215	14
7	.34	e6.0	e1.5	e.00	e4.5	e100	46	404	271	228	80	14
8	.34	e6.0	e2.0	e.00	e4.4	e110	44	373	231	193	45	471
9	.34	e6.0	e1.9	e.00	e4.3	e120	43	333	232	167	34	359
10	.20	e6.4	e1.7	e.00	e4.0	e110	43	293	219	176	25	278
11	.10	6.8	e1.5	e.00	e4.0	e90	40	260	187	916	16	175
12	.80	6.3	e1.3	e.00	e4.2	e80	51	255	177	502	12	100
13	.50	8.0	e1.2	e.00	e4.2	e75	72	404	241	304	13	168
14	.80	8.0	e1.1	e.00	e4.5	e85	115	376	272	222	13	373
15	.60	6.8	e1.0	e.00	e5.0	e95	208	310	399	158	18	3320
16	.90	6.8	e.85	e.00	e6.0	108	213	385	578	181	13	6070
17	3.5	4.2	e.75	e.00	e7.0	108	205	626	388	213	13	781
18	12	4.7	e.65	e.00	e12	101	278	476	375	142	66	325
19	8.0	11	e.50	e.00	e30	95	321	348	389	115	54	195
20	5.2	4.7	e.40	e.00	e45	95	334	281	334	96	81	134
21	12	4.2	e.30	e.00	e70	90	357	248	467	68	104	133
22	25	e4.0	e.20	e.00	e65	83	313	297	550	47	69	209
23	22	e3.8	e.10	e.00	e50	79	266	245	440	43	52	242
24	18	e3.6	e.05	e.00	e40	71	223	260	377	41	40	238
25	14	e3.5	e.02	e.00	e25	74	192	246	387	35	32	169
26	9.7	e2.0	e.00	e.00	e20	68	217	246	357	31	27	111
27	6.8	e1.6	e.00	e.00	e18	36	311	254	459	31	22	83
28	9.1	e1.5	e.00	e.00	e16	47	322	242	1490	28	16	61
29	9.1	e1.5	e.00	e.00	---	55	304	239	819	28	14	55
30	9.1	e1.5	e.00	e.00	---	57	285	232	620	27	14	51
31	9.1	---	e.00	e.00	---	61	---	277	---	23	14	---
TOTAL	180.27	162.2	26.82	0.00	448.14	2343	5153	10960	11832	6863	1344	14198
MEAN	5.82	5.41	.87	.000	16.0	75.6	172	354	394	221	43.4	473
MAX	25	11	2.0	.00	70	120	357	716	1490	916	215	6070
MIN	.05	1.5	.00	.00	.01	20	40	232	177	23	12	13
AC-FT	358	322	53	.00	889	4650	10220	21740	23470	13610	2670	28160

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1991, BY WATER YEAR (WY)

MEAN	162	51.1	13.6	10.2	233	1849	1535	754	1125	496	213	177
MAX	2364	409	138	121	3023	10220	12170	4302	5646	1811	1405	1174
(WY)	1972	1947	1947	1983	1943	1972	1952	1975	1944	1935	1937	1941
MIN	.83	.33	.000	.000	.000	22.2	29.5	18.0	14.8	9.26	.023	1.38
(WY)	1989	1989	1989	1935	1935	1964	1981	1981	1988	1980	1988	1936

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1935 - 1991

ANNUAL TOTAL	61223.29	53510.43	
ANNUAL MEAN	168	147	552
HIGHEST ANNUAL MEAN			1637
LOWEST ANNUAL MEAN			38.0
HIGHEST DAILY MEAN	3000	6070	55000
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		8900	110000
INSTANTANEOUS PEAK STAGE		8.15	a24.00
ANNUAL RUNOFF (AC-FT)	121400	106100	399900
10 PERCENT EXCEEDS	471	375	1180
50 PERCENT EXCEEDS	19	35	70
90 PERCENT EXCEEDS	.00	.00	.10

e Estimated.

a From floodmark, site and datum then in use.

LITTLE MISSOURI RIVER BASIN

193

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)	
OCT 01...	1155	1.1	2280	--	22.5	12.5	--	--	--	--	--	
NOV 27...	1250	1.6	4000	8.3	-9.0	0.5	40	13.1	103	K47	20	
MAR 05...	1000	53	1300	--	-7.5	0.5	--	--	--	--	--	
13...	1030	78	950	8.4	4.0	0.5	1100	13.0	98	K12	870	
29...	1205	50	1650	--	4.0	2.5	--	--	--	--	--	
MAY 01...	1250	357	1410	--	3.0	4.0	--	--	--	--	--	
JUN 18...	1135	356	1100	--	16.5	14.5	--	--	--	--	--	
JUL 29...	1105	28	1880	8.5	31.0	26.0	63	7.6	102	K100	K84	
AUG 28...	0920	17	1470	8.5	28.5	22.5	2000	7.5	96	390	190	
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)	ALKA- LINITY WAT DIS TOT IT FIELD CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)
NOV 27...	600	120	73	800	74	14	19	713	740	830	36	
MAR 13...	86	20	8.7	180	81	8	6.4	205	192	220	7	
JUL 29...	230	57	22	330	74	9	12	322	312	312	34	
AUG 28...	150	38	13	320	81	11	10	292	272	293	19	
DATE		SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00615)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00613)
NOV 27...	<1.0	20	0.50	15	3060	--	--	--	--	0.020	<0.010	
MAR 13...	290	6.9	0.30	6.5	629	637	0.86	133	0.390	0.030	0.020	
JUL 29...	650	10	0.60	13	1300	1280	1.77	98.3	--	0.020	0.010	
AUG 28...	490	8.5	0.90	11	1030	1060	1.40	46.4	--	0.020	<0.010	
DATE		NITRO- GEN, NO2+NO3 DIS- SOLVED (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,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHOPHOS- PHATE TOTAL (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)
NOV 27...	<0.100	<0.100	0.250	0.280	1.7	--	0.060	<0.010	0.020	<0.010	40	
MAR 13...	0.430	0.410	0.080	0.060	2.6	--	0.560	0.010	<0.010	<0.010	240	
JUL 29...	<0.050	<0.050	<0.010	0.010	1.7	0.70	0.110	0.010	<0.010	<0.010	80	
AUG 28...	1.60	1.70	0.020	0.030	4.2	0.70	1.20	0.040	0.020	0.020	50	

LITTLE MISSOURI RIVER BASIN

06337000 LITTLE MISSOURI RIVER NEAR WATFORD CITY, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	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)
NOV 27...	1	<100	<10	<1.0	<1	<1	3	40	<1	110	60
MAR 13...	<1	21	<0.5	<1.0	2	<3	1	270	<1	21	20
JUL 29...	2	62	<0.5	<1.0	<1	<3	5	70	<1	22	5
AUG 28...	3	55	<0.5	<1.0	2	<3	13	85	<1	44	2
DATE	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)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 27...	<0.1	<2	<1	<1	<1.0	1600	5	<10	224	0.95	62
MAR 13...	0.1	<10	4	<1	<1.0	190	<6	5	1860	394	99
JUL 29...	<0.1	<10	6	1	<1.0	590	<6	<3	175	13	97
AUG 28...	<0.1	<10	10	6	<1.0	410	<6	4	4480	202	100

MISSOURI RIVER MAIN STEM

195

06338000 LAKE SAKAKAWEA NEAR RIVERDALE, ND

LOCATION.--Lat 47°30'10", long 101°25'50", in S¹/₂ sec.31, T.147 N., R.84 W., Mercer County, Hydrologic Unit 10110101, in control structure of Garrison Dam, 2.5 mi west of Riverdale, 14 mi upstream from Knife River, and at mile 1,389.9.

DRAINAGE AREA.--181,400 mi², approximately.

MONTHEND-ELEVATION AND CONTENTS RECORDS

PERIOD OF RECORD.--October 1953 to current year. Prior to October 1966, published as Garrison Reservoir near Riverdale.

REVISED RECORDS.--WSP 1559: 1957 (M).

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

REMARKS.--Reservoir is formed by earth-fill dam; storage began in November 1953. Maximum capacity, 24,200,000 acre-ft below elevation, 1,854.0 ft, top of 29-ft gates. Normal maximum, 22,700,000 acre-ft below elevation, 1,850.0 ft, of which about 4,300,000 acre-ft is designated for flood control. Elevation of crest of spillway, 1,825.0 ft, surmounted by radial gates. Inactive storage, 5,000,000 acre-ft below elevation, 1,775.0 ft. Dead storage, zero at elevation, 1,672.0 ft. Snake Creek arm of the reservoir has connecting gate to main reservoir, with sill at elevation, 1,810 ft. Figures herein represent total contents.

COOPERATION.--Elevations and contents are furnished by the U.S. Army Corps of Engineers. Elevations are observed elevations at midnight on the last day of each month. Contents are computed based on reservoir inflow, reservoir outflow, evaporation, and rainfall; and are adjusted for wind effect.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 24,368,000 acre-ft, July 25, 1975, elevation, 1,854.6 ft; minimum since first reaching normal maximum level in July of 1969, 13,140,000 acre-ft, Apr. 24, 1990, adjusted for wind effect; minimum elevation, 1,815.0 ft, May 14, 1991.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 15,760,000 acre-ft, July 22, elevation, 1,829.2 ft; minimum contents, 12,155,000 acre-ft, May 10, adjusted for wind effect; minimum elevation, 1,815.0 ft, May 14.

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	1,821.0	13,614,000	--
Oct. 31-----	1,821.6	13,738,000	+124,000
Nov. 30-----	1,821.9	13,812,000	+74,000
Dec. 31-----	1,819.7	13,262,000	-476,000
CAL YR 1990-----	--	--	-287,000
Jan. 31-----	1,817.6	12,747,000	-515,000
Feb. 28-----	1,815.7	12,298,000	-449,000
Mar. 31-----	1,816.6	12,499,000	+201,000
Apr. 30-----	1,815.6	12,249,000	-250,000
May 31-----	1,817.8	12,787,000	+538,000
June 30-----	1,826.4	15,024,000	+2,240,000
July 31-----	1,828.7	15,662,000	+638,000
Aug. 31-----	1,826.5	15,068,000	-594,000
Sept. 30-----	1,826.5	15,076,000	+8,000
WTR YR 1991-----	--	--	+1,540,000

MISSOURI RIVER MAIN STEM

06338490 MISSOURI RIVER AT GARRISON DAM, ND
(National stream-quality accounting network station)

LOCATION.--Lat 47°30'08", long 101°25'50", in S sec.31, T.147 N., R.84 W., Mercer County, Hydrologic Unit 10130101, downstream from dam at National Fish Hatchery's supply line from penstocks 4 and 5, in control structure of Garrison Dam, 2.5 mi west of Riverdale, 14 mi upstream from Knife River, and at mile 1,389.9.

DRAINAGE AREA.--181,400 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1969 to current year.

GAGE.--Flow meter and gate readings.

REMARKS.--Records good. Many diversions above station. Flow regulated by Lake Sakakawea (station 06338000). Prior to October 1969 records were obtained at a site 9.1 mi downstream. Discharges at the downstream site were generally about 7 percent greater than those furnished by the U.S. Army Corps of Engineers for the present site.

COOPERATION.--Records furnished by the U.S. Army Corps of Engineers.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9600	10400	18100	17200	21100	18900	11500	22100	19500	18900	19500	19000
2	9600	9700	17200	19000	21100	17400	10500	21600	19200	19100	19400	18400
3	9800	9300	17400	18800	20700	17000	10600	21800	19700	19300	19600	18000
4	9900	10300	17600	18500	20600	16900	10300	19400	19100	19500	19100	18900
5	9600	16300	17600	19600	20900	14400	10400	19500	19300	19600	19300	17300
6	10400	16400	17300	19900	20900	12500	10300	20000	19200	19400	19500	18300
7	10100	10100	17300	20100	21000	12900	10800	18300	19100	19000	19400	18000
8	10500	9800	16800	21000	21000	13400	10500	18400	19200	19000	19800	18000
9	10300	9800	17500	21100	20800	13300	10300	18100	19300	19700	19400	18100
10	10400	10000	16700	21000	21000	13200	10200	18600	19300	19300	19800	18000
11	9900	10600	17000	21200	21100	12500	10700	18400	19200	19300	19900	16100
12	9900	10500	17000	21200	21300	12500	17000	19400	19500	19400	19500	12900
13	10100	10400	17300	20400	21300	12900	23000	19200	18200	19100	19400	13500
14	9900	10200	16700	20900	21200	12900	29000	18500	19200	19200	19400	12700
15	10200	10600	16900	21000	20900	13000	29000	18900	18600	19600	19400	13600
16	10200	10200	17200	20800	20700	12400	29000	18800	19400	19400	19600	12900
17	10400	10200	17000	20700	20900	12100	29000	19900	19500	19700	19300	12800
18	9900	10300	17400	21000	21100	10800	28900	19500	19600	19300	19400	10900
19	9200	10100	17300	21300	20900	10800	22600	19500	19700	19200	19900	10500
20	9500	10700	17500	20900	21100	10500	19100	19700	19300	19200	19400	9700
21	9200	10400	17500	20900	21200	10100	19400	19400	19300	19500	20000	10400
22	10000	10100	16900	21200	21100	10700	19200	19000	18900	19400	19400	10200
23	10600	10400	17100	21000	21500	10300	19100	19200	18900	19200	19000	10300
24	10300	10500	17300	21000	21400	10600	16900	19400	19200	19200	19000	10000
25	10300	10400	17100	21100	21200	10300	16100	19400	19300	19400	18800	10200
26	10200	12500	17400	21000	21100	10700	16300	19600	19100	19400	18600	10300
27	9900	13600	17400	21100	21300	10600	16500	19400	19300	19000	18900	10100
28	9700	15300	17500	21300	21400	10500	16400	19500	19300	19000	18400	9800
29	10300	17600	17600	21500	---	10700	19100	18900	18900	19200	18100	9900
30	10300	17400	17100	21000	---	10900	19500	19400	18900	19400	19300	13800
31	10300	---	17200	21100	---	10800	---	19600	---	19300	18300	---
TOTAL	310500	344100	534900	637800	589800	386500	521200	602400	576200	598200	597800	412600
MEAN	10020	11470	17250	20570	21060	12470	17370	19430	19210	19300	19280	13750
MAX	10600	17600	18100	21500	21500	18900	29000	22100	19700	19700	20000	19000
MIN	9200	9300	16700	17200	20600	10100	10200	18100	18200	18900	18100	9700
AC-FT	615900	682500	1061000	1265000	1170000	766600	1034000	1195000	1143000	1187000	1186000	818400

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1970 - 1991, BY WATER YEAR (WY)

	19650	21610	22080	25250	27260	22250	20680	22290	24370	25900	24640	20280
MEAN	19650	21610	22080	25250	27260	22250	20680	22290	24370	25900	24640	20280
MAX	32430	33240	29530	30500	31500	28210	37500	38490	40120	61800	54130	37230
(WY)	1976	1979	1970	1979	1976	1983	1972	1972	1975	1975	1975	1975
MIN	10020	11150	17250	19100	19360	12470	10590	10560	13960	17390	16240	10990
(WY)	1991	1989	1991	1989	1990	1991	1987	1986	1984	1977	1977	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1970 - 1991

ANNUAL TOTAL	6184000	6112000										
ANNUAL MEAN	16940	16750										
HIGHEST ANNUAL MEAN										23000		
LOWEST ANNUAL MEAN										33000		1975
HIGHEST DAILY MEAN	25600	Jan 28	29000	Apr 14	65200	Jul 25	1975					
LOWEST DAILY MEAN	9200	Oct 19	9200	Oct 19	6000	Sep 29	1974					
ANNUAL SEVEN-DAY MINIMUM	9600	Sep 17	9770	Oct 16	9600	Sep 17	1990					
ANNUAL RUNOFF (AC-FT)	122700000		121200000		166700000							
10 PERCENT EXCEEDS	20800		21000		31600							
50 PERCENT EXCEEDS	18100		18800		21900							
90 PERCENT EXCEEDS	9960		10200		14800							

MISSOURI RIVER MAIN STEM

197

06338490 MISSOURI RIVER AT GARRISON DAM, ND--CONTINUED
(National stream-quality accounting network station)

LOCATION.--Samples collected at National Fish Hatchery's supply line from penstocks 4 and 5, in control structure of Garrison Dam.

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)
NOV 28...	0910	15300	660	8.5	1.5	8.0	1.0	9.5	80	--	K1
JAN 09...	0915	21100	680	8.6	-18.0	3.0	1.9	11.9	87	--	<1
FEB 13...	0935	21300	680	8.5	0.0	4.5	1.0	12.5	98	--	<1
APR 10...	0905	10200	740	8.3	12.0	3.0	1.0	10.4	78	--	<1
JUN 12...	0950	19500	680	8.3	25.0	11.0	2.3	--	--	--	<1
JUL 16...	0920	19400	685	8.1	30.0	14.5	2.0	10.2	100	--	K1
DATE	STREP- TOCOCCEI 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)	ALKA- LINITY WAT DIS TOT IT FIELD MG/L AS CACO3 (39086)	BICAR- BONATE WATER DIS IT FIELD MG/L AS HCO3 (00453)
NOV 28...	<1	240	58	23	63	36	2	4.0	167	164	190
JAN 09...	50	230	56	22	59	35	2	4.0	106	--	--
FEB 13...	<1	240	56	23	64	37	2	4.4	120	170	205
APR 10...	K100	230	55	22	59	36	2	4.2	168	178	217
JUN 12...	K85	230	54	23	59	35	2	3.8	164	166	203
JUL 16...	K9	230	55	22	58	35	2	3.9	163	164	200
DATE	CAR- BONATE WATER DIS IT FIELD MG/L AS CO3 (00452)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)
NOV 28...	5	210	12	0.60	6.1	446	476	0.61	18400	--	0.030
JAN 09...	--	210	11	0.20	6.2	455	432	0.62	25900	--	0.010
FEB 13...	1	210	13	0.60	6.1	466	480	0.63	26800	--	<0.010
APR 10...	0	190	11	0.60	6.4	426	456	0.58	11700	--	<0.010
JUN 12...	0	180	9.9	0.60	6.1	423	437	0.58	22300	--	<0.010
JUL 16...	0	170	13	0.60	5.9	434	428	0.59	22700	0.130	<0.010
DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	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,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
NOV 28...	<0.010	1.40	<0.100	0.060	0.040	<0.20	--	<0.010	<0.010	<0.010	<0.010
JAN 09...	<0.010	0.100	0.100	0.020	0.020	0.30	--	0.010	<0.010	<0.010	<0.010
FEB 13...	<0.010	0.100	<0.100	0.030	0.010	0.80	--	<0.010	<0.010	<0.010	<0.010
APR 10...	<0.010	<0.050	<0.050	0.010	0.010	0.40	--	0.040	<0.010	0.010	<0.010
JUN 12...	<0.010	0.095	0.088	0.020	0.030	0.30	--	<0.010	<0.010	<0.010	0.010
JUL 16...	0.010	0.120	0.140	<0.010	0.030	0.30	0.30	0.020	<0.010	<0.010	0.010

MISSOURI RIVER MAIN STEM

06338490 MISSOURI RIVER AT GARRISON DAM, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	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)
NOV 28...	<10	2	58	<0.5	<1.0	1	<3	3	4	<1
FEB 13...	<10	2	58	<0.5	2.0	<1	<3	3	11	2
APR 10...	<10	2	55	<0.5	<1.0	<1	<3	3	7	<1
JUL 16...	<10	2	58	<0.5	<1.0	<1	<3	3	9	<1
DATE	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	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 28...	54	2	<0.1	<10	1	<1	<1.0	580	<6	9
FEB 13...	57	4	<0.1	<10	2	<1	<1.0	560	<6	11
APR 10...	49	2	<0.1	<10	<1	<1	<1.0	560	<6	21
JUL 16...	55	3	<0.1	<10	<1	<1	<1.0	540	<6	4

MISSOURI RIVER MAIN STEM

199

06339010 MISSOURI RIVER ABOVE STANTON, ND

LOCATION.--Lat 47°21'45", long 101°21'25", SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ sec.22, T.145 N., R.84 W., McLean County, Hydrologic Unit 10130101, on left bank 9 mi south of Riverdale, and at mile 1,379.

DRAINAGE AREA.--181,400 mi², approximately.

GAGE-HEIGHT RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1600.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated completely by releases from Garrison Dam (station 06338490) 13 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 72.24 ft, Jan. 29, 1977; minimum daily recorded, 62.07 ft, Sept. 18, 1991.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64.23	64.32	64.87	---	68.28	66.41	64.35	64.33	66.19	66.12	66.34	66.10
2	64.20	64.18	64.48	---	67.83	65.90	64.61	64.35	66.19	66.10	66.32	66.10
3	64.25	64.18	64.35	---	67.34	66.02	64.45	64.06	66.21	66.14	66.30	65.93
4	64.23	64.27	64.14	---	67.01	65.81	64.23	64.20	66.19	66.10	66.34	65.80
5	64.27	64.97	64.67	---	66.78	65.51	64.25	64.17	66.14	66.18	66.29	65.86
6	64.26	64.97	64.84	---	66.77	65.13	64.24	65.09	66.22	66.18	66.33	65.79
7	64.20	64.35	65.29	---	66.68	65.03	64.37	65.50	66.10	66.06	66.29	66.15
8	64.26	64.38	65.42	68.03	66.71	64.99	64.35	65.99	66.18	66.10	66.34	66.11
9	64.33	64.19	65.49	67.90	66.68	65.14	64.27	66.20	66.15	66.12	66.31	66.05
10	64.43	64.28	65.40	68.23	66.64	65.03	64.34	65.95	66.17	66.21	66.28	65.95
11	64.17	64.19	64.95	69.15	66.73	65.04	64.35	66.11	66.16	66.20	66.31	65.57
12	64.29	64.32	64.75	69.55	66.67	64.74	65.38	66.19	66.13	66.17	66.30	65.01
13	64.16	64.28	64.63	70.14	66.66	64.91	66.52	66.12	66.04	66.18	66.24	64.92
14	64.29	64.21	64.89	69.90	66.78	64.86	67.85	65.89	66.04	66.19	66.32	64.87
15	64.24	64.41	65.07	69.54	66.62	64.89	67.96	66.18	66.04	66.22	66.20	64.76
16	64.18	64.30	---	69.29	66.71	64.79	67.98	65.91	65.91	66.22	66.30	63.28
17	64.23	64.34	---	69.11	66.65	64.71	67.99	66.29	66.17	66.29	66.27	62.49
18	64.20	64.25	---	68.97	66.63	64.43	67.97	66.18	66.07	66.18	66.11	62.07
19	64.27	64.33	---	68.58	66.59	64.51	67.12	66.21	66.16	66.21	66.35	62.68
20	64.20	64.36	---	69.47	66.64	64.37	66.48	66.17	66.17	66.23	66.27	63.56
21	64.19	64.36	---	69.70	66.66	64.23	66.24	66.18	66.13	66.26	66.25	64.21
22	64.20	64.34	---	69.01	66.55	64.35	66.24	66.13	66.13	66.21	66.20	64.13
23	64.30	64.24	---	69.02	66.71	64.26	66.23	66.15	66.19	66.17	66.15	64.10
24	64.29	64.29	---	69.05	66.66	64.42	65.94	66.15	66.14	66.21	66.07	64.11
25	64.28	64.33	---	68.90	66.69	64.31	65.56	66.23	66.11	66.20	66.09	64.03
26	64.29	64.35	---	68.71	66.60	64.28	65.63	66.19	66.10	66.23	65.92	64.26
27	64.19	64.64	---	68.53	66.65	64.31	65.22	66.21	66.11	66.24	66.03	64.18
28	64.14	64.69	---	68.52	66.66	64.32	65.09	66.22	66.12	66.29	66.07	63.60
29	64.34	65.29	---	69.15	---	64.28	65.27	66.14	66.14	66.24	65.96	63.88
30	64.32	65.10	---	68.99	---	64.40	64.47	66.21	66.09	66.35	66.19	63.45
31	64.32	---	---	68.69	---	64.42	---	66.20	---	66.30	65.98	---
MEAN	64.25	64.42	---	---	66.81	64.83	65.63	65.78	66.13	66.20	66.22	64.63
MAX	64.43	65.29	---	---	68.28	66.41	67.99	66.29	66.22	66.35	66.35	66.15
MIN	64.14	64.18	---	---	66.55	64.23	64.23	64.06	65.91	66.06	65.92	62.07

KNIFE RIVER BASIN

06339100 KNIFE RIVER AT MANNING, ND

LOCATION.--Lat 47°14'10", long 102°46'10", in SE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.6, T.143 N., R.95 W., Dunn County, Hydrologic Unit 10130201, on left bank 50 ft downstream from bridge on State Highway 22, and 0.4 mi north of Manning.

DRAINAGE AREA.--205 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,156.55 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

REVISIONS.--Maximum discharge for water year 1970 was revised to 2,940 ft³/s, June 15, gage height, 16.20 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.12	e.00	e.00	e.78	1.7	e1.9	e.80	.50	.00	.00
2	.00	.00	e.10	e.00	e.02	e.66	1.7	e1.9	e.70	.74	.00	.00
3	.00	.00	e.10	e.00	e.06	e.74	1.4	e1.8	e.60	.46	.00	.00
4	.00	.00	e.09	e.00	e.09	e1.1	1.6	e1.8	e.50	.35	.00	.00
5	.00	.00	e.09	e.00	e.20	e1.5	1.5	e1.7	e.45	.26	.00	.00
6	.00	.00	e.12	e.00	e.19	e1.6	e1.5	e1.6	e.35	.25	.00	.00
7	.00	.00	e.13	e.00	e.74	e1.6	e1.4	e1.6	e.30	.25	.00	.00
8	.00	.00	e.12	e.00	e.70	e1.2	e1.4	e1.5	e.25	.25	.00	.00
9	.00	.00	e.11	e.00	e.66	e1.3	e1.3	e1.5	e.19	.19	.00	.00
10	.00	.00	e.12	e.00	e.90	e1.4	e1.3	e1.5	e.15	.19	.00	.00
11	.00	.00	e.12	e.00	e1.1	e1.5	e1.7	e1.7	e.15	.19	.00	.00
12	.00	.01	e.14	e.00	e.92	e1.8	e2.0	e1.9	e.14	.19	.00	.00
13	.00	.02	e.16	e.00	e.62	e2.0	e3.0	e2.0	e.13	.18	.00	.00
14	.00	.02	e.16	e.00	e.37	e2.2	e4.0	e1.9	e.12	.18	.00	.00
15	.00	.03	e.14	e.00	e.20	e2.3	e3.5	e1.7	e.12	.21	.00	.00
16	.00	.03	e.10	e.00	e.25	e2.5	e3.3	e1.7	8.4	.22	.00	3.6
17	.00	.04	e.07	e.00	e.43	e2.7	e3.0	e1.6	4.7	.22	.00	41
18	.00	.06	e.04	e.00	e.38	e2.8	e2.7	e1.6	1.3	.17	.00	15
19	.00	.10	e.02	e.00	e.39	e2.9	e2.5	e1.5	.40	.15	.00	9.1
20	.00	.14	e.00	e.00	e.51	3.4	e2.3	e1.5	.49	.15	.00	6.4
21	.00	.21	e.00	e.00	e.74	3.9	e2.2	e1.4	.34	.05	.00	3.9
22	.00	.16	e.00	e.00	e1.1	4.0	e2.0	e1.4	.28	.01	.00	2.9
23	.00	.14	e.00	e.00	e1.2	3.5	e1.9	e1.3	3.2	.00	.00	2.2
24	.00	e.12	e.00	e.00	e1.1	3.1	e1.8	e1.3	16	.00	.00	2.0
25	.00	e.11	e.00	e.00	e.99	2.8	e1.7	e1.2	10	.00	.00	1.8
26	.00	e.11	e.00	e.00	e.90	2.2	e1.6	e1.2	6.1	.00	.00	1.1
27	.00	e.11	e.00	e.00	e.84	2.1	e1.6	e1.4	4.0	.00	.00	1.2
28	.00	e.10	e.00	e.00	e.82	1.9	e2.0	e1.5	1.9	.00	.00	.87
29	.00	e.09	e.00	e.00	---	1.6	e2.4	e1.3	.92	.00	.00	.59
30	.00	e.10	e.00	e.00	---	1.6	e2.0	e1.1	.75	.00	.00	.67
31	.00	---	e.00	e.00	---	1.6	---	e1.0	---	.00	.00	---
TOTAL	0.00	1.70	2.05	0.00	16.42	64.28	62.0	48.0	63.73	5.36	0.00	92.33
MEAN	.000	.057	.066	.000	.59	2.07	2.07	1.55	2.12	.17	.000	3.08
MAX	.00	.21	.16	.00	1.2	4.0	4.0	2.0	16	.74	.00	41
MIN	.00	.00	.00	.00	.00	.66	1.3	1.0	.12	.00	.00	.00
AC-FT	.00	3.4	4.1	.00	33	127	123	95	126	11	.00	183

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1991, BY WATER YEAR (WY)

	MEAN	5.06	1.78	1.44	4.07	18.4	87.7	64.4	19.1	15.4	8.33	2.84	5.61
MAX	54.1	6.73	3.15	30.5	89.5	399	485	104	91.5	96.1	32.6	68.5	
(WY)	1983	1983	1987	1974	1986	1972	1975	1970	1970	1969	1983	1978	
MIN	.000	.057	.066	.000	.36	1.37	1.32	.63	.21	.036	.000	.000	
(WY)	1991	1991	1991	1991	1991	1975	1990	1980	1988	1988	1988	1990	

SUMMARY STATISTICS	FOR 1990 CALENDAR YEAR	FOR 1991 WATER YEAR	WATER YEARS 1967 - 1991
ANNUAL TOTAL	272.55	355.87	
ANNUAL MEAN	.75	.97	19.5
HIGHEST ANNUAL MEAN			48.1
LOWEST ANNUAL MEAN			.90
HIGHEST DAILY MEAN	11	41	2400
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		58	2940
INSTANTANEOUS PEAK STAGE		7.91	16.20
ANNUAL RUNOFF (AC-FT)	541	706	14140
10 PERCENT EXCEEDS	1.7	2.2	22
50 PERCENT EXCEEDS	.24	.14	1.5
90 PERCENT EXCEEDS	.00	.00	.10

e Estimated.

KNIFE RIVER BASIN

201

06339100 KNIFE RIVER AT MANNING, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 13...	1110	0.02	2290	--	6.5	3.0	--	--	--	--	--	--
FEB 25...	1240	0.99	3000	--	-2.5	0.5	--	--	--	--	--	--
MAR 18...	1345	2.8	1900	8.5	12.0	1.0	130	25	17	380	86	14
APR 30...	1400	2.0	1790	--	6.0	7.0	--	--	--	--	--	--
JUN 21...	1355	0.29	2050	--	21.0	19.5	--	--	--	--	--	--
JUL 22...	1025	0.02	1490	8.5	22.0	22.0	110	22	14	310	85	13
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
MAR 18...	5.9	610	0	500	500	5.2	0.70	17	1270	1250	1.73	
JUL 22...	8.1	540	14	460	320	6.1	0.60	25	980	985	1.33	
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR 18...	9.50	1	400	210	<1	40	20	<0.1	2	<1	1600	
JUL 22...	0.05	5	360	340	1	30	20	<0.1	1	<1	590	

KNIFE RIVER BASIN

06339500 KNIFE RIVER NEAR GOLDEN VALLEY, ND

LOCATION.--Lat 47°09'40", long 102°03'39", in SE¹/₄, sec.34, T.143 N., R.90 W., Mercer County, Hydrologic Unit 10130201, on left bank 6 ft downstream from highway bridge, 4.5 mi downstream from Elm Creek, and 9 mi south of Golden Valley.

DRAINAGE AREA.--1,230 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to November 1906, April 1907 to November 1915, April 1916 to October 1919, and October 1921 to September 1924 (published as "at Broncho" or "near Broncho"), and April 1943 to current year. Monthly discharge only for some periods published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1006:0 Drainage area. WSP 1279: 1904, 1914-19(M), 1922-24(M), 1944.

GAGE.--Water-stage recorder. Datum of gage is 1,847.13 ft above National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to May 1, 1946.

REMARKS.--Records poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.95	e3.5	3.2	e.23	e2.2	e2.5	e10	9.9	e7.2	e20	.54	.01
2	e.85	e3.5	2.9	e.24	e2.3	e3.5	e10	10	e7.0	e18	1.6	.00
3	.71	e3.3	3.0	e.25	e2.5	e5.0	e11	10	e11	17	1.7	.00
4	.69	e3.5	3.1	e.25	e3.0	e6.8	e11	10	e20	14	1.5	.00
5	e.72	e3.6	3.0	e.25	e3.5	e6.0	e10	9.9	e19	11	1.4	.00
6	e.76	e3.5	3.1	e.26	e3.3	e5.0	e10	e10	e16	9.2	1.4	.00
7	e.80	e3.5	3.3	e.26	e3.2	e5.5	e9.5	e10	e13	7.3	1.3	.00
8	e.80	e3.5	3.5	e.26	e3.1	e7.0	e9.0	e9.8	e10	5.8	1.2	.00
9	e.80	e3.5	3.6	e.25	e3.0	e10	e8.5	e9.6	e8.0	4.8	1.0	.00
10	e.82	e3.6	3.7	e.25	e2.9	e15	e8.5	e9.6	e7.0	3.9	.85	.02
11	e1.0	e3.7	3.8	e.26	e2.8	e13	e8.5	e9.2	e6.0	3.3	.60	.08
12	e2.0	e3.6	4.0	e.30	e2.6	12	e8.2	e9.0	e5.2	2.9	.39	.12
13	e3.5	e3.6	4.0	e.50	e2.5	11	e8.5	e8.5	e5.0	3.0	.28	.09
14	e4.2	e3.7	3.9	e.70	e2.4	11	e8.5	e8.0	e5.0	2.8	.25	.09
15	e4.0	e3.7	3.5	e.90	e2.4	10	e8.5	e7.5	e5.5	2.4	.26	.16
16	e4.0	e3.6	3.2	e1.2	e2.4	8.6	e8.8	e7.2	e5.0	2.0	22	3.8
17	e4.0	e3.6	2.9	e1.5	e2.4	9.7	e9.0	e7.0	e4.8	1.6	10	13
18	e4.0	e3.5	3.0	e1.4	e2.3	11	e8.8	e6.5	e4.5	1.2	4.1	33
19	e4.0	e3.5	2.4	e1.3	e2.3	e19	e11	e6.0	e4.0	.94	1.8	35
20	e4.0	3.1	2.4	e1.3	e2.2	e12	e11	e6.0	e4.5	.95	1.0	22
21	e4.0	3.4	1.6	e1.4	e2.2	e10	e11	e5.5	e6.0	.79	.66	13
22	e4.0	3.3	e1.0	e1.5	e2.1	7.8	e11	e5.2	e15	2.6	.42	12
23	e4.0	3.0	e.80	e1.6	e2.0	9.6	e11	e5.0	e25	5.2	.30	18
24	e4.0	3.0	e.60	e1.7	e2.0	8.3	e11	e5.0	e23	3.6	.35	14
25	e4.0	2.5	e.50	e1.8	e2.0	9.3	e11	e5.0	e20	2.7	.34	11
26	e3.9	2.7	e.20	e1.9	e2.0	7.2	11	e7.0	e19	2.1	.26	8.7
27	e3.5	2.7	e.25	e2.0	e2.0	7.2	9.7	e9.0	e20	1.8	.21	6.8
28	e3.8	2.8	e.24	e2.1	e2.1	8.0	9.9	e8.0	e23	1.3	.18	5.3
29	e3.8	2.9	e.23	e2.1	---	9.0	10	e7.5	e30	1.0	.13	4.2
30	e3.3	3.4	e.20	e2.1	---	8.8	9.8	e7.0	e25	.66	.08	3.5
31	e3.3	---	e.21	e2.2	---	e9.0	---	e7.0	---	.35	.04	---
TOTAL	84.20	100.3	71.33	32.26	69.7	277.8	293.7	244.9	373.7	154.19	56.14	203.87
MEAN	2.72	3.34	2.30	1.04	2.49	8.96	9.79	7.90	12.5	4.97	1.81	6.80
MAX	4.2	3.7	4.0	2.2	3.5	19	11	10	30	20	22	35
MIN	.69	2.5	.20	.23	2.0	2.5	8.2	5.0	4.0	.35	.04	.00
AC-FT	167	199	141	64	138	551	583	486	741	306	111	404

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1991, BY WATER YEAR (WY)

	MEAN	16.0	11.1	7.08	9.49	38.7	352	332	94.7	151	46.7	36.2	16.1
MAX	245	69.7	23.0	140	299	1729	2448	1031	1193	255	725	97.5	
(WY)	1983	1983	1983	1974	1982	1972	1952	1970	1914	1969	1918	1978	
MIN	.69	1.93	.52	.026	.000	2.30	6.98	1.42	1.03	2.32	.28	.41	
(WY)	1961	1962	1962	1962	1959	1964	1981	1923	1961	1919	1959	1958	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1903 - 1991

ANNUAL TOTAL	4096.58	1962.09	
ANNUAL MEAN	11.2	5.38	92.4
HIGHEST ANNUAL MEAN			235
LOWEST ANNUAL MEAN			5.38
HIGHEST DAILY MEAN	281	May 27	10300
LOWEST DAILY MEAN	.07	Aug 10	.00
ANNUAL SEVEN-DAY MINIMUM	.12	Aug 8	.00
INSTANTANEOUS PEAK FLOW			68
INSTANTANEOUS PEAK STAGE			5.72
ANNUAL RUNOFF (AC-FT)	8130	3890	a26.70
10 PERCENT EXCEEDS	18	11	122
50 PERCENT EXCEEDS	3.6	3.5	10
90 PERCENT EXCEEDS	.67	.26	2.1

e Estimated.

a From floodmark.

KNIFE RIVER BASIN

203

06339500 KNIFE RIVER NEAR GOLDEN VALLEY, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1964-65, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
02...	0925	0.83	1180	--	17.5	12.0	--	--	--	--	--	--
NOV												
19...	1145	3.5	2060	--	12.5	3.0	--	--	--	--	--	--
JAN												
07...	1115	0.26	3510	--	-15.5	1.0	--	--	--	--	--	--
MAR												
04...	1105	6.8	2900	--	14.0	0.5	--	--	--	--	--	--
18...	1105	15	2300	8.7	11.0	1.0	250	44	34	430	78	12
APR												
30...	1035	9.9	2130	--	5.5	8.0	--	--	--	--	--	--
JUN												
06...	0940	16	2220	--	21.5	20.0	--	--	--	--	--	--
JUL												
11...	0900	3.2	1730	8.7	22.5	22.0	180	32	25	370	80	12
AUG												
13...	0945	0.26	1750	--	27.0	23.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINEITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
18...	9.1	660	0	540	700	5.3	0.70	8.2	1610	1560	2.19	
JUL												
11...	11	490	27	450	530	5.9	0.50	13	1260	1260	1.71	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
18...	64.3	1	320	50	1	50	20	<0.1	2	1	830	
JUL												
11...	11.0	4	290	20	1	30	10	<0.1	3	<1	870	

KNIFE RIVER BASIN

06339560 BRUSH CREEK NEAR BEULAH, ND

LOCATION.--Lat 47°10'43", long 101°47'05", in NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ sec.25, T.143 N., R.88 W., Mercer County, Hydrologic Unit 10130201, on right bank 60 ft upstream from bridge on State Highway 49, and 6 mi south of Beulah.

DRAINAGE AREA.--23.92 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1974 to December 1990 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 1,948 ft above National Geodetic Vertical Datum of 1929, from State Highway Department levels.

REMARKS.--Records fair except those for period of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.09	.21	e.25	---	---	---	---	---	---	---	---	---
2	.09	.20	e.25	---	---	---	---	---	---	---	---	---
3	.09	.20	e.24	---	---	---	---	---	---	---	---	---
4	.09	.20	e.23	---	---	---	---	---	---	---	---	---
5	.10	.20	e.23	---	---	---	---	---	---	---	---	---
6	.09	.21	e.23	---	---	---	---	---	---	---	---	---
7	.10	.22	e.23	---	---	---	---	---	---	---	---	---
8	.10	.21	e.24	---	---	---	---	---	---	---	---	---
9	.11	.21	e.25	---	---	---	---	---	---	---	---	---
10	.13	.23	e.30	---	---	---	---	---	---	---	---	---
11	.12	.26	e.28	---	---	---	---	---	---	---	---	---
12	.12	.26	e.27	---	---	---	---	---	---	---	---	---
13	.12	.26	e.26	---	---	---	---	---	---	---	---	---
14	.11	.26	e.24	---	---	---	---	---	---	---	---	---
15	.12	.26	e.23	---	---	---	---	---	---	---	---	---
16	.13	.27	e.20	---	---	---	---	---	---	---	---	---
17	.18	.29	e.18	---	---	---	---	---	---	---	---	---
18	.20	.28	e.15	---	---	---	---	---	---	---	---	---
19	.20	.29	e.12	---	---	---	---	---	---	---	---	---
20	.17	.29	e.08	---	---	---	---	---	---	---	---	---
21	.16	.30	e.05	---	---	---	---	---	---	---	---	---
22	.17	.28	e.02	---	---	---	---	---	---	---	---	---
23	.17	.27	e.01	---	---	---	---	---	---	---	---	---
24	.18	.28	e.00	---	---	---	---	---	---	---	---	---
25	.18	.30	e.00	---	---	---	---	---	---	---	---	---
26	.19	.31	e.00	---	---	---	---	---	---	---	---	---
27	.17	e.27	e.00	---	---	---	---	---	---	---	---	---
28	.19	e.24	e.00	---	---	---	---	---	---	---	---	---
29	.19	e.26	e.00	---	---	---	---	---	---	---	---	---
30	.20	e.26	e.00	---	---	---	---	---	---	---	---	---
31	.21	---	e.00	---	---	---	---	---	---	---	---	---
TOTAL	4.47	7.58	4.54	---	---	---	---	---	---	---	---	---
MEAN	.14	.25	.15	---	---	---	---	---	---	---	---	---
MAX	.21	.31	.30	---	---	---	---	---	---	---	---	---
MIN	.09	.20	.00	---	---	---	---	---	---	---	---	---
AC-FT	8.9	15	9.0	---	---	---	---	---	---	---	---	---

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1991, BY WATER YEAR (WY)

	MEAN	.43	.42	.23	.087	2.67	9.47	3.24	1.68	.78	.28	.32	.22
MAX	1.79	1.13	.70	.46	13.2	57.9	11.5	4.48	4.70	.68	2.60	.74	
(WY)	1983	1983	1987	1987	1986	1982	1975	1975	1984	1987	1987	1986	
MIN	.14	.18	.000	.000	.000	.52	.42	.21	.14	.025	.008	.039	
(WY)	1989	1989	1984	1979	1975	1980	1981	1980	1988	1977	1977	1988	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

WATER YEARS 1975 - 1991

ANNUAL TOTAL	95.24												
ANNUAL MEAN	.26									1.65			
HIGHEST ANNUAL MEAN										6.14			1982
LOWEST ANNUAL MEAN										.25			1980
HIGHEST DAILY MEAN	2.0	Mar 11								590			Mar 29 1982
LOWEST DAILY MEAN	.00	Jan 1								.00			Jan 10 1975
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1								.00			Jan 10 1975
INSTANTANEOUS PEAK FLOW										940			Mar 29 1982
INSTANTANEOUS PEAK STAGE										9.26			Mar 21 1978
ANNUAL RUNOFF (AC-FT)	189									1200			
10 PERCENT EXCEEDS	.60									2.0			
50 PERCENT EXCEEDS	.20									.26			
90 PERCENT EXCEEDS	.00									.00			

e Estimated.

KNIFE RIVER BASIN

205

06339560 BRUSH CREEK NEAR BEULAH, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1975 to November 1990 (discontinued).

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)
NOV 20...	1230	0.31	2020	8.5	13.0	4.0	11.7	570	99
DATE	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)
NOV 20...	78	300	5	495	532	615	17	720	11
DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)	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)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	
NOV 20...	0.40	1500	<1	0.020	<0.100	0.050	<0.010	20	

06340000 SPRING CREEK AT ZAP, ND

LOCATION.--Lat 47°17'10", long 101°55'31", in SW¼ sec.14, T.144 N., R.89 W., Mercer County, Hydrologic Unit 10130201, on right bank 250 ft downstream from Burlington Northern Railway bridge in Zap, and 9 mi upstream from mouth.

DRAINAGE AREA.--549 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to September 1924, October 1945 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,819.39 ft above National Geodetic Vertical Datum of 1929. Mar. 4 to Sept. 30, 1924, nonrecording gage at site 250 ft upstream at different datum. Oct. 1, 1945, to Sept. 30, 1947, nonrecording gage 250 ft upstream at datum 1.12 ft higher.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow slightly regulated by Lake Ilo, 56 mi upstream, capacity 7,130 acre-ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known occurred in about 1902, from ice jam. Floods of February 1913 and March 1943 reached a stage of about 20 ft and 19.5 ft, respectively, from information by local residents.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.9	7.8	e5.4	e.10	e6.2	e6.5	15	14	8.8	11	2.2	1.9
2	4.7	e7.8	e5.2	e.05	e6.5	e7.0	17	14	7.6	9.8	2.5	1.7
3	3.9	e12	e5.1	e.00	e8.0	e8.0	18	15	6.8	9.9	2.6	1.6
4	4.3	e8.0	e5.0	e.00	e15	e20	17	16	7.1	8.7	2.6	1.6
5	4.3	e8.0	e5.1	e.00	e16	e25	17	17	11	7.4	2.8	1.6
6	4.2	e7.7	e5.3	e.00	e14	e15	16	15	10	6.3	3.0	1.6
7	e4.1	e7.0	e5.5	e.00	e13	e17	15	14	8.5	5.6	2.8	1.6
8	4.1	e7.0	e5.7	e.00	e14	e16	14	14	7.2	4.8	2.7	1.6
9	e4.2	e6.8	e6.0	e.00	e13	e16	13	14	7.2	4.4	2.6	1.7
10	5.0	6.9	e5.8	e.00	e12	e16	13	14	8.6	4.0	2.4	1.6
11	5.0	e7.0	e5.8	e.10	e12	e17	14	12	7.4	4.2	2.1	2.0
12	4.9	e7.5	e5.7	e.50	e12	e18	14	12	7.0	3.9	2.0	2.4
13	5.0	e7.8	e5.4	e1.0	e11	e17	16	13	5.7	3.6	2.0	2.4
14	5.4	7.9	e5.2	e1.5	e10	e18	19	14	6.5	3.6	3.2	2.6
15	5.9	9.0	e5.0	e1.8	e8.0	e18	20	13	8.3	3.6	8.2	2.5
16	6.6	e8.5	e4.7	e2.5	e7.5	e19	23	12	7.1	3.2	6.4	2.8
17	9.8	e10	e4.4	e3.0	e7.5	e20	24	11	6.0	3.1	4.3	3.4
18	e9.8	7.2	e4.0	e4.0	e7.5	e21	24	9.9	5.8	2.9	3.3	3.3
19	9.4	7.6	e3.5	e4.5	e7.5	e22	25	8.7	4.9	2.7	3.2	3.3
20	8.5	7.5	e3.0	e5.0	e7.5	e25	23	8.4	7.4	2.8	3.1	3.3
21	e8.0	7.6	e2.5	e4.5	e7.2	34	19	7.9	9.7	2.7	2.7	3.4
22	7.5	7.6	e2.0	e5.0	e7.0	27	17	7.5	7.9	2.9	2.6	4.0
23	6.8	6.3	e1.5	e5.0	e7.0	26	16	7.1	7.5	2.8	3.2	4.3
24	e6.4	8.4	e1.4	e5.2	e7.0	21	15	6.4	9.3	2.5	3.2	4.2
25	6.0	5.7	e1.3	e5.4	e7.0	19	15	6.2	10	2.5	3.2	4.0
26	6.0	e5.4	e1.0	e5.6	e7.0	20	15	8.0	9.8	2.3	3.0	3.9
27	6.6	e5.4	e.80	e5.8	e7.0	16	15	10	8.7	2.4	2.8	3.7
28	7.0	e5.4	e.50	e6.0	e7.0	14	15	9.2	7.6	2.5	2.6	3.9
29	7.3	e5.6	e.40	e6.0	---	13	15	8.1	8.6	2.6	2.3	4.0
30	7.2	e5.7	e.30	e6.0	---	16	14	7.5	8.6	2.5	2.3	4.3
31	7.6	---	e.20	e6.0	---	15	---	8.1	---	2.4	2.1	---
TOTAL	192.4	222.1	112.70	84.55	264.4	562.5	513	347.0	236.6	133.6	94.0	84.2
MEAN	6.21	7.40	3.64	2.73	9.44	18.1	17.1	11.2	7.89	4.31	3.03	2.81
MAX	9.8	12	6.0	6.0	16	34	25	17	11	11	8.2	4.3
MIN	3.9	5.4	.20	.00	6.2	6.5	13	6.2	4.9	2.3	2.0	1.6
AC-FT	382	441	224	168	524	1120	1020	688	469	265	186	167

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1991, BY WATER YEAR (WY)

	MEAN	10.3	9.62	6.76	5.87	24.4	156	156	38.8	47.1	24.0	10.2	7.73
MAX	74.4	51.9	21.2	30.6	143	933	1044	292	290	178	53.2	16.5	
(WY)	1983	1983	1973	1973	1954	1972	1952	1970	1971	1962	1990	1986	
MIN	1.76	2.88	.80	.000	.000	3.39	9.71	7.35	3.10	1.84	.96	1.10	
(WY)	1959	1962	1962	1959	1949	1949	1961	1961	1961	1961	1961	1958	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1924 - 1991

ANNUAL TOTAL	5995.10	2847.05	
ANNUAL MEAN	16.4	7.80	41.5
HIGHEST ANNUAL MEAN			99.5
LOWEST ANNUAL MEAN			6.95
HIGHEST DAILY MEAN	688	Aug 25	5640
LOWEST DAILY MEAN	.20	Dec 31	.00
ANNUAL SEVEN-DAY MINIMUM	.64	Dec 25	.00
INSTANTANEOUS PEAK FLOW			41
INSTANTANEOUS PEAK STAGE			5.21
ANNUAL RUNOFF (AC-FT)	11890	5650	30030
10 PERCENT EXCEEDS	17	16	54
50 PERCENT EXCEEDS	7.0	6.6	8.6
90 PERCENT EXCEEDS	3.8	2.0	2.8

e Estimated.

KNIFE RIVER BASIN

207

06340000 SPRING CREEK AT ZAP, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1969-70, 1974 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 20...	1056	7.5	1810	--	10.5	1.5	--	--	--	--	--	--
FEB 12...	1525	12	1780	--	7.0	0.0	--	--	--	--	--	--
MAR 19...	1234	22	1240	--	15.0	1.0	--	--	--	--	--	--
MAR 27...	1150	33	1120	8.3	1.0	0.0	--	--	--	--	--	--
JUN 04...	1254	6.0	1790	8.4	24.0	22.0	380	64	53	280	61	6
JUL 15...	1415	3.7	1810	--	31.0	30.5	--	--	--	--	--	--
SEP 04...	1120	1.6	1910	8.7	24.5	19.5	340	49	52	300	65	7
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	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)	SOLIDS, SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
JUN 04...		8.7	540	0	440	540	9.4	0.40	7.4	1240	1230	1.69
SEP 04...		11	500	20	440	580	11	0.50	2.9	1310	1270	1.78
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
JUN 04...		20.2	2	540	20	<1	70	110	<0.1	1	1	1600
SEP 04...		5.66	4	480	20	<1	70	50	<0.1	<1	<1	1300

KNIFE RIVER BASIN

06340500 KNIFE RIVER AT HAZEN, ND
(National stream-quality accounting network station)

LOCATION.--Lat 47°17'07", long 101°37'18", in SW¹/₄, SE¹/₄, SE¹/₄, sec.18, T.144 N., R.86 W., Mercer County, Hydrologic Unit 10130201, on left bank at downstream side of highway bridge, 0.5 mi south of Hazen, and 3 mi upstream from Antelope Creek.

DRAINAGE AREA.--2,240 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October to November 1928, March 1929 to September 1933, August 1937 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1146: 1943. WSP 1279: 1930-31, 1932-33(M). WSP 1917: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,712.35 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 25, 1947, nonrecording gages at same site and datum.

REMARKS.--Records good except those for period of estimated daily discharge, which are fair. Slight regulation by Lake Ilo 81 mi upstream, capacity, 7,130 acre-ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--According to local residents, the floods of 1943 and 1950 were not exceeded during the period 1884 to 1942.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	13	17	e16	e5.2	e13	e18	e41	32	22	50	6.0	3.9
2	12	17	e15	e5.1	e14	e19	40	31	22	43	6.0	3.3
3	14	17	e14	e5.0	e15	e22	40	31	21	38	6.8	2.9
4	15	e17	e15	e5.0	e16	e30	41	33	20	33	6.8	2.6
5	13	e17	e16	e5.0	e18	e50	38	33	19	29	8.7	2.2
6	12	e16	e16	e4.9	e21	e48	36	33	21	26	11	2.1
7	12	e15	e17	e4.9	e27	e44	34	33	31	24	14	3.0
8	11	e16	e17	e4.9	e26	e47	32	34	30	21	14	3.3
9	11	e16	e18	e4.9	e26	e50	30	32	26	19	14	2.4
10	12	e16	e17	e4.9	e25	e52	29	30	27	17	13	3.4
11	12	e16	e17	e5.0	e25	e56	28	30	25	15	11	4.4
12	12	e16	e16	e5.2	e24	e60	28	30	24	14	7.3	5.3
13	12	e17	e16	e5.4	e23	e70	34	29	23	12	5.5	5.9
14	12	e16	e16	e5.8	e21	e90	39	27	22	12	6.0	7.8
15	12	e16	e16	e6.6	e20	e85	41	25	21	10	11	16
16	13	e17	e15	e8.0	e20	e82	42	25	19	8.8	24	15
17	20	e18	e15	e10	e20	e80	46	24	19	8.0	20	9.4
18	21	e17	e14	e15	e19	e78	48	23	19	6.4	16	7.2
19	20	e16	e12	e13	e19	e74	50	21	20	5.1	24	11
20	20	e17	e10	e10	e21	e70	50	20	23	5.1	20	49
21	19	e17	e9.0	e11	e20	e65	51	20	25	5.1	16	47
22	18	e17	e8.0	e12	e20	e60	48	21	24	5.1	13	38
23	18	e17	e7.0	e12	e19	e55	43	20	32	4.8	27	30
24	19	e17	e6.0	e11	e19	e50	39	18	33	5.1	27	25
25	19	e16	e5.0	e11	e19	e46	36	18	45	5.1	15	29
26	19	e16	e4.0	e13	e19	e44	34	18	41	5.1	10	27
27	19	e16	e4.5	e12	e19	e43	36	20	35	6.2	8.9	23
28	19	e17	e5.0	e12	e18	e45	36	21	36	7.4	7.4	21
29	18	e18	e4.8	e12	---	e46	34	21	42	9.5	5.9	18
30	18	e17	e4.5	e12	---	e43	33	20	54	7.3	5.0	16
31	18	---	e5.0	e12	---	e42	---	24	---	6.3	4.5	---
TOTAL	483	498	370.8	263.8	566	1664	1157	797	821	463.4	384.8	434.1
MEAN	15.6	16.6	12.0	8.51	20.2	53.7	38.6	25.7	27.4	14.9	12.4	14.5
MAX	21	18	18	15	27	90	51	34	54	50	27	49
MIN	11	15	4.0	4.9	13	18	28	18	19	4.8	4.5	2.1
AC-FT	958	988	735	523	1120	3300	2290	1580	1630	919	763	861

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1991, BY WATER YEAR (WY)

	MEAN	36.3	30.9	21.2	19.9	87.3	692	554	170	243	111	47.5	35.2
MAX	365	223	83.1	145	927	3228	4293	1530	1041	979	215	143	143
(WY)	1983	1983	1983	1974	1930	1943	1952	1970	1944	1938	1954	1978	1978
MIN	6.39	7.71	3.79	.70	.000	11.6	26.3	17.0	8.70	10.5	2.00	.50	.50
(WY)	1962	1962	1962	1962	1962	1965	1981	1931	1961	1961	1933	1933	1933

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1929 - 1991

ANNUAL TOTAL	13733.0	7902.9	
ANNUAL MEAN	37.6	21.7	
HIGHEST ANNUAL MEAN			172
LOWEST ANNUAL MEAN			441
HIGHEST DAILY MEAN	1230	Aug 25	21.7
LOWEST DAILY MEAN	4.0	Dec 26	22400
ANNUAL SEVEN-DAY MINIMUM	4.7	Dec 25	.00
INSTANTANEOUS PEAK FLOW			.00
INSTANTANEOUS PEAK STAGE			35300
ANNUAL RUNOFF (AC-FT)	27240	15680	27.01
10 PERCENT EXCEEDS	66	43	124400
50 PERCENT EXCEEDS	18	18	254
90 PERCENT EXCEEDS	11	5.1	31
			9.5

e Estimated.

a Backwater from ice.

KNIFE RIVER BASIN

209

06340500 KNIFE RIVER AT HAZEN--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1951, 1969 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, KF AGAR (COLS. PER 100 ML) (31673)
NOV 27...	1152	16	1750	8.3	-3.5	0.0	4.5	11.1	77	K40	2200
JAN 08...	1145	4.9	2050	--	-17.5	0.0	--	--	--	--	--
FEB 12...	1040	24	2350	8.1	5.0	0.0	9.5	9.7	68	48	5700
MAR 19...	1107	74	1550	--	13.5	0.5	--	--	--	--	--
MAR 27...	1010	43	1360	--	2.5	1.0	--	--	--	--	--
APR 09...	1024	30	1560	8.4	15.0	11.0	14	9.8	89	K30	180
JUN 04...	1104	20	1710	--	17.0	20.0	--	--	--	--	--
JUL 15...	1250	10	2080	--	38.0	36.5	--	--	--	--	--
SEP 10...	0830	3.9	1520	8.4	14.5	16.0	9.7	8.6	87	280	1400
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)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)
NOV 27...	410	82	49	270	58	6	9.9	510	512	625	0
FEB 12...	300	60	35	200	58	5	14	349	354	432	0
APR 09...	290	59	34	230	63	6	7.4	397	--	--	--
SEP 10...	280	54	36	260	66	7	9.6	487	488	591	2
DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
NOV 27...	510	9.9	0.20	9.3	1180	1250	1.60	51.9	--	<0.010	<0.010
FEB 12...	430	10	0.30	12	946	978	1.29	61.0	0.510	0.040	0.030
APR 09...	430	7.2	0.40	5.1	980	1010	1.33	79.9	--	<0.010	<0.010
SEP 10...	420	12	0.50	10	1010	1100	1.37	10.5	--	0.010	<0.010
DATE	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, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS 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)
NOV 27...	<0.100	<0.100	0.080	0.050	0.50	0.030	<0.010	0.010	<0.010	<10	1
FEB 12...	0.550	0.540	0.170	0.160	1.8	0.160	0.110	0.100	0.090	30	2
APR 09...	0.091	0.088	0.020	0.020	<0.20	0.020	<0.010	0.020	<0.010	10	<1
SEP 10...	<0.050	<0.050	0.020	0.030	0.90	0.070	0.030	<0.010	<0.010	<10	1

KNIFE RIVER BASIN

06340500 KNIFE RIVER AT HAZEN--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	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 27...	80	<0.5	<1.0	1	<3	2	13	<1	71	110	<0.1
FEB 12...	57	<0.5	2.0	<1	1	6	190	1	42	170	0.2
APR 09...	57	<0.5	<1.0	1	<3	1	12	<1	39	42	<0.1
SEP 10...	140	<0.5	<1.0	<1	<3	<1	<3	<1	48	86	<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, DIS- SUS- PENDE (MG/L) (80154)	SED- MENT, DIS- SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. & FINER THAN .062 MM (70331)	
NOV 27...	<10	2	<1	<1.0	1300	<6	24	45	2.0	52	
FEB 12...	2	3	<1	1.0	930	6	9	15	0.97	63	
APR 09...	<10	1	<1	<1.0	1000	<6	7	38	3.1	79	
SEP 10...	<10	3	<1	<1.0	940	<6	9	103	1.1	63	

MISSOURI RIVER MAIN STEM

211

06340700 MISSOURI RIVER NEAR STANTON, ND

LOCATION.--Lat 47°17'14", long 101°20'25", in SW $\frac{1}{4}$ sec.16, T.144 N., R.84 W., Mercer County, Hydrologic Unit 10130101, on right bank 3 mi southeast of Stanton, 0.1 mi below Ft. Clark irrigation pumping station, 0.4 mi above the United Power Association power plant, and at mile 1,372.

DRAINAGE AREA.--182,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--October 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,650.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 30, 1964, at datum 50.00 ft lower.

REMARKS.--Stage regulated completely by releases from Garrison Dam (station 06338490) 18 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 24.56 ft, Feb. 22, 1965; minimum daily recorded, 9.19 ft, Sept. 13, 1990.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.53	---	11.69	---	13.93	12.66	9.89	12.36	---	12.34	12.49	12.28
2	9.48	---	11.87	---	13.89	11.90	10.34	12.94	---	12.32	12.46	12.31
3	9.47	---	11.67	---	13.85	11.98	10.04	13.01	---	12.40	12.46	12.08
4	9.49	---	11.58	---	13.77	11.68	9.68	12.75	---	12.34	12.50	12.21
5	9.55	---	11.77	---	13.31	11.36	9.71	12.39	---	12.44	12.45	12.20
6	9.60	---	11.65	---	13.25	10.80	9.74	12.51	12.49	12.44	12.51	12.01
7	9.60	---	11.61	---	13.02	10.61	9.87	12.45	12.34	12.35	12.46	12.43
8	9.59	---	11.54	---	13.01	10.55	9.88	12.05	12.42	12.36	12.55	12.25
9	---	---	11.59	15.63	12.86	10.90	9.81	12.43	12.42	12.34	12.52	12.18
10	---	---	11.72	15.13	12.81	10.73	9.97	12.00	12.41	12.44	12.48	12.04
11	---	---	11.56	15.50	12.89	10.84	10.00	12.39	12.41	12.42	12.51	11.55
12	---	---	11.54	15.22	12.79	10.45	11.03	12.38	12.35	12.39	12.53	11.04
13	---	---	11.50	15.08	12.76	10.60	12.60	12.32	12.27	12.40	12.42	10.71
14	---	---	11.66	14.68	12.84	10.64	14.23	12.00	12.24	12.39	12.54	10.74
15	---	---	11.53	14.51	12.99	10.64	14.51	12.48	12.26	12.42	12.41	10.77
16	---	---	11.61	14.23	13.00	10.58	14.54	12.09	12.42	12.39	12.51	10.37
17	---	---	11.66	13.88	12.87	10.41	14.57	12.61	12.38	12.50	12.54	10.78
18	---	---	11.67	14.16	12.78	10.07	14.60	12.47	12.43	12.38	12.27	10.35
19	---	---	11.59	14.02	12.69	10.13	13.69	12.42	12.42	12.41	12.58	9.54
20	---	---	11.81	13.86	12.77	10.01	12.78	12.43	12.48	12.44	12.50	9.72
21	---	---	12.21	14.04	12.78	9.77	12.42	12.40	12.40	12.45	12.51	9.87
22	---	---	11.52	13.97	12.69	9.99	12.41	12.39	12.39	12.39	12.44	9.78
23	---	---	11.13	13.86	12.89	9.73	12.40	12.38	12.45	12.32	12.43	9.80
24	---	---	---	13.95	12.84	10.04	12.12	12.39	12.39	12.38	12.29	9.83
25	---	---	---	13.88	12.88	9.88	11.48	12.48	12.34	12.43	12.32	9.53
26	---	---	---	13.90	12.71	9.88	11.62	12.45	12.33	12.39	12.14	9.96
27	---	---	---	13.90	12.82	9.86	11.51	12.47	12.35	12.40	12.19	9.87
28	---	---	---	13.80	12.85	9.93	11.52	12.47	12.39	12.44	12.32	9.78
29	---	11.30	---	13.97	---	9.77	12.02	12.38	12.42	12.35	12.14	9.61
30	---	11.80	---	14.13	---	9.85	12.29	12.45	12.33	12.50	12.41	10.47
31	---	---	---	14.05	---	9.97	---	---	---	12.44	12.22	---
MEAN	---	---	---	---	13.02	10.52	11.71	---	---	12.40	12.42	10.87
MAX	---	---	---	---	13.93	12.66	14.60	---	---	12.50	12.58	12.43
MIN	---	---	---	---	12.69	9.73	9.68	---	---	12.32	12.14	9.53

MISSOURI RIVER MAIN STEM

06340900 MISSOURI RIVER NEAR HENSLER, ND

LOCATION.--Lat 47°16'45", long 101°11'03", in SW¼ sec.22, T.144 N., R.83 W., McLean County, Hydrologic Unit 10130101, on left bank about 7.5 mi west of Washburn, and at mile 1,362.

DRAINAGE AREA.--183,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--May 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,640.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 30, 1964, at datum 40 ft lower.

REMARKS.--Stage regulated by releases from Garrison Dam (station 06338490) 28 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 27.77 ft, Mar. 20, 1965; minimum daily recorded, 13.65 ft, June 4, 1986.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14.00	14.11	16.05	---	19.31	17.01	14.21	16.33	16.49	16.41	16.54	16.34
2	13.93	13.82	16.33	---	19.25	16.66	14.64	16.96	16.50	16.36	16.52	16.39
3	13.87	13.95	16.08	---	19.11	16.56	14.31	17.04	16.52	16.45	16.52	16.12
4	13.92	13.98	15.99	---	19.00	16.07	14.06	16.97	16.55	16.41	16.54	16.19
5	14.00	14.66	16.17	---	18.48	15.86	13.99	16.50	16.49	16.49	16.49	16.29
6	14.02	16.01	16.03	---	18.45	15.31	14.05	16.54	16.51	16.49	16.54	16.04
7	14.00	15.04	16.04	---	18.07	14.98	14.14	16.66	16.66	16.42	16.52	16.65
8	14.05	14.49	15.91	19.93	17.85	14.96	14.18	16.11	16.58	16.42	16.56	16.30
9	14.12	13.97	15.97	---	17.60	15.24	14.06	16.54	16.50	16.41	16.56	16.25
10	14.27	14.06	16.10	19.89	17.36	15.06	14.33	16.10	16.48	16.50	16.53	16.11
11	13.97	14.16	15.95	20.08	17.42	15.18	14.27	16.56	16.48	16.49	16.54	15.60
12	14.01	14.15	15.97	19.99	17.26	14.90	14.97	16.43	16.42	16.46	16.58	15.35
13	13.92	14.14	15.87	20.07	17.16	14.87	16.64	16.39	16.36	16.46	16.49	14.85
14	14.09	14.02	16.09	19.97	17.35	15.00	18.14	16.13	16.34	16.46	16.57	14.94
15	14.09	14.32	15.94	19.99	18.28	14.93	18.53	16.54	16.35	16.49	16.51	14.95
16	14.04	14.09	16.01	19.90	18.40	14.97	18.57	16.26	16.48	16.48	16.52	14.66
17	14.09	14.26	16.09	19.62	17.90	14.76	18.58	16.58	16.43	16.55	16.58	14.89
18	14.04	14.08	16.05	19.69	17.45	14.54	18.59	16.61	16.48	16.50	16.34	14.70
19	14.09	14.13	16.04	19.62	17.11	14.39	17.98	16.50	16.50	16.46	16.58	14.26
20	14.01	14.30	---	19.58	17.07	14.41	17.01	16.49	16.56	16.53	16.52	13.98
21	14.01	14.15	---	19.61	17.02	14.13	16.59	16.47	16.48	16.51	16.54	14.04
22	13.96	14.25	---	19.56	16.93	14.34	16.49	16.47	16.45	16.50	16.50	14.02
23	14.08	13.99	---	19.36	17.13	14.10	16.50	16.45	---	16.40	16.51	14.01
24	14.13	14.15	---	---	---	14.33	16.38	16.47	---	16.45	16.37	14.05
25	14.10	14.23	---	---	17.06	14.23	15.66	16.52	16.42	16.50	16.39	13.79
26	14.08	14.32	---	19.18	16.94	14.25	15.73	16.51	16.40	16.46	16.25	14.15
27	14.01	14.92	---	19.24	17.03	14.22	15.66	16.53	16.40	16.48	16.27	14.08
28	13.90	15.39	---	---	17.06	14.25	15.68	16.53	16.46	16.52	16.40	14.02
29	14.22	15.60	---	---	---	14.12	15.89	16.45	16.49	16.40	16.23	13.83
30	14.09	16.21	---	19.46	---	14.09	16.42	16.50	16.42	16.51	16.40	14.44
31	14.13	---	---	19.33	---	14.27	---	16.53	---	16.50	16.33	---
MEAN	14.04	14.43	---	---	17.72	14.90	15.87	16.51	---	16.47	16.48	15.04
MAX	14.27	16.21	---	---	19.31	17.01	18.59	17.04	---	16.55	16.58	16.65
MIN	13.87	13.82	---	---	16.93	14.09	13.99	16.10	---	16.36	16.23	13.79

MISSOURI RIVER MAIN STEM

213

06341000 MISSOURI RIVER AT WASHBURN, ND

LOCATION.--Lat 47°17'20", long 101°02'15", in SE $\frac{1}{4}$,SW $\frac{1}{4}$, sec.14, T.144 N., R.82 W., McLean County, Hydrologic Unit 10130101, on left bank near municipal water plant in Washburn, and at mile 1,355.

DRAINAGE AREA.--184,000 mi², approximately.

GAGE-HEIGHT RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,640.00 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 30, 1964, at datum 40 ft lower.

REMARKS.--Stage regulated by releases from Garrison Dam (station 06338490) 35 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 22.76 ft, Jan. 11, 1964; minimum daily recorded, 9.44 ft, Sept. 25, 1991.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9.71	9.75	11.61	16.15	15.62	12.50	9.94	11.87	11.99	11.94	12.00	11.90
2	9.66	9.51	11.83	15.94	15.67	12.38	10.26	12.41	11.99	11.83	12.00	11.93
3	9.64	9.63	11.68	15.82	15.82	13.00	10.01	12.49	12.01	11.91	11.98	11.69
4	9.69	9.66	11.60	16.07	15.91	11.98	9.89	12.54	12.04	11.89	12.01	11.73
5	9.73	10.05	11.71	16.28	15.66	11.54	9.76	12.03	11.99	11.96	11.97	11.82
6	9.80	11.44	11.63	16.45	15.62	11.06	9.80	12.03	11.98	11.96	12.01	11.60
7	9.77	10.91	11.63	---	15.13	10.67	9.86	12.21	11.95	11.92	11.99	12.17
8	9.81	10.13	11.49	---	14.65	10.66	9.87	11.67	11.96	11.90	12.01	11.84
9	9.83	9.58	11.54	---	---	10.87	9.78	12.03	11.97	11.89	12.02	11.80
10	9.93	9.71	11.63	---	---	10.74	10.07	11.66	11.98	11.96	11.99	11.65
11	9.68	9.77	11.52	---	13.70	10.82	9.91	12.07	11.96	12.00	12.00	11.19
12	9.72	9.76	11.51	---	13.50	10.62	10.35	11.92	11.92	11.94	12.03	10.99
13	9.62	---	11.42	16.44	13.07	10.54	11.91	11.90	11.89	11.93	11.98	10.48
14	9.73	---	11.62	16.27	13.31	10.68	---	11.70	11.80	11.94	12.01	10.53
15	9.71	---	11.47	16.23	15.69	10.62	---	11.99	11.91	11.93	12.00	10.50
16	9.64	---	11.52	---	16.54	10.69	---	11.81	11.96	11.94	11.98	10.34
17	9.70	---	11.60	15.91	15.55	10.47	13.97	11.98	11.86	11.99	12.02	10.37
18	9.71	---	11.52	15.92	14.51	10.34	13.97	12.12	11.96	11.99	11.88	10.31
19	9.72	---	11.56	15.88	13.60	10.07	13.54	12.05	11.98	11.91	12.04	9.85
20	9.64	---	11.74	---	13.00	10.16	12.62	11.96	12.02	11.97	12.00	9.68
21	9.63	---	12.97	---	12.67	9.87	12.18	11.99	11.98	11.97	12.01	9.63
22	9.60	---	15.76	15.88	12.54	10.04	12.06	11.96	11.92	11.97	11.98	9.66
23	9.71	---	16.33	---	12.73	9.86	12.09	11.94	11.98	11.88	11.98	9.63
24	9.74	---	16.77	---	12.72	10.01	12.04	11.95	11.94	11.91	11.87	9.66
25	9.76	---	16.46	---	12.62	9.98	11.36	11.99	11.93	11.96	11.88	9.44
26	9.72	---	16.31	---	12.50	9.96	11.36	12.02	11.92	11.92	11.77	9.72
27	9.65	---	16.27	---	12.54	9.95	11.33	12.04	11.89	11.95	11.77	9.67
28	9.58	10.84	16.38	---	12.57	9.95	11.35	12.02	11.95	11.99	11.89	9.65
29	9.88	11.11	16.40	---	---	9.88	11.36	11.97	12.00	11.86	11.75	9.50
30	9.77	11.69	16.39	---	---	9.84	11.99	11.99	11.91	11.95	11.86	9.84
31	9.78	---	16.32	---	---	9.99	---	12.05	---	11.97	11.88	---
MEAN	9.72	---	13.17	---	---	10.64	---	12.01	11.95	11.94	11.95	10.63
MAX	9.93	---	16.77	---	---	13.00	---	12.54	12.04	12.00	12.04	12.17
MIN	9.58	---	11.42	---	---	9.84	---	11.66	11.80	11.83	11.75	9.44

TURTLE CREEK BASIN

06341410 TURTLE CREEK ABOVE WASHBURN, ND

LOCATION.--Lat 47°23'06", long 100°54'43", in NW¹/₄NE¹/₄NE¹/₄ sec.18, T.14S N., R.80 W., McLean County, Hydrologic Unit 10130101, on right bank 250 ft downstream from bridge on county highway, 8.5 mi northeast of Washburn, and 8.8 mi south of Turtle Lake.

DRAINAGE AREA.--350 mi², approximately, of which 195 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 1,780 ft from topographic map.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Water from the McClusky Canal is sometimes diverted into the stream at a point upstream from the gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	e5.4	e.75	e.00	e.00	e.04	e.10	e4.9	e.10	5.6	.06	2.4
2	4.0	e5.0	e.60	e.00	e.05	e.03	e.20	e3.8	e.10	2.1	.06	2.7
3	3.8	e4.7	e.62	e.00	e.20	e.05	e.37	e4.1	e.11	2.9	.06	2.8
4	4.5	e5.0	e.64	e.00	e.50	e.10	e.34	e6.7	e.50	2.1	.06	2.7
5	6.1	e5.5	.73	e.00	e2.5	e1.0	e2.3	e8.5	e.30	1.8	.07	2.7
6	5.4	e5.0	.84	e.00	e2.0	e20	e3.0	e7.5	e.28	1.9	.08	2.8
7	4.2	e4.0	.83	e.00	e1.5	e15	e2.7	e6.0	e.25	1.6	.07	3.2
8	4.0	e5.2	.64	e.00	e1.2	e12	e2.9	e4.8	e.20	1.7	.07	3.3
9	4.0	e5.0	e.60	e.00	e.85	e10	e4.2	e6.7	e.60	1.5	.07	3.6
10	4.4	e4.5	e.58	e.00	e.70	e8.0	e4.6	e3.5	e.50	.60	.06	3.6
11	5.2	e5.0	e.54	e.00	e.78	e14	e4.3	e2.6	e.35	.36	.05	3.6
12	4.3	e5.0	e.50	e.00	e.50	e16	e5.8	e2.8	e.25	.27	.04	4.1
13	4.4	e5.2	e.45	e.00	e.20	e15	e7.1	e2.5	e.20	.33	.03	4.3
14	4.7	e5.8	e.35	e.00	e.10	e18	e7.0	e1.4	e.17	.28	.02	7.4
15	4.7	e5.8	e.30	e.00	e.06	e13	e8.5	1.2	e.15	.21	.01	8.0
16	5.5	e5.5	e.25	e.00	e.05	e11	e4.5	1.4	e.13	.17	.03	8.1
17	7.8	e5.8	e.20	e.00	e.05	e9.5	e5.1	1.2	e.12	.15	.04	6.9
18	7.0	e6.4	e.15	e.00	e.10	e12	e4.6	.77	e.10	.13	.04	5.4
19	e6.0	e6.4	e.10	e.00	e.15	e22	e4.2	.75	e.11	.12	.03	3.7
20	e5.0	e6.1	e.08	e.00	e.25	e14	e3.7	.55	e.15	.11	.02	3.1
21	e4.5	e6.1	e.06	e.00	e.20	e4.5	e3.2	.36	e.25	.11	.02	4.2
22	e4.0	e5.0	e.05	e.00	e.15	e1.8	e2.6	.36	e.20	.11	.01	5.5
23	e3.0	e3.0	e.04	e.00	e.10	e2.0	e2.2	.22	e.22	.11	.01	6.1
24	e4.0	e5.0	e.03	e.00	e.08	e1.0	e1.9	.09	e.25	.11	.01	6.1
25	e4.5	e4.7	e.02	e.00	e.06	e1.5	e1.5	.08	e.30	.10	.01	5.6
26	e5.5	e2.7	e.01	e.00	e.05	e1.0	e1.7	.07	e.25	.10	.00	4.9
27	e5.0	e2.4	e.00	e.00	e.05	e.50	e9.0	e.07	e.20	.09	.00	4.3
28	e5.0	e2.0	e.00	e.00	e.05	e.30	e11	e.07	e.14	.09	.00	4.3
29	e5.0	e1.5	e.00	e.00	---	e.20	e8.2	.08	e.10	.09	.00	4.7
30	e4.8	e1.0	e.00	e.00	---	e.15	e6.7	.08	6.6	.08	.00	4.8
31	e5.0	---	e.00	e.00	---	e.13	---	.09	---	.07	.00	---
TOTAL	149.7	139.7	9.96	0.00	12.48	223.80	123.51	73.24	13.18	24.99	1.03	134.9
MEAN	4.83	4.66	.32	.000	.45	7.22	4.12	2.36	.44	.81	.033	4.50
MAX	7.8	6.4	.84	.00	2.5	22	11	8.5	6.6	5.6	.08	8.1
MIN	3.0	1.0	.00	.00	.00	.03	.10	.07	.10	.07	.00	2.4
AC-FT	297	277	20	.00	25	444	245	145	26	50	2.0	268

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1991, BY WATER YEAR (WY)

	1987	1988	1989	1990	1991
MEAN	2.98	1.19	.17	.048	1.43
MAX	6.88	4.66	.38	.22	6.65
(WY)	1988	1991	1988	1987	1987
MIN	.092	.043	.000	.000	.000
(WY)	1990	1990	1990	1989	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1987 - 1991

ANNUAL TOTAL	697.08	906.49	5.43
ANNUAL MEAN	1.91	2.48	19.8
HIGHEST ANNUAL MEAN			1.10
LOWEST ANNUAL MEAN			767
HIGHEST DAILY MEAN	90	Jul 26	22
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW			34
INSTANTANEOUS PEAK STAGE			3.57
ANNUAL RUNOFF (AC-FT)	1380	1800	3930
10 PERCENT EXCEEDS	5.0	6.1	10
50 PERCENT EXCEEDS	.19	.60	.35
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

TURTLE CREEK BASIN

215

06341410 TURTLE CREEK ABOVE WASHBURN, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	
NOV 14...	1116	6.0	1200	--	8.3	16.0	1.0	6.9	10.5	75	300	
FEB 11...	1342	0.78	890	--	--	1.0	0.0	--	--	--	--	
MAR 21...	1039	4.5	700	--	8.2	10.0	1.0	15	9.6	69	150	
APR 03...	1110	0.37	1240	--	8.3	11.0	5.0	23	8.5	67	270	
MAY 14...	1130	1.4	1860	--	8.5	21.0	17.5	12	5.4	57	280	
JUL 05...	1027	2.0	--	1820	8.4	29.0	22.0	12	4.9	57	230	
SEP 03...	1405	2.8	2310	--	8.4	23.0	19.0	1.3	7.3	79	400	
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)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)
NOV 14...	42	48	160	53	4	8.7	310	360	18	0.80	2.1	
MAR 21...	23	23	100	57	4	7.1	257	130	8.8	0.20	11	
APR 03...	39	42	190	59	5	10	469	210	12	0.30	13	
MAY 14...	35	46	340	72	9	13	671	410	16	0.20	13	
JUL 05...	23	43	360	76	10	13	734	300	12	0.30	12	
SEP 03...	43	71	410	68	9	23	523	750	32	0.60	34	
DATE		SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)
NOV 14...	796	826	1.08	12.8	0.070	0.030	0.100	0.070	0.010	300	6	
MAR 21...	436	458	0.59	5.34	--	0.010	<0.050	0.140	0.100	190	93	
APR 03...	816	798	1.11	0.82	--	<0.010	<0.050	0.030	0.040	320	50	
MAY 14...	1300	1280	1.77	4.88	--	0.010	<0.050	0.080	0.500	570	120	
JUL 05...	1280	1210	1.74	6.91	--	0.020	<0.050	0.040	0.400	770	160	
SEP 03...	1640	1680	2.23	12.5	--	<0.010	<0.050	0.050	0.330	880	100	

PAINTED WOODS CREEK BASIN

06341800 PAINTED WOODS CREEK NEAR WILTON, ND

LOCATION.--Lat 47°16'30", long 100°47'30", in SW¹/₄SW¹/₄ sec.23, T.144 N., R.80 W., McLean County, Hydrologic Unit 10130101, on right bank 600 ft upstream from county highway bridge, 7 mi upstream from Yanktonai Creek, and 8 mi north of Wilton.

DRAINAGE AREA.--427 mi², approximately, of which about 310 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1957 to September 1981, August 1982 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,760 ft, from topographic map.

REMARKS.--Records good except those for period of estimated daily discharges, which are poor. Since the fall of 1982 Missouri River basin water has been diverted into the stream at a point several miles upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	37	e30	e18	e28	e38	32	45	33	24	18	22
2	26	38	e32	e19	e30	e42	28	45	24	24	17	17
3	26	35	e33	e19	e30	49	30	47	16	25	20	17
4	26	24	e33	e19	e31	45	34	50	17	30	21	15
5	26	30	e35	e20	e32	37	32	52	22	32	20	17
6	27	31	e34	e20	e33	33	28	49	31	31	23	25
7	27	36	e34	e20	e35	29	31	46	37	26	20	26
8	27	41	e34	e20	e32	28	33	45	36	27	20	19
9	27	38	e34	e20	e28	29	29	44	38	23	23	9.3
10	27	38	e35	e21	e25	29	30	44	35	22	23	5.6
11	27	38	e35	e21	e24	29	33	46	28	28	23	3.7
12	28	33	e34	e21	e22	26	36	48	23	26	23	2.7
13	27	42	e33	e23	e24	25	40	47	27	24	23	2.0
14	28	39	e33	e22	e26	21	40	39	30	28	23	1.9
15	28	38	e33	e22	e24	19	40	36	32	29	24	13
16	28	37	e32	e23	e25	18	39	36	33	27	29	30
17	30	29	e32	e24	e27	19	39	27	31	25	32	32
18	29	32	e31	e26	e29	19	40	19	31	21	27	33
19	27	37	e30	e25	e30	18	25	18	28	16	26	32
20	27	39	e29	e23	e31	13	11	20	29	15	25	32
21	27	39	e26	e24	e31	11	20	20	31	14	22	32
22	26	33	e23	e24	e32	8.2	33	26	29	27	17	36
23	27	e30	e21	e22	e33	7.1	36	25	28	27	17	34
24	27	e28	e20	e23	e33	7.2	38	18	29	26	16	31
25	27	e27	e20	e24	e33	6.4	38	16	30	28	15	31
26	28	e26	e20	e25	e34	5.7	39	20	31	27	12	34
27	32	e22	e21	e25	e35	4.4	49	19	31	23	12	34
28	36	e24	e22	e25	e36	5.6	48	16	31	24	12	30
29	35	e27	e22	e26	---	18	50	14	29	24	19	28
30	36	e29	e21	e26	---	31	47	18	24	23	23	28
31	36	---	e19	e26	---	33	---	30	---	21	23	---
TOTAL	882	997	891	696	833	703.6	1048	1025	874	767	648	673.2
MEAN	28.5	33.2	28.7	22.5	29.7	22.7	34.9	33.1	29.1	24.7	20.9	22.4
MAX	36	42	35	26	36	49	50	52	38	32	32	36
MIN	26	22	19	18	22	4.4	11	14	16	14	12	1.9
AC-FT	1750	1980	1770	1380	1650	1400	2080	2030	1730	1520	1290	1340

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1991, BY WATER YEAR (WY)

	MEAN	8.11	7.69	6.51	5.98	8.14	39.9	35.8	13.3	12.9	8.61	9.18	8.05
MAX	38.4	33.3	33.9	30.5	34.7	162	310	48.0	52.4	43.4	42.6	43.2	
(WY)	1987	1990	1987	1990	1987	1987	1979	1986	1971	1986	1987	1986	
MIN	.000	.000	.000	.000	.000	.000	.56	.091	.007	.000	.000	.000	.000
(WY)	1962	1962	1959	1959	1959	1969	1977	1977	1961	1961	1958	1958	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1958 - 1991

ANNUAL TOTAL	7286.26	10037.8	
ANNUAL MEAN	20.0	27.5	a13.4
HIGHEST ANNUAL MEAN			48.6
LOWEST ANNUAL MEAN			.42
HIGHEST DAILY MEAN	46	Mar 17	3060
LOWEST DAILY MEAN	.33	Aug 3	.00
ANNUAL SEVEN-DAY MINIMUM	.53	Jul 28	.00
INSTANTANEOUS PEAK FLOW			4050
INSTANTANEOUS PEAK STAGE			9.64
ANNUAL RUNOFF (AC-FT)	14450	19910	9720
10 PERCENT EXCEEDS	34	38	35
50 PERCENT EXCEEDS	25	27	.85
90 PERCENT EXCEEDS	.99	17	.00

e Estimated.

a Mean discharge for 9-year period (1983-90) since Missouri River water has been diverted into the basin, 29.3 ft³/s; mean discharge for the 24 years prior to this diversion (1958-81), 8.07 ft³/s.

PAINTED WOODS CREEK BASIN

217

06341800 PAINTED WOODS CREEK NEAR WILTON, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1959-64, 1970 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)
NOV 14...	1320	38	1340	8.5	18.0	1.5	2.0	10.2	74	220	29
JAN 10...	1113	21	1490	8.4	-15.5	0.0	1.6	11.2	77	390	56
FEB 11...	1218	25	1200	--	-2.0	0.0	--	--	--	--	--
MAR 21...	1303	9.6	840	8.5	12.0	1.5	2.5	12.7	92	220	35
APR 03...	1308	30	1080	8.4	15.5	3.5	5.1	10.8	82	290	44
MAY 14...	1332	38	1380	8.2	21.5	17.5	7.3	9.1	96	370	54
JUL 05...	1235	32	1280	8.5	32.0	23.5	8.6	8.2	98	330	45
SEP 03...	1137	17	1310	8.4	21.5	18.0	1.5	7.7	81	350	46
DATE		MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (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)
NOV 14...		36	96	48	3	7.1	253	450	18	0.40	4.4
JAN 10...		60	170	48	4	12	296	480	21	0.50	5.3
MAR 21...		32	99	49	3	6.0	188	240	12	0.40	2.3
APR 03...		43	130	49	3	9.1	226	290	14	0.50	2.3
MAY 14...		57	160	48	4	12	284	440	21	0.50	3.9
JUL 05...		53	150	48	4	16	250	380	18	0.50	2.1
SEP 03...		57	160	49	4	13	266	430	21	0.60	2.2
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, 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)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P) (00671)	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)
NOV 14...		854	793	1.16	88.3	0.020	<0.100	0.060	<0.010	300	4
JAN 10...		956	983	1.30	53.9	<0.010	<0.100	0.050	0.010	330	120
MAR 21...		536	540	0.73	13.9	<0.010	<0.050	0.030	<0.010	180	19
APR 03...		706	669	0.96	56.4	<0.010	<0.050	0.020	<0.010	240	14
MAY 14...		922	919	1.25	95.1	<0.010	<0.050	0.030	0.010	330	16
JUL 05...		814	815	1.11	70.8	0.020	<0.050	0.060	0.020	290	10
SEP 03...		864	890	1.18	39.2	<0.010	<0.050	0.030	<0.010	310	14

MISSOURI RIVER MAIN STEM

06342020 MISSOURI RIVER AT PRICE, ND

LOCATION.--Lat 47°04'47", long 100°55'55", in NW¼, sec.34, T.142 N., R.81 W., Oliver County, Hydrologic Unit 10130101, on right bank 0.5 mi south of Price, and at mile 1,338.

DRAINAGE AREA.--185,000 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--November 1959 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,620.00 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Sept. 30, 1964, at datum 20 ft lower.

REMARKS.--Stage regulated by releases from Garrison Dam (station 06338490) 52 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 30.12 ft, Jan. 22, 1967; minimum daily recorded, 17.68 ft, Apr. 22, 1987, and Sept. 30, 1991.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17.89	17.89	19.69	24.14	23.53	22.45	18.09	19.98	20.17	20.17	20.20	20.09
2	17.87	17.75	19.78	24.03	23.46	24.34	18.28	20.30	20.16	20.09	20.22	20.13
3	17.83	17.74	19.77	24.21	23.55	24.64	18.22	20.52	20.17	20.11	20.21	20.01
4	17.90	17.76	19.67	24.29	23.59	25.07	18.13	20.63	20.21	20.12	20.22	19.94
5	17.90	17.94	19.73	24.31	23.51	22.74	17.94	20.19	20.18	20.15	20.21	20.00
6	17.93	19.16	19.74	24.31	23.57	20.81	17.97	20.10	20.15	20.17	20.24	19.90
7	17.96	19.38	19.71	24.42	23.72	20.30	18.00	20.27	20.17	20.16	20.23	20.12
8	17.98	18.35	19.61	24.40	23.78	19.65	18.03	19.93	20.14	20.10	20.23	20.12
9	17.98	17.87	19.60	24.47	23.88	19.39	18.00	20.01	20.16	20.11	20.26	20.04
10	18.00	17.82	19.66	24.57	23.79	19.19	18.12	19.94	20.17	20.14	20.24	19.93
11	17.95	17.88	19.62	24.38	23.76	19.08	18.07	20.06	20.14	20.23	20.24	19.65
12	17.81	17.85	19.61	24.49	23.82	18.95	18.25	20.06	20.12	20.17	20.27	19.37
13	17.83	17.91	19.50	24.41	23.92	18.77	19.60	20.05	20.11	20.15	20.26	18.84
14	17.80	17.85	19.62	24.37	23.50	18.85	21.00	19.99	19.98	20.17	20.25	18.82
15	17.85	17.86	19.56	24.32	22.87	18.81	21.84	20.01	20.08	20.16	20.28	18.73
16	17.81	17.90	19.55	24.29	23.68	18.85	21.98	20.04	20.08	20.18	20.25	18.70
17	17.81	17.91	19.59	24.15	24.08	18.69	22.00	19.98	20.08	20.19	20.26	18.50
18	17.84	17.91	19.58	24.01	24.07	18.62	22.00	20.24	20.12	20.25	20.24	18.55
19	17.84	17.80	19.68	24.11	24.03	18.25	21.79	20.20	20.16	20.15	20.19	18.15
20	17.81	17.91	20.08	23.83	24.04	18.37	20.91	20.12	20.20	20.20	20.31	17.96
21	17.76	17.93	22.19	23.66	24.03	18.11	20.35	20.20	20.17	20.20	20.27	17.80
22	17.74	17.91	22.71	23.90	23.60	18.15	20.17	20.14	20.10	20.23	20.27	17.85
23	17.80	17.81	---	23.73	23.07	18.10	20.16	20.11	20.14	20.14	20.25	17.78
24	17.87	17.79	24.03	23.64	23.46	18.11	20.16	20.12	20.15	20.13	20.18	17.81
25	17.89	17.85	---	23.63	23.54	18.16	19.72	20.13	20.15	20.17	20.13	17.71
26	17.87	17.92	---	23.55	23.50	18.09	19.52	20.19	20.13	20.17	20.08	17.71
27	17.82	18.25	24.15	23.58	23.10	18.08	19.51	20.18	20.09	20.18	20.01	17.82
28	17.76	18.78	24.16	23.50	22.60	18.08	19.50	20.18	20.11	20.21	20.10	17.78
29	17.88	19.15	---	23.38	---	18.05	19.43	20.17	20.17	20.13	20.06	17.71
30	17.92	19.58	---	23.53	---	18.04	19.93	20.13	20.14	20.16	20.03	17.68
31	17.90	---	24.12	23.51	---	18.12	---	20.23	---	20.20	20.15	---
MEAN	17.86	18.11	---	24.04	23.61	19.51	19.56	20.14	20.14	20.16	20.20	18.84
MAX	18.00	19.58	---	24.57	24.08	25.07	22.00	20.63	20.21	20.25	20.31	20.13
MIN	17.74	17.74	---	23.38	22.60	18.04	17.94	19.93	19.98	20.09	20.01	17.68

SQUARE BUTTE CREEK BASIN

219

06342260 SQUARE BUTTE CREEK BELOW CENTER, ND

LOCATION.--Lat 47°03'25", long 101°11'35", in SE $\frac{1}{4}$, sec.4, T.141 N., R.83 W., Oliver County, Hydrologic Unit 10130101, on right bank at southeast corner of farmyard, and 6 mi southeast of Center.

DRAINAGE AREA.--146 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1965 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,865 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Nelson Lake 1.5 mi upstream beginning Aug. 24, 1967, capacity 5,000 acre-ft. The capacity of Nelson Lake was increased to 10,000 acre-ft in Aug. 1975.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.4	1.0	e.85	e1.0	e1.6	1.2	1.2	1.4	1.4	3.6	.87	e1.2
2	1.4	.90	e.80	e1.1	e1.8	1.2	1.3	1.4	1.4	1.2	1.1	e1.2
3	1.5	e.90	e.80	e1.1	e1.7	1.3	1.2	1.6	1.2	1.2	1.1	e1.2
4	1.4	e.90	e.85	e1.2	e1.7	2.1	1.2	1.7	1.2	1.2	1.2	1.2
5	1.2	.91	e.85	e1.3	e1.6	1.8	1.3	1.6	1.2	.80	.86	1.2
6	.97	e.90	e.90	e1.4	e1.6	1.4	1.1	1.5	1.2	1.5	1.0	1.2
7	1.2	e1.1	e.90	e1.4	e1.5	1.2	1.0	1.4	1.2	4.7	1.0	1.2
8	1.1	1.4	e.90	e1.4	e1.4	1.2	1.0	1.4	1.2	1.2	1.1	1.4
9	1.4	1.4	e1.0	e1.5	e1.3	1.5	1.0	1.5	1.1	1.2	1.2	1.2
10	1.5	1.2	e1.1	e1.6	e1.3	1.2	.90	1.5	1.1	1.2	1.1	1.2
11	1.5	1.2	e.85	e1.5	e1.3	1.2	.90	1.5	1.1	1.2	1.2	1.2
12	1.3	1.2	e.85	e1.5	1.2	1.3	1.3	1.5	.90	1.1	1.2	1.2
13	1.3	1.2	e.85	e1.4	1.4	1.3	1.5	1.5	.94	1.2	1.2	1.2
14	1.6	1.3	e.85	e1.4	1.1	1.2	1.5	1.5	1.0	1.2	1.1	3.2
15	1.7	1.5	e.90	e1.3	1.5	1.2	1.2	1.5	1.2	1.2	1.0	23
16	1.5	1.5	e.85	e1.4	1.5	1.2	1.4	1.3	1.2	1.2	1.2	8.4
17	1.7	1.4	e.85	e1.5	1.5	1.2	1.5	1.5	1.0	1.1	e1.3	2.4
18	1.3	1.4	e.80	e1.4	1.5	1.4	1.5	1.4	.93	.78	e1.2	2.2
19	1.5	1.3	e.80	e1.4	1.5	1.4	1.3	1.2	1.1	1.0	e1.2	2.2
20	1.2	1.2	e.80	e1.3	1.4	1.5	1.4	1.3	1.3	1.1	e1.1	1.9
21	1.1	.97	e.85	e1.4	1.2	1.5	1.3	1.5	1.2	1.1	e1.2	2.0
22	1.3	.97	e.80	e1.4	1.0	1.5	1.2	1.4	1.2	.90	e1.2	2.0
23	1.3	e.95	e.80	e1.3	1.0	1.3	1.4	1.3	1.2	1.1	e1.2	1.8
24	1.1	e1.0	e.80	e1.3	1.1	1.2	1.5	1.3	1.2	1.1	e1.1	1.7
25	1.3	e1.0	e.75	e1.3	1.2	1.4	1.3	1.4	1.2	1.2	e1.0	1.7
26	1.4	e.95	e.80	e1.2	1.2	1.5	1.4	1.3	1.0	1.1	e1.2	1.5
27	1.1	e.90	e.70	e1.2	1.1	1.4	1.4	1.4	1.2	1.1	e1.1	1.6
28	1.2	e.90	e.75	e1.3	1.2	1.4	1.4	1.4	1.2	1.2	e1.0	1.7
29	.97	e.90	e.80	e1.3	---	1.4	1.5	1.4	1.2	1.2	e1.1	1.7
30	.96	e.90	e.90	e1.3	---	1.4	1.5	1.4	5.2	.91	e1.1	1.6
31	1.1	---	e1.0	e1.4	---	1.3	---	1.7	---	.94	e1.2	---
TOTAL	40.50	33.25	26.30	41.5	38.4	42.3	38.60	44.7	38.67	40.73	34.63	76.4
MEAN	1.31	1.11	.85	1.34	1.37	1.36	1.29	1.44	1.29	1.31	1.12	2.55
MAX	1.7	1.5	1.1	1.6	1.8	2.1	1.5	1.7	5.2	4.7	1.3	23
MIN	.96	.90	.70	1.0	1.0	1.2	.90	1.2	.90	.78	.86	1.2
AC-FT	80	66	52	82	76	84	77	89	77	81	69	152

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1991, BY WATER YEAR (WY)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.57	1.43	1.38	1.37	3.19	54.4	38.4	7.99	6.46	6.03	2.26	1.64															
MAX	2.98	2.99	3.35	2.04	12.2	216	223	44.9	65.0	104	18.1	3.64															
(WY)	1981	1983	1978	1983	1985	1987	1969	1970	1966	1969	1969	1980															
MIN	.24	.19	.21	.20	.089	1.36	1.29	.79	.57	.71	.83	.35															
(WY)	1968	1968	1968	1968	1966	1991	1991	1989	1989	1989	1982	1967															

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1965 - 1991

ANNUAL TOTAL	509.42	495.98	
ANNUAL MEAN	1.40	1.36	10.6
HIGHEST ANNUAL MEAN			30.0
LOWEST ANNUAL MEAN			.86
HIGHEST DAILY MEAN	30	23	2670
LOWEST DAILY MEAN	.50	.70	.00
ANNUAL SEVEN-DAY MINIMUM	.58	.77	.00
INSTANTANEOUS PEAK FLOW		153	9700
INSTANTANEOUS PEAK STAGE		3.70	14.35
INSTANTANEOUS LOW FLOW			.00
ANNUAL RUNOFF (AC-FT)	1010	984	7650
10 PERCENT EXCEEDS	1.9	1.5	6.5
50 PERCENT EXCEEDS	1.3	1.2	1.5
90 PERCENT EXCEEDS	.80	.90	.90

e Estimated.

SQUARE BUTTE CREEK BASIN

06342260 SQUARE BUTTE CREEK BELOW CENTER, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 19...	1412	1.4	1650	--	10.0	5.0	--	--	--	--	--	--
JAN 07...	1327	1.4	1630	--	-13.0	0.5	--	--	--	--	--	--
FEB 11...	0939	1.3	1460	--	10.0	3.5	--	--	--	--	--	--
MAR 19...	1441	1.3	--	--	18.5	8.5	--	--	--	--	--	--
a25...	1340	1.5	1480	8.3	15.0	8.0	400	89	42	220	54	5
JUN 03...	1050	1.2	1560	--	31.0	22.0	--	--	--	--	--	--
JUL 01...	1237	1.4	1210	--	27.5	19.5	--	--	--	--	--	--
SEP 03...	1546	1.2	1730	8.3	25.0	18.0	420	91	46	240	55	5

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR a25...	7.1	490	0	400	450	19	0.30	19	1010	1090	1.37
SEP 03...	9.9	510	0	420	520	21	0.40	19	1200	1200	1.63
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR a25...	4.06	1	1000	40	1	40	260	<0.1	3	1	1100
SEP 03...	3.89	3	930	20	<1	50	70	<0.1	<1	<1	1300

a Replicate sample also collected for quality-assurance purposes.

BURNT CREEK BASIN

221

06342450 BURNT CREEK NEAR BISMARCK, ND

LOCATION.--Lat 46°54'54", long 100°48'48", in SW¹/₄,NW¹/₄,SW¹/₄ sec.29, T.140 N., R.80 W., Burleigh County, Hydrologic Unit 10130101, on left bank on upstream side of county highway bridge, and 7 mi northwest of Bismarck.

DRAINAGE AREA.--108 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1967 to current year (seasonal records only since 1982).

GAGE.--Water-stage recorder. Altitude of gage is 1,690 ft, from topographic map.

REMARKS.--Records good.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 5.3 ft³/s, April 29, gage height, 4.77 ft; no flow for months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	.00	.00	.00	3.5	.14	.00	.00	.00
2	---	---	---	---	.00	.00	.00	2.4	.12	.00	.00	.00
3	---	---	---	---	.00	.00	.00	1.9	.09	.00	.00	.00
4	---	---	---	---	.00	.00	.00	1.9	.10	.00	.00	.00
5	---	---	---	---	.00	.00	.00	1.8	.09	.00	.00	.00
6	---	---	---	---	.00	.00	.00	2.1	.07	.00	.00	.00
7	---	---	---	---	.00	.00	.00	2.4	.02	.00	.00	.00
8	---	---	---	---	.00	.00	.00	2.4	.00	.00	.00	.00
9	---	---	---	---	.00	.00	.00	1.9	.00	.00	.00	.00
10	---	---	---	---	.00	.00	.00	1.8	.00	.00	.00	.00
11	---	---	---	---	.00	.00	.00	1.4	.00	.00	.00	.00
12	---	---	---	---	.00	.00	.00	1.3	.00	.00	.00	.00
13	---	---	---	---	.00	.00	.00	1.5	.00	.00	.00	.00
14	---	---	---	---	.00	.00	.00	1.3	.00	.00	.00	.00
15	---	---	---	---	.00	.00	.00	1.8	.00	.00	.00	.00
16	---	---	---	---	.00	.00	.00	2.1	.00	.00	.00	.00
17	---	---	---	---	.00	.00	.00	1.8	.00	.00	.00	.00
18	---	---	---	---	.00	.00	.77	1.2	.00	.00	.00	.00
19	---	---	---	---	.00	.00	1.7	1.0	.00	.00	.00	.00
20	---	---	---	---	.00	.00	2.3	.82	.00	.00	.00	.00
21	---	---	---	---	.00	.00	1.7	.61	.00	.00	.00	.00
22	---	---	---	---	.00	.00	1.2	.52	.00	.00	.00	.00
23	---	---	---	---	.00	.00	.74	.49	.00	.00	.00	.00
24	---	---	---	---	.00	.00	.61	.38	.00	.00	.00	.00
25	---	---	---	---	.00	.00	.42	.38	.00	.00	.00	.00
26	---	---	---	---	.00	.00	.36	.55	.00	.00	.00	.00
27	---	---	---	---	.00	.00	.51	.43	.00	.00	.00	.00
28	---	---	---	---	.00	.00	1.9	.31	.00	.00	.00	.00
29	---	---	---	---	---	.00	4.5	.22	.00	.00	.00	.00
30	---	---	---	---	---	.00	4.4	.18	.00	.00	.00	.00
31	---	---	---	---	---	.00	---	.20	---	.00	.00	---
TOTAL	---	---	---	---	0.00	0.00	21.11	40.59	0.63	0.00	0.00	0.00
MEAN	---	---	---	---	.000	.000	.70	1.31	.021	.000	.000	.000
MAX	---	---	---	---	.00	.00	4.5	3.5	.14	.00	.00	.00
MIN	---	---	---	---	.00	.00	.00	.18	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	42	81	1.2	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1991, BY WATER YEAR (WY)

	MEAN	.31	.26	.10	.054	5.96	36.9	34.9	3.85	2.34	.75	.32	.29
MAX	1.97	1.19	.66	.45	39.4	170	256	9.36	13.6	6.36	3.43	3.45	
(WY)	1981	1981	1978	1979	1986	1987	1969	1975	1971	1969	1968	1978	
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1968	1968	1968	1968	1968	1990	1990	1990	1977	1973	1972	1970	

SUMMARY STATISTICS

WATER YEARS 1968 - 1991

ANNUAL MEAN	a7.57	
HIGHEST ANNUAL MEAN	a22.2	1969
LOWEST ANNUAL MEAN	a.55	1977
HIGHEST DAILY MEAN	3900	Apr 18 1979
LOWEST DAILY MEAN	.00	Oct 1 1967
ANNUAL SEVEN-DAY MINIMUM	.00	Oct 1 1967
INSTANTANEOUS PEAK FLOW	b10000	Apr 18 1979
INSTANTANEOUS PEAK STAGE	16.93	Apr 18 1979
ANNUAL RUNOFF (AC-FT)	a5490	
10 PERCENT EXCEEDS	7.0	
50 PERCENT EXCEEDS	.03	
90 PERCENT EXCEEDS	.00	

a Based on complete water years only (1967-1981).

b From rating curve extended above 2,200 ft³/s. on basis of culvert and flow-over-road measurement of peak flow.

BURNT CREEK BASIN

06342450 BURNT CREEK NEAR BISMARCK, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
APR 25...	1407	0.42	1270	8.2	28.0	16.5	390	58	59	140	43	3
MAY 13...	1440	1.7	1190	--	25.0	19.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 25...	11	470	0	380	310	9.2	0.20	6.4	846	824	1.15	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 25...		0.96	1	90	30	<1	100	10	<0.1	<1	1	620

06342500 MISSOURI RIVER AT BISMARCK, ND

LOCATION.--Lat 46°48'51", long 100°49'12", in SE $\frac{1}{4}$ NW $\frac{1}{4}$, SE $\frac{1}{4}$, sec.31, T.139 N., R.80 W., Burleigh County, Hydrologic Unit 10130101, on left bank 40 ft upstream from Bismarck City waterplant, 2,100 ft downstream from Burlington Northern Railway bridge, 1.6 mi northwest of Bismarck Post Office, 3.5 mi upstream from Heart River, and at mi 1,314.5.

DRAINAGE AREA.--186,400 mi², 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.--Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Lake Sakakawea (station 06338000) 75.4 mi upstream since November 1953.

EXTREMES SINCE COMPLETION OF GARRISON DAM.--Since completion of Garrison Dam in 1953, maximum discharge, 68,900 ft³/s, July 13, 1975, gage height, 14.24 ft; maximum gage height, 14.58 ft, Dec. 18, 1979, backwater from ice.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known, 31.6 ft, Mar. 31, 1881, present site and datum.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	10900	11300	18500	e19000	e23000	e21000	11400	20800	21900	21700	21900	21000
2	10900	11300	18700	e19000	e23000	e20000	11300	21200	21700	21600	22000	21200
3	10800	10500	19500	e19000	e23000	e18000	12200	23500	21700	21100	22000	21200
4	10900	10700	18900	e19000	e23000	e17000	11500	24200	22000	21300	21900	20200
5	11000	11000	18700	e20000	e23000	e16000	10600	23400	22100	21300	22000	20500
6	11100	13400	19100	e21000	e23000	e16500	10400	21400	21800	21600	22000	20500
7	11300	17200	18800	e22000	e22000	e17000	10500	21700	21800	21700	22100	20000
8	11300	14700	18600	e23000	e22000	e17500	10800	21500	21500	21300	22100	22200
9	11400	12500	18100	e23000	e22000	e17800	10800	19600	21800	21200	22300	21200
10	11500	11000	18300	e23000	e22000	e18000	10500	e20000	21800	21200	22200	20600
11	11800	11200	18600	e23000	e22000	e17000	11000	e20500	21600	22000	22000	19700
12	10800	11200	18400	e23000	e22000	e16000	11000	e21000	21600	21800	22100	17700
13	11100	11300	18200	e23000	e22000	e15800	14400	21100	21400	21600	22200	15800
14	10600	11300	18000	e23000	e22000	e15000	21700	20400	21000	21500	22000	14600
15	11100	11000	18500	e23000	e22000	e15000	29200	20100	21000	21600	22300	14600
16	11000	11700	18100	e23000	e22000	e14800	31800	21200	21100	21700	22200	14700
17	10800	11200	18300	e22000	e22000	14500	32300	e21300	21400	21500	22200	13700
18	10900	11600	19000	e22000	e22000	13800	32400	e21500	21200	22000	22200	14300
19	10900	11100	e18000	e22000	e22000	12700	32300	e21600	21600	21800	21400	13100
20	11100	11200	e18000	e22000	e22000	12400	28300	21700	22000	21700	22300	11800
21	10700	11700	e18000	e22000	e22000	12200	23700	21600	21900	21800	22200	10800
22	10600	11500	e18000	e22000	e22000	11300	21700	21700	21600	22000	22200	11100
23	10600	11500	e18000	e22000	e22000	11800	21200	21500	21400	21800	22100	10800
24	11000	10900	e19000	e22000	e22000	11300	21200	21400	21600	21400	21900	10800
25	11000	11200	e19000	e22000	e22000	11700	20000	21400	21500	21500	21400	10800
26	11200	11400	e19000	e22000	e22000	11400	17400	21700	21400	21700	21300	10000
27	11100	12000	e19000	e22000	e23000	11300	17700	21700	21200	21600	20600	11000
28	10600	13500	e19000	e22000	e23000	11300	17500	21800	21200	21700	20800	10700
29	10400	15300	e19000	e23000	---	11300	17400	21800	21400	21800	21300	10500
30	11400	16600	e19000	e23000	---	11100	18900	21400	21500	21500	20600	9970
31	11100	---	e19000	e23000	---	11100	---	22100	---	21900	21300	---
TOTAL	340900	362000	576300	679000	624000	451600	551100	665800	646700	669900	677100	465070
MEAN	11000	12070	18590	21900	22290	14570	18370	21480	21560	21610	21840	15500
MAX	11800	17200	19500	23000	23000	21000	32400	24200	22100	22000	22300	22200
MIN	10400	10500	18000	19000	22000	11100	10400	19600	21000	21100	20600	9970
AC-FT	676200	718000	1143000	1347000	1238000	895700	1093000	1321000	1283000	1329000	1343000	922500

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1991, BY WATER YEAR (WY)

	MEAN	20480	18780	16200	17530	19390	22130	25710	24830	34880	28930	23040	20540
MAX	38800	35040	31690	32350	34840	35980	90160	62990	79400	79720	57010	39700	
(WY)	1952	1979	1970	1969	1969	1939	1952	1928	1929	1928	1975	1975	
MIN	7521	6380	4486	3365	4241	6210	10510	9234	8445	10840	6249	4561	
(WY)	1935	1936	1938	1940	1938	1940	1966	1963	1960	1960	1934	1934	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1928 - 1991

ANNUAL TOTAL	6788200	6709470	
ANNUAL MEAN	18600	18380	22510
HIGHEST ANNUAL MEAN			35630
LOWEST ANNUAL MEAN			13030
HIGHEST DAILY MEAN	27700	Jan 25	32400
LOWEST DAILY MEAN	10400	Sep 14	9970
ANNUAL SEVEN-DAY MINIMUM	10700	Sep 14	10500
INSTANTANEOUS PEAK FLOW			32500
INSTANTANEOUS PEAK STAGE			a11.29
ANNUAL RUNOFF (AC-FT)	13460000	13310000	16310000
10 PERCENT EXCEEDS	24000	22200	35900
50 PERCENT EXCEEDS	19500	21000	21300
90 PERCENT EXCEEDS	11000	11000	8550

e Estimated.

a Backwater from ice.

MISSOURI RIVER MAIN STEM

06342500 MISSOURI RIVER AT BISMARCK, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
APR a19...	1345	31000	700	8.3	17.0	5.0	230	54	23	59	35	2
SEP 30...	1330	9370	656	8.3	15.5	14.0	220	51	22	55	35	2
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR a19...	3.0	200	0	170	170	11	0.60	6.6	433	428	0.59	
SEP 30...	3.8	210	0	170	180	12	0.60	6.0	439	434	0.60	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR a19...	36200	1	90	20	<1	50	10	<0.1	<1	1	620	
SEP 30...	11100	3	120	10	<1	50	10	<0.1	2	<1	580	

a Replicate sample also collected for quality-assurance purposes.

HEART RIVER BASIN

225

06343500 E.A. PATTERSON LAKE NEAR DICKINSON, ND

LOCATION.--Lat 46°52'11", long 102°49'37", in NE¹/₄NW¹/₄SW¹/₄ sec.8, T.139 N., R.96 W., Stark County, Hydrologic Unit 10130202, at left edge of spillway, and 2 mi southwest of Dickinson.

DRAINAGE AREA.--400 mi², approximately.

RESERVOIR-ELEVATION AND CONTENTS RECORDS

PERIOD OF RECORD.--May 1950 to current year. Prior to October 1958, published as Dickinson Reservoir near Dickinson.

GAGE.--Water-stage recorder. Datum of gage is 2,400.00 ft above National Geodetic Vertical Datum of 1929 (levels by Water and Power Resources Service); gage readings have been reduced to elevations NGVD. Prior to Jan. 4, 1961, nonrecording gage at same site and datum.

REMARKS.--Reservoir is formed by earth-fill dam; storage began May 23, 1950; dam completed Aug. 9, 1950. Total capacity is 24,600 acre-ft at maximum pool, elevation, 2,428.9 ft. Dead storage is 1,000 acre-ft below lowest point of outlet, elevation, 2,404.0 ft. Conservation storage is 9,100 acre-ft between elevations, 2,404.0 ft and 2,420.0 ft, crest of spillway. The crest of the spillway was raised 3.5 ft in 1981 from 2,416.5 ft. Figures given herein represent total contents based on capacity table dated Jan. 1, 1965. The reservoir is for flood control, irrigation, and municipal supply.

COOPERATION.--Record of elevation and contents furnished by U.S. Bureau of Reclamation. Monthend elevations interpolated from once-daily readings. Extremes are those observed.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 11,590 acre-ft, June 9, 1982, elevation, 2,421.13 ft; minimum since initial filling of reservoir, 2,780 acre-ft, Sept. 30, 1991, elevation, 2,409.91 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents recorded, 5,370 acre-ft, Oct. 1, elevation, 2,414.74 ft; minimum, 2,780 acre-ft, Sept. 30, elevation 2,409.91 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	2,414.75	5,380	--
Oct. 31-----	2,414.16	5,000	-380
Nov. 30-----	2,413.85	4,800	-200
Dec. 31-----	2,413.54	4,620	-180
CAL YR 1990-----	--	--	-1,840
Jan. 31-----	2,413.26	4,460	-160
Feb. 28-----	2,413.12	4,370	-90
Mar. 31-----	2,413.21	4,430	+60
Apr. 30-----	2,413.55	4,630	+200
May 31-----	2,413.38	4,530	-100
June 30-----	2,413.50	4,590	+60
July 31-----	2,412.17	3,850	-740
Aug. 31-----	2,410.70	3,130	-720
Sept. 30-----	2,409.91	2,780	-350
WTR YR 1991-----	--	--	-2,600

HEART RIVER BASIN

06343500 E.A. PATTERSON LAKE NEAR DICKINSON, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971, 1975, 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		OXYGEN, DIS-SOLVED (MG/L) (00300)										
DATE	TIME	SAM-PLING DEPTH (FEET) (00003)	RESER-VOIR DEPTH (FEET) (72025)	BARO-METRIC PRES-SURE (MM OF HG) (00025)	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)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TRANS-PAR-ENCY (SECCHI DISK) (IN) (00077)	OXYGEN, DIS-SOLVED (MG/L) (00300)	
OCT 04...	0920	3.30	20.0	691	1750	8.6	9.0	11.0	28	18.0	8.0	
JAN 03...	1214	3.30	21.0	710	2140	8.7	-21.0	1.5	27	60.0	10.0	
APR 09...	0910	3.30	20.0	700	1760	8.7	8.0	8.0	25	14.0	9.2	
JUL 09...	1515	3.30	21.0	694	1820	8.7	27.0	21.0	25	22.0	7.6	
DATE	TIME	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)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	
OCT 04...	81	260	48	33	310	71	8	13	330	570	16	
JAN 03...	77	310	55	43	400	72	10	15	418	720	22	
APR 09...	85	250	45	33	320	73	9	12	344	650	14	
JUL 09...	94	240	44	31	310	72	9	19	351	600	18	
DATE	TIME	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	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)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	BORON, DIS-SOLVED (UG/L AS B) (01020)
OCT 04...	0.20	1.3	1250	1190	1.70	0.010	<0.100	0.380	0.070	0.060	410	
JAN 03...	0.80	0.80	1560	1510	2.12	<0.010	<0.100	0.260	0.070	0.050	490	
APR 09...	0.50	2.2	1250	1280	1.70	<0.010	<0.050	<0.010	0.060	<0.010	410	
JUL 09...	0.70	0.60	1220	1230	1.66	<0.010	<0.050	0.160	0.070	0.060	410	
DATE	TIME	SAM-PLING DEPTH (FEET) (00003)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	CLOUD COVER (PER-CENT) (00032)	WIND SPEED (MILES PER HOUR) (00035)	WIND DIREC-TION (DEG. FROM TRUE NORTH) (00036)		
OCT 04...	0915	0.0	1780	8.6	11.0	8.0	81	--	--	--		
OCT 04...	0918	1.60	1760	8.6	11.0	8.0	81	--	--	--		
OCT 04...	0920	3.30	1750	8.6	11.0	8.0	81	100	10	315		
OCT 04...	0922	6.60	1760	8.6	11.0	8.0	81	--	--	--		
OCT 04...	0925	13.1	1740	8.6	11.0	7.7	78	--	--	--		
OCT 04...	0927	19.7	1750	8.6	10.5	7.8	78	--	--	--		
JAN 03...	1212	0.0	2140	8.8	0.0	10.2	76	--	--	--		
JAN 03...	1213	1.60	2170	8.8	1.0	9.9	76	--	--	--		
JAN 03...	1214	3.30	2140	8.7	1.5	10.0	77	0	10	315		
JAN 03...	1215	6.60	2140	8.7	1.5	10.2	79	--	--	--		
JAN 03...	1216	13.1	2150	8.7	2.0	11.4	89	--	--	--		
JAN 03...	1217	19.7	2270	8.6	2.0	9.1	71	--	--	--		
JAN 03...	1220	21.0	2300	8.6	2.0	2.7	21	--	--	--		
APR 09...	0900	0.0	1780	8.6	8.0	9.4	87	--	--	--		
APR 09...	0905	1.60	1770	8.6	8.0	9.3	86	--	--	--		
APR 09...	0910	3.30	1760	8.7	8.0	9.2	85	0	5.0	315		
APR 09...	0913	6.60	1760	8.6	8.0	9.2	85	--	--	--		
APR 09...	0916	13.1	1760	8.6	8.0	9.1	84	--	--	--		
APR 09...	0920	19.7	1760	8.6	7.0	9.6	87	--	--	--		
JUL 09...	1510	0.0	1820	8.7	23.0	8.0	103	--	--	--		
JUL 09...	1512	1.60	1800	8.7	21.0	7.8	97	--	--	--		
JUL 09...	1515	3.30	1820	8.7	21.0	7.6	94	15	5.0	135		
JUL 09...	1518	6.60	1940	8.7	20.5	6.5	80	--	--	--		
JUL 09...	1520	13.1	1830	8.7	20.0	6.2	34	--	--	--		
JUL 09...	1525	19.7	1810	8.7	20.0	5.2	63	--	--	--		

HEART RIVER BASIN

227

06344300 HEART RIVER AT DICKINSON, ND

LOCATION.--Lat 46°51'56", long 102°44'10", in SW¹/₄, NW¹/₄, SE¹/₄, sec.12, T.139 N., R.96 W., Stark County, Hydrologic Unit 101302202, on left bank near the southeast corner of Dickinson sewage lagoon cell No. 3, 1.9 mi southeast of Dickinson and 9.5 mi downstream from Edward Arthur Patterson Lake.

DRAINAGE AREA.--440 mi², approximately.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 2,360 ft from topographic map.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair. Flow regulated by Edward Arthur Patterson Lake (station 06343500) 10 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.2	1.6	e1.7	e1.6	e1.6	e1.6	1.6	1.9	1.7	1.6	1.5	1.8
2	1.3	1.6	e1.6	e1.4	2.0	e1.3	1.6	1.7	1.5	1.7	1.5	2.4
3	1.3	1.6	e1.6	e1.3	2.9	e1.8	1.6	1.8	1.7	2.4	1.9	2.9
4	1.3	1.5	e1.6	e1.3	3.8	4.3	1.5	4.0	11	1.5	2.1	3.3
5	1.3	1.6	e1.7	e1.3	3.2	2.8	1.6	2.5	7.3	1.3	6.8	2.6
6	1.2	1.5	e1.7	e1.3	2.5	1.9	1.7	2.0	2.4	1.2	7.9	1.9
7	1.2	1.5	e1.7	e1.3	2.3	1.7	1.4	1.8	1.7	1.1	3.9	1.9
8	1.3	1.6	e1.7	e1.4	2.2	1.6	1.4	1.6	1.5	1.1	3.4	2.0
9	1.3	1.5	e1.8	e1.3	1.9	1.7	1.4	1.6	1.5	1.1	3.1	2.1
10	1.4	1.5	e1.8	e1.4	1.8	1.7	1.3	1.6	1.5	1.1	3.3	2.7
11	1.4	1.6	e1.8	e1.6	1.7	1.8	1.5	1.6	1.4	1.2	3.1	3.9
12	1.3	1.6	e1.8	e1.9	1.7	1.7	5.9	1.8	1.3	1.4	3.2	2.2
13	1.4	1.6	e1.8	e2.1	1.7	1.7	6.5	2.5	1.2	1.3	3.7	1.8
14	1.4	1.6	e1.8	e2.1	1.8	1.6	8.5	2.3	1.3	1.2	3.5	1.8
15	1.3	1.6	e1.7	e2.0	1.6	1.6	9.2	2.2	2.9	1.1	4.1	2.2
16	1.4	1.6	e1.6	e1.9	e1.5	1.5	4.6	2.1	2.0	1.0	6.6	5.3
17	1.9	1.7	e1.4	e1.8	e1.5	1.6	2.8	1.8	1.5	.96	7.0	2.3
18	3.4	1.7	e1.5	e1.9	e1.5	1.6	2.0	1.6	1.4	.91	5.6	1.8
19	2.2	1.5	e1.1	e1.8	e1.6	1.7	1.9	1.5	1.2	.95	4.9	1.7
20	1.8	1.6	e.90	e1.7	e1.7	1.9	1.9	1.6	26	1.0	5.8	1.7
21	1.6	1.6	e.80	e1.6	e1.6	1.7	2.0	1.7	4.7	1.0	5.3	1.8
22	1.7	1.7	e.90	e1.5	e1.5	1.6	1.9	1.7	2.0	1.0	4.6	3.0
23	1.6	1.7	e.90	e1.6	e1.4	1.6	1.9	1.7	23	1.0	5.1	2.3
24	1.5	1.7	e1.2	e1.4	e1.4	1.6	1.7	1.5	14	.96	5.6	2.3
25	1.5	e1.4	e1.1	e1.3	e1.5	1.7	1.7	1.4	4.7	.90	5.4	2.0
26	1.5	e1.5	e1.0	e1.3	e1.4	1.6	13	3.8	2.4	1.5	4.7	1.8
27	1.4	e1.4	e1.1	e1.4	e1.5	1.5	11	3.4	3.7	2.3	5.0	1.8
28	1.5	e1.3	e1.1	e1.4	e1.5	1.7	3.6	2.0	12	2.8	6.4	1.7
29	1.5	e1.3	e.90	e1.4	---	1.9	2.5	1.8	5.8	2.8	7.1	1.6
30	1.4	e1.5	e.80	e1.3	---	1.8	2.0	1.7	2.0	2.1	4.3	1.5
31	1.4	---	e1.2	e1.3	---	1.7	---	1.7	---	1.6	3.6	---
TOTAL	46.9	46.7	43.30	47.9	52.3	55.5	101.2	61.9	146.3	43.08	140.0	68.1
MEAN	1.51	1.56	1.40	1.55	1.87	1.79	3.37	2.00	4.88	1.39	4.52	2.27
MAX	3.4	1.7	1.8	2.1	3.8	4.3	13	4.0	26	2.8	7.9	5.3
MIN	1.2	1.3	.80	1.3	1.4	1.3	1.3	1.4	1.2	.90	1.5	1.5
AC-FT	93	93	86	95	104	110	201	123	290	85	278	135

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1991, BY WATER YEAR (WY)

	MEAN	5.26	3.33	2.79	2.24	5.54	64.4	54.0	14.8	26.7	35.2	3.71	5.82
MAX	20.7	6.60	6.41	3.28	16.2	414	377	57.8	163	256	6.71	29.0	
(WY)	1987	1984	1987	1984	1987	1986	1987	1984	1984	1986	1984	1986	
MIN	1.51	1.56	1.40	1.55	1.25	1.78	2.59	2.00	2.57	1.39	1.54	1.38	
(WY)	1991	1991	1991	1991	1989	1990	1990	1991	1988	1991	1990	1990	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1984 - 1991

ANNUAL TOTAL	810.55	853.18	
ANNUAL MEAN	2.22	2.34	18.2
HIGHEST ANNUAL MEAN			67.1
LOWEST ANNUAL MEAN			2.34
HIGHEST DAILY MEAN	60 Jun 28	26 Jun 20	3000 Mar 3 1986
LOWEST DAILY MEAN	.80 Dec 21	.80 Dec 21	.10 Mar 27 1984
ANNUAL SEVEN-DAY MINIMUM	.97 Dec 20	.97 Dec 20	.50 Mar 22 1984
INSTANTANEOUS PEAK FLOW		68 Jun 20	a3500 Mar 3 1986
INSTANTANEOUS PEAK STAGE		4.07 Jun 20	a10.93 Mar 1 1986
ANNUAL RUNOFF (AC-FT)	1610	1690	13170
10 PERCENT EXCEEDS	2.0	4.0	13
50 PERCENT EXCEEDS	1.6	1.7	2.3
90 PERCENT EXCEEDS	1.2	1.3	1.4

e Estimated.

a Backwater from ice.

HEART RIVER BASIN

06344300 HEART RIVER AT DICKINSON, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1984 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT- ANCE	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR	TEMPER- ATURE WATER	HARD- NESS TOTAL	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	SODIUM, DIS- SOLVED	SODIUM PERCENT	SODIUM AD- SORP- TION RATIO
		(00061)	(00095)	(00400)	(DEG C) (00020)	(DEG C) (00010)	(MG/L AS CACO3) (00900)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	(MG/L AS NA) (00930)		
OCT 03...	1215	1.3	2590	--	13.0	10.5	--	--	--	--	--	--
NOV 20...	1640	1.6	2100	--	12.0	3.5	--	--	--	--	--	--
JAN 14...	1340	2.1	2600	--	3.0	0.5	--	--	--	--	--	--
FEB 15...	1305	1.7	2200	--	0.5	0.5	--	--	--	--	--	--
MAR 20...	1150	1.8	1480	8.2	13.0	2.5	110	23	13	310	85	13
MAY 02...	1320	1.7	1500	--	4.0	5.0	--	--	--	--	--	--
JUN 13...	1620	1.2	1870	--	23.0	25.5	--	--	--	--	--	--
JUL a30...	1315	2.1	2190	9.0	32.0	24.5	210	33	30	370	79	11
SEP 09...	1825	2.0	2630	--	15.0	18.0	--	--	--	--	--	--
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
MAR 20...	3.5	410	0	340	470	7.0	0.60	11	1060	1040	1.44	
JUL a30...	8.7	510	0	410	570	50	0.50	10	1340	1320	1.82	
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR 20...	5.18	2	420	70	1	20	100	<0.1	1	<1	460	
JUL a30...	7.60	<1	490	20	<1	50	40	<0.1	2	<1	600	

a Replicate sample also collected for quality-assurance purposes.

HEART RIVER BASIN

229

06344600 GREEN RIVER NEAR NEW HRADEC, ND

LOCATION.--Lat 47°01'40", long 103°03'10", on line between secs.13 and 14, T.141 N., R.98 W., Billings County, Hydrologic Unit 10130202, on left bank above county highway bridge, and 8 mi west of New Hradec.

DRAINAGE AREA.--152 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1964 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,510 ft above National Geodetic Vertical Datum of 1929, from topographic map.

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

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.18	e.95	e.57	e.08	e.15	e.80	1.5	5.2	.68	.92	.19	.00
2	e.16	e1.1	e.43	e.09	e.20	e.70	1.2	4.8	.63	.83	.18	.00
3	e.13	e1.3	e.40	e.07	e.30	e1.0	1.1	3.9	.56	.72	.27	.00
4	e.12	e1.2	e.32	e.07	e.35	e2.0	1.1	3.2	.81	.61	.28	.00
5	e.13	e1.2	e.37	e.07	e.50	e3.0	1.2	3.0	1.2	.51	.21	.00
6	e.15	e1.1	e.43	e.08	e.40	e3.5	1.2	3.1	1.1	.35	.12	.00
7	e.18	e1.1	e.47	e.06	e.50	e5.0	.95	2.6	1.1	.27	.10	.00
8	e.25	e1.1	e.48	e.08	e.45	e5.5	.84	2.1	1.1	.20	.05	.00
9	e.31	e1.1	e.47	e.08	e.40	4.6	.97	2.0	e1.2	.15	.03	.00
10	e.42	e1.2	e.45	e.08	e.50	3.7	1.1	1.9	e.88	.08	.01	.00
11	e.55	e1.3	e.45	e.08	e.60	3.6	.96	1.6	e.60	.18	.00	.00
12	e.77	e1.2	e.55	e.08	e.70	3.5	1.3	1.6	e.50	.12	.00	.00
13	e1.0	e1.3	e.45	e.10	e.70	3.6	2.1	1.9	e.55	.06	.00	.00
14	e1.1	e1.3	e.45	e.10	e.70	3.8	2.3	1.9	.61	.05	.00	.00
15	e1.2	e1.2	e.40	e.15	e.60	3.9	2.3	2.0	36	.04	.00	.00
16	e1.4	e1.1	e.35	e.10	e.70	3.4	4.6	1.7	9.4	.04	.00	.00
17	e1.8	e1.0	e.30	e.15	e.60	2.9	7.3	1.5	4.8	.04	.00	.00
18	e1.9	e.91	e.25	e.20	e.55	2.6	7.2	1.3	2.8	.04	.00	.00
19	e2.2	e.65	e.30	e.15	e.60	2.6	6.4	1.1	1.6	.04	.00	.00
20	e1.9	e.78	e.25	e.10	e1.0	3.1	6.1	1.1	1.8	.04	.00	.02
21	e1.7	e.82	e.20	e.06	e.90	3.5	5.3	1.2	2.0	.03	.00	.15
22	e1.5	e.76	e.15	e.08	e.80	3.3	4.3	.94	1.6	.03	.00	.22
23	e1.3	e.81	e.15	e.10	e.80	3.4	3.3	.76	3.8	.03	.00	.22
24	e1.2	e.74	e.15	e.08	e.75	2.8	2.5	.60	6.5	.03	.00	.35
25	e1.3	e.72	e.15	e.06	e.80	2.2	1.8	.63	11	.03	.00	.50
26	e1.4	e.71	e.15	e.08	e.80	1.9	1.8	.65	8.5	.03	.00	.56
27	e1.3	e.71	e.15	e.10	e.90	1.5	1.8	.52	5.3	.03	.00	.56
28	e1.3	e.72	e.20	e.10	e1.0	1.4	2.6	.70	3.0	.02	.00	.25
29	e1.3	e.69	e.15	e.05	---	1.4	3.3	.81	2.0	.05	.00	.13
30	e1.0	e.72	e.08	e.10	---	1.4	4.1	.80	1.3	.10	.00	.11
31	e.88	---	e.07	e.15	---	1.5	---	.71	---	.14	.00	---
TOTAL	30.03	29.49	9.74	2.93	17.25	87.10	82.52	55.82	112.92	5.81	1.44	3.07
MEAN	.97	.98	.31	.095	.62	2.81	2.75	1.80	3.76	.19	.046	.10
MAX	2.2	1.3	.57	.20	1.0	5.5	7.3	5.2	36	.92	.28	.56
MIN	.12	.65	.07	.05	.15	.70	.84	.52	.50	.02	.00	.00
AC-FT	60	58	19	5.8	34	173	164	111	224	12	2.9	6.1

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1991, BY WATER YEAR (WY)

MEAN	3.89	1.65	1.02	1.59	8.87	63.1	47.6	20.5	21.7	13.2	3.60	2.10
MAX	47.7	8.89	2.74	14.3	67.4	323	314	141	101	123	29.5	21.1
(WY)	1983	1983	1978	1974	1983	1972	1975	1970	1970	1964	1981	1986
MIN	.35	.42	.28	.095	.28	.33	.71	.68	.067	.000	.000	.010
(WY)	1982	1967	1990	1991	1975	1964	1990	1968	1988	1988	1988	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1964 - 1991

ANNUAL TOTAL	1424.47	438.12	
ANNUAL MEAN	3.90	1.20	
HIGHEST ANNUAL MEAN			15.7
LOWEST ANNUAL MEAN			35.9
HIGHEST DAILY MEAN	498	Jun 28	1.20
LOWEST DAILY MEAN	.00	May 4	1991
ANNUAL SEVEN-DAY MINIMUM	.00	Sep 1	2700
INSTANTANEOUS PEAK FLOW			Mar 13 1972
INSTANTANEOUS PEAK STAGE			May 25 1964
ANNUAL RUNOFF (AC-FT)	2830		.00
10 PERCENT EXCEEDS	2.5		.00
50 PERCENT EXCEEDS	.64		.00
90 PERCENT EXCEEDS	.04		.00

e Estimated.

a Backwater from ice.

HEART RIVER BASIN

06344600 GREEN RIVER NEAR NEW HRADEC, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1984 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 01...	1420	0.16	1160	--	25.0	14.0	--	--	--	--	--	--
NOV 19...	1200	0.65	1120	--	12.0	4.5	--	--	--	--	--	--
JAN 11...	1540	0.08	1650	--	-3.5	1.0	--	--	--	--	--	--
FEB 14...	1450	0.68	750	--	-8.0	1.0	--	--	--	--	--	--
MAR a19...	1400	2.7	820	8.3	20.5	1.0	120	26	14	130	69	5
APR 30...	1335	4.1	1160	--	3.0	6.0	--	--	--	--	--	--
JUN 13...	1305	0.32	1240	--	24.0	23.0	--	--	--	--	--	--
JUL 29...	1615	0.02	1370	8.7	36.0	30.5	200	40	24	230	70	7
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
MAR a19...	4.2	240	0	190	210	4.2	0.20	13	545	518	0.74	
JUL 29...	9.8	490	0	400	300	6.2	0.50	6.6	904	858	1.23	
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR a19...	3.90	1	320	200	1	10	40	<0.1	2	<1	260	
JUL 29...	0.05	3	480	10	<1	30	10	<0.1	3	2	440	

a Replicate sample also collected for quality-assurance purposes.

HEART RIVER BASIN

231

06345500 HEART RIVER NEAR RICHARDTON, ND

LOCATION.--Lat 46°44'46", long 102°18'27", in NE 1/4, sec.29, T.138 N., R.92 W., Stark County, Hydrologic Unit 10130202, on right bank 5 ft upstream from bridge on State Highway 8, 0.5 mi downstream from Plum Creek, and 9.5 mi south of Richardton.

DRAINAGE AREA.--1,240 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1903 to September 1922, April 1943 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1209: Drainage area. WSP 1239: 1906, 1918(M), 1947(M).

GAGE.--Water-stage recorder. Datum of gage is 2,153.67 ft above National Geodetic Vertical Datum of 1929. May 18, 1903, to Sept. 30, 1922, nonrecording gage at 3 sites in 1 mi reach below present site at different datums. Apr. 14, 1943, to July 7, 1947, nonrecording gage at present site and datum.

REMARKS.--Records good except those for period of estimated daily discharges, which are poor. Flow is regulated by E.A. Patterson Lake (station 06343500) 85 river miles upstream since 1950. Some diversions for irrigation and water supply at low flow.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 5, 1938, reached a stage of about 26 ft, from information by local residents, discharge, 16,000 ft³/s; flood of Mar. 25, 1943, reached a stage of 24.2 ft from floodmarks, discharge, 11,700 ft³/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.65	e5.0	e5.5	e.05	e.06	e9.0	21	19	7.3	41	.00	.00
2	e.61	e5.2	e5.2	e.05	e.08	e10	20	15	6.0	31	.00	.00
3	e.62	e5.4	e5.2	e.05	e.10	e12	20	15	6.4	23	.00	.00
4	e.62	e5.2	e5.4	e.05	e.20	e14	18	15	9.3	17	.00	.00
5	e.60	e4.8	e5.6	e.05	e.30	e16	16	14	19	14	.00	.00
6	e.64	e4.3	e6.0	e.05	e.35	e18	15	14	13	10	.00	.00
7	e.68	e4.8	e6.5	e.05	e1.0	e19	13	15	17	8.2	.00	.00
8	e.70	e5.2	e7.0	e.05	e2.5	e20	12	16	20	7.0	.00	.00
9	e.70	e5.2	e7.5	e.05	e3.5	e22	11	13	15	5.5	.00	.00
10	e.70	e5.2	e8.0	e.05	e4.0	e25	10	12	10	4.4	.00	.00
11	e.70	e5.4	e8.2	e.05	e5.5	e26	11	11	7.9	4.1	.00	.00
12	e.72	e5.8	e8.2	e.05	e6.0	e27	15	10	6.0	4.2	.00	.00
13	e.80	e6.0	e8.0	e.06	e6.5	e27	19	9.0	4.6	4.1	.00	.00
14	e.90	e6.0	e7.8	e.06	e5.5	e27	25	8.6	4.4	4.0	.00	.00
15	e2.0	e6.2	e7.5	e.05	e5.2	e30	31	8.8	4.3	4.0	.00	.00
16	e3.0	e6.2	e7.0	e.05	e5.0	e33	31	8.4	9.3	4.5	.00	.00
17	e3.0	e6.2	e6.0	e.05	e6.0	e30	33	8.2	8.6	4.9	.00	.00
18	e3.5	e6.3	e3.5	e.06	e8.0	e30	32	7.2	5.5	4.8	.00	.00
19	e4.0	e6.4	e2.0	e.06	e8.0	e35	27	6.0	4.5	4.3	.00	.00
20	e5.0	e6.4	e1.0	e.05	e10	e40	23	5.7	57	3.9	.00	.00
21	e6.0	e6.4	e.30	e.05	e11	e38	21	5.2	63	2.9	.00	.09
22	e7.0	e6.4	e.20	e.06	e12	e38	19	4.8	62	2.1	.00	.83
23	e6.8	e6.0	e.12	e.05	e13	e33	24	4.2	59	1.5	.00	.95
24	e6.5	e5.5	e.11	e.05	e12	e24	21	3.9	43	.78	.00	.97
25	e6.5	e5.2	e.10	e.05	e12	e24	19	3.5	45	.43	.00	1.3
26	e6.0	e5.4	e.08	e.05	e12	e22	19	4.0	78	.17	.00	1.3
27	e5.5	e5.4	e.07	e.05	e11	e15	20	4.4	56	.01	.00	.81
28	e5.5	e5.6	e.06	e.05	e10	e22	18	5.8	39	.00	.00	.57
29	e5.5	e5.8	e.05	e.05	---	24	29	5.5	34	.00	.00	1.3
30	e5.5	e5.8	e.05	e.05	---	24	26	5.6	33	.00	.00	1.9
31	e5.0	---	e.06	e.05	---	19	---	9.1	---	.00	.00	---
TOTAL	95.94	168.7	122.30	1.60	170.79	753.0	619	286.9	747.1	211.79	0.00	10.02
MEAN	3.09	5.62	3.95	.052	6.10	24.3	20.6	9.25	24.9	6.83	.000	.33
MAX	7.0	6.4	8.2	.06	13	40	33	19	78	41	.00	1.9
MIN	.60	4.3	.05	.05	.06	9.0	10	3.5	4.3	.00	.00	.00
AC-FT	190	335	243	3.2	339	1490	1230	569	1480	420	.00	20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1991, BY WATER YEAR (WY)

	MEAN	16.2	13.2	8.60	9.07	46.9	378	351	107	171	70.3	27.5	11.6
MAX	240	114	52.5	112	643	2125	2160	1318	1225	584	401	86.4	
(WY)	1983	1983	1983	1973	1982	1945	1950	1970	1906	1969	1909	1986	
MIN	.10	1.93	1.00	.000	.000	1.66	5.77	5.58	.37	.40	.000	.000	
(WY)	1961	1961	1920	1962	1950	1964	1905	1905	1961	1919	1991	1958	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1903 - 1991

ANNUAL TOTAL	6595.66	3187.14	
ANNUAL MEAN	18.1	8.73	
HIGHEST ANNUAL MEAN			102
LOWEST ANNUAL MEAN			316
HIGHEST DAILY MEAN	1240	78	17000
LOWEST DAILY MEAN	.05	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.07	.00	.00
INSTANTANEOUS PEAK FLOW		176	23400
INSTANTANEOUS PEAK STAGE		6.05	a28.05
ANNUAL RUNOFF (AC-FT)	13080	6320	73770
10 PERCENT EXCEEDS	21	24	131
50 PERCENT EXCEEDS	6.0	5.2	11
90 PERCENT EXCEEDS	.70	.00	1.4

e Estimated.

a From high-water mark in gage well.

HEART RIVER BASIN

06345500 HEART RIVER NEAR RICHARDTON, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
02...	1320	0.61	1920	--	21.0	14.0	--	--	--	--	--	--
NOV												
20...	1220	6.4	2340	--	14.0	2.0	--	--	--	--	--	--
JAN												
07...	1355	0.05	3640	--	-16.0	0.5	--	--	--	--	--	--
FEB												
11...	1410	5.6	4800	--	7.0	0.5	--	--	--	--	--	--
MAR												
25...	1235	24	1020	8.5	12.0	2.0	200	40	25	160	63	5
MAY												
06...	1435	15	1560	--	13.5	9.5	--	--	--	--	--	--
JUN												
17...	1235	8.5	1840	--	26.0	24.5	--	--	--	--	--	--
JUL												
02...	1345	28	1480	--	22.0	22.0	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
25...		4.3	270	0	220	310	12	0.30	2.9	682	686	0.93
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
25...		44.4	<1	220	10	<1	20	20	0.1	<1	<1	660

HEART RIVER BASIN

233

06345780 HEART RIVER ABOVE LAKE TSCHIDA NEAR GLEN ULLIN, ND

LOCATION.--Lat 46°39'24", Long 102°04'40", in SW¹/₄NE¹/₄NE¹/₄ sec.30, T.137 N., R.90 W., Grant County, Hydrologic Unit 10130202, on right bank 100 ft downstream from bridge on county road, and 16 mi south and 1 mi west of Hebron.

DRAINAGE AREA.--285 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,090 ft, from topographic map.

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor. Flow is regulated by E.A. Patterson Lake (station 06343500) about 90 river mi upstream from station, and some diversions for irrigation and water supply at low flow.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.16	5.9	e6.2	e.32	e.40	e12	23	28	9.6	33	.08	.00
2	.16	5.4	e5.8	e.31	e.45	e11	22	23	10	37	.09	.00
3	.15	5.7	e5.8	e.31	e.60	e10	24	22	9.2	34	.10	.00
4	.15	6.2	e6.0	e.30	e.70	e11	23	21	9.9	27	.11	.00
5	.17	6.3	e6.4	e.30	e.80	e12	22	19	12	22	.11	.00
6	.16	4.3	6.9	e.30	e1.0	16	21	19	18	18	.11	.01
7	.15	5.2	7.3	e.27	e1.1	17	19	17	17	15	.09	.01
8	.16	5.7	7.8	e.27	e1.3	18	17	17	15	12	.09	.01
9	.18	5.5	8.5	e.28	e1.5	19	16	18	19	11	.08	.01
10	.19	5.7	9.0	e.28	e2.0	20	14	18	17	12	.07	.01
11	.20	6.2	9.3	e.28	e2.2	24	14	16	13	20	.06	.01
12	.20	6.9	9.3	e.30	e2.8	26	16	15	9.9	19	.05	.01
13	.20	7.3	9.0	e.32	e3.5	23	23	14	8.2	8.9	.04	.01
14	.24	7.3	8.7	e.34	e6.0	24	26	13	9.4	6.9	.03	.01
15	.51	7.3	e8.4	e.35	e5.0	23	27	12	7.5	5.7	.04	.01
16	.73	7.3	e7.5	e.32	e7.0	27	30	12	6.4	4.5	.05	.06
17	1.5	7.8	e7.2	e.34	e6.5	30	33	12	6.0	3.6	.04	.12
18	2.9	8.3	e5.5	e.37	e8.0	25	31	11	6.2	2.8	.04	.17
19	4.0	8.0	e4.0	e.35	e7.5	28	33	9.7	8.3	2.0	.04	.23
20	4.2	8.0	e2.0	e.33	e9.0	38	30	9.5	67	1.4	.03	.23
21	4.0	7.7	e1.5	e.33	e10	38	27	9.3	119	.84	.02	.19
22	5.4	7.5	e.40	e.35	e11	41	24	8.8	91	.95	.02	.25
23	6.5	7.3	e.45	e.34	e12	41	22	8.5	74	.95	.02	.21
24	7.2	e6.6	e.40	e.32	e13	36	23	7.8	69	.58	.02	.27
25	7.4	e6.1	e.33	e.32	e13	33	25	7.2	54	.36	.03	.36
26	6.9	e5.8	e.33	e.32	e12	32	23	7.5	48	.23	.02	.18
27	6.3	e5.8	e.35	e.35	e13	29	23	7.6	65	.18	.02	.22
28	5.9	e6.0	e.32	e.40	e13	21	24	7.3	54	.18	.02	.18
29	6.1	e6.2	e.30	e.36	---	29	23	7.1	42	.17	.01	.15
30	6.1	e6.4	e.30	e.34	---	23	23	8.6	37	.13	.01	.12
31	6.0	---	e.35	e.33	---	25	---	10	---	.09	.01	---
TOTAL	84.11	195.7	145.63	10.00	164.35	762	701	415.9	931.6	300.46	1.55	3.04
MEAN	2.71	6.52	4.70	.32	5.87	24.6	23.4	13.4	31.1	9.69	.050	.10
MAX	7.4	8.3	9.3	.40	13	41	33	28	119	37	.11	.36
MIN	.15	4.3	.30	.27	.40	10	14	7.1	6.0	.09	.01	.00
AC-FT	167	388	289	20	326	1510	1390	825	1850	596	3.1	6.0

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1991, BY WATER YEAR (WY)

	1988	1989	1990	1991	1988	1989	1990	1991
MEAN	3.81	9.58	6.21	3.84	5.80	51.1	33.3	23.8
MAX	4.57	11.4	9.49	6.82	8.13	110	63.3	40.6
(WY)	1990	1990	1989	1990	1990	1989	1989	1989
MIN	2.71	6.52	4.43	.32	3.41	18.5	13.3	13.4
(WY)	1991	1991	1990	1991	1989	1990	1991	1991

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1988 - 1991

ANNUAL TOTAL	6462.27	3715.34	
ANNUAL MEAN	17.7	10.2	18.0
HIGHEST ANNUAL MEAN			25.6
LOWEST ANNUAL MEAN			10.2
HIGHEST DAILY MEAN	1320	Jul 1	1320
LOWEST DAILY MEAN	.10	Aug 17	.00
ANNUAL SEVEN-DAY MINIMUM	.16	Oct 1	.00
INSTANTANEOUS PEAK FLOW			207
INSTANTANEOUS PEAK STAGE			5.87
ANNUAL RUNOFF (AC-FT)	12820	7370	13040
10 PERCENT EXCEEDS	24	26	30
50 PERCENT EXCEEDS	7.3	6.2	6.9
90 PERCENT EXCEEDS	.24	.06	.15

e Estimated.

HEART RIVER BASIN

06345780 HEART RIVER ABOVE LAKE TSCHIDA NEAR GLEN ULLIN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1988 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
02...	1545	0.18	2040	--	21.0	14.5	--	--	--	--	--	--
NOV												
05...	1115	6.0	1970	--	5.0	2.5	--	--	--	--	--	--
21...	1450	8.1	2370	--	4.0	2.5	--	--	--	--	--	--
JAN												
07...	1620	0.27	3500	--	-16.0	0.5	--	--	--	--	--	--
FEB												
11...	1620	2.2	2320	--	5.5	1.0	--	--	--	--	--	--
MAR												
25...	1630	34	1070	9.1	11.0	7.5	200	40	25	170	64	5
MAY												
06...	1750	18	1600	--	11.0	14.5	--	--	--	--	--	--
JUN												
17...	1605	5.8	1720	--	23.0	26.5	--	--	--	--	--	--
JUL												
02...	1540	42	1510	--	23.5	23.5	--	--	--	--	--	--
AUG												
12...	1700	0.04	2080	7.6	29.0	24.0	200	29	30	400	80	12
SEP												
10...	1740	0.01	2470	--	19.0	17.5	--	--	--	--	--	--
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
25...		4.6	290	2	240	320	12	0.30	2.9	725	719	0.99
AUG												
12...		13	720	10	600	470	11	0.80	6.2	1360	1320	1.85
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
25...		66.0	1	240	10	<1	20	10	<0.1	<1	<1	650
AUG												
12...		0.15	<1	740	20	<1	50	20	<0.1	2	<1	690

HEART RIVER BASIN

235

06346000 LAKE TSCHIDA NEAR GLEN ULLIN, ND

LOCATION.--Lat 46°35'43", long 101°48'34", in SW¹/₄, NE¹/₄ sec.13, T.136 N., R.89 W., Grant County, Hydrologic Unit 10130202, 10 mi upstream from Heart Butte Creek, and 14 mi north of Elgin.

DRAINAGE AREA.--1,710 mi², approximately.

RESERVOIR-ELEVATION AND CONTENTS RECORDS

PERIOD OF RECORD.--August 1949 to current year. Prior to October 1957, published as Heart Butte Reservoir near Glen Ullin.

GAGE.--Nonrecording gage. Datum of gage is at National Geodetic Vertical Datum of 1929, levels by Water and Power Resources Service.

REMARKS.--Reservoir is formed by earth-fill dam; storage began Sept. 29, 1949; dam completed Dec. 9, 1949. Total capacity is 430,000 acre-ft at maximum pool, elevation, 2,118.2 ft. Dead storage is 6,750 acre-ft below lowest point of outlet, elevation, 2,030.0 ft. Active conservation storage is 69,030 acre-ft between elevations, 2,030.0 ft and 2,064.5 ft, crest of spillway. Figures given herein represent total contents. Controlled releases are through 4 by 5 ft slide gate. The spillway is uncontrolled "glory hole" type and discharges through a conduit 14 ft in diameter. The reservoir is for flood control, irrigation, and incidental water supply.

COOPERATION.--Record of elevations and contents furnished by U.S. Bureau of Reclamation. Monthend elevations interpolated from once-daily readings. Extremes are those observed.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 174,000 acre-ft, Apr. 9, 1952, elevation, 2,086.23 ft; minimum since first reaching spillway level, 33,300 acre-ft, Sept. 30, 1991, elevation, 2,049.23 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 47,240 acre-ft, July 5, elevation, 2,055.13 ft; minimum, 33,300 acre-ft, Sept. 30, elevation, 2,049.23 ft.

MONTHEND ELEVATION AND CONTENTS, WATER YEAR OCTOBER 1989 TO SEPTEMBER 1990

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	2,051.66	38,590	--
Oct. 31-----	2,051.46	38,150	-440
Nov. 30-----	2,051.51	38,260	+110
Dec. 31-----	2,051.70	38,700	+440
CAL YR 1990-----	--	--	-8,540
Jan. 31-----	2,051.69	38,670	-30
Feb. 28-----	2,051.86	39,060	+390
Mar. 31-----	2,052.58	40,770	+1,710
Apr. 30-----	2,053.28	42,480	+1,710
May 31-----	2,053.22	42,330	-150
June 30-----	2,055.06	47,050	+4,720
July 31-----	2,052.72	41,110	-5,940
Aug. 31-----	2,050.04	34,990	-6,120
Sept. 30-----	2,049.23	33,300	-1,690
WTR YR 1991-----	--	--	-5,290

HEART RIVER BASIN

06346000 LAKE TSCHIDA NEAR GLEN ULLIN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1971, 1980 to current year.

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	RESER- VOIR DEPTH (FEET) (72025)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	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)	COLOR (PLAT- INUM- COBALT UNITS) (00080)	TRANS- PAR- ENCY (SECCHI DISK) (IN) (00077)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)
NOV 23...	0948	3.30	20.0	728	1470	8.2	4.5	3.0	14	9.00	11.7	92
JAN 16...	1207	3.30	37.8	760	1570	8.3	-4.0	1.5	11	181	12.9	93
JUN 26...	1033	3.30	35.0	742	1480	8.4	20.0	20.5	11	52.0	7.7	88
SEP 20...	1142	3.30	33.5	706	1550	8.6	21.0	15.0	25	22.0	9.0	97

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)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
NOV 23...	320	55	44	230	60	6	13	304	530	13	0.50
JAN 16...	340	58	47	240	60	6	13	331	540	13	0.60
JUN 26...	310	54	43	230	60	6	12	300	510	15	0.40
SEP 20...	290	47	42	230	62	6	12	304	410	17	0.50

DATE	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)
NOV 23...	1.0	1010	1070	1.37	--	0.030	<0.100	0.110	0.010	<0.010	360
JAN 16...	1.4	1120	1110	1.52	--	0.020	<0.100	0.120	0.020	<0.010	400
JUN 26...	1.2	1030	1050	1.40	0.062	0.010	0.072	0.070	0.030	0.020	370
SEP 20...	1.8	1060	943	1.44	--	--	0.080	--	0.040	--	390

HEART RIVER BASIN

237

06346000 LAKE TSCHIDA NEAR GLEN ULLIN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED CENT SATUR- ATION) (00301)	CLOUD COVER (PER- CENT) (00032)	WIND SPEED (MILES PER HOUR) (00035)	WIND DIREC- TION (DEG. FROM TRUE NORTH) (00036)
NOV										
23...	0946	0.0	1470	8.2	3.0	11.8	93	--	--	--
23...	0947	1.60	1470	8.2	3.0	11.8	93	--	--	--
23...	0948	3.30	1470	8.2	3.0	11.7	92	80	4.0	285
23...	0949	6.60	1480	8.2	3.0	11.8	93	--	--	--
23...	0950	13.1	1480	8.3	3.0	11.7	92	--	--	--
23...	0951	19.7	1480	8.3	3.0	11.7	92	--	--	--
JAN										
16...	1205	0.0	1580	8.3	1.5	13.5	97	--	--	--
16...	1206	1.60	1570	8.3	1.5	13.2	95	--	--	--
16...	1207	3.30	1570	8.3	1.5	12.9	93	10	13	300
16...	1208	6.60	1560	8.3	2.0	12.8	94	--	--	--
16...	1209	13.1	1570	8.3	2.5	12.5	93	--	--	--
16...	1210	19.7	1590	8.3	2.5	12.6	94	--	--	--
16...	1212	26.2	1650	8.3	3.0	11.2	84	--	--	--
16...	1213	32.8	1710	8.2	3.5	10.5	80	--	--	--
16...	1214	37.8	1720	8.1	3.5	10.3	78	--	--	--
JUN										
26...	1015	0.0	1500	8.4	20.5	7.7	88	--	--	--
26...	1025	1.60	1500	8.4	20.5	7.7	88	--	--	--
26...	1033	3.30	1480	8.4	20.5	7.7	88	15	12	270
26...	1045	6.60	1480	8.4	20.5	7.7	88	--	--	--
26...	1050	13.2	1480	8.4	20.5	7.7	88	--	--	--
26...	1055	19.8	1470	8.4	20.5	7.6	87	--	--	--
26...	1100	26.4	1470	8.4	20.0	7.5	86	--	--	--
26...	1105	33.0	1470	8.4	20.0	7.5	86	--	--	--
26...	1110	35.0	1470	8.4	20.0	7.6	87	--	--	--
SEP										
20...	1140	0.0	1550	8.5	15.0	9.2	99	--	--	--
20...	1141	1.60	1550	8.5	15.0	9.0	97	--	--	--
20...	1142	3.30	1550	8.6	15.0	9.0	97	0	5.0	230
20...	1143	6.60	1520	8.6	15.0	8.9	95	--	--	--
20...	1145	13.2	1520	8.6	15.0	8.8	94	--	--	--
20...	1146	19.8	1520	8.7	14.5	8.8	94	--	--	--
20...	1147	26.4	1520	8.6	14.5	8.8	94	--	--	--
20...	1148	33.5	1520	8.6	14.5	8.7	93	--	--	--

HEART RIVER BASIN

06347500 BIG MUDDY CREEK NEAR ALMONT, ND

LOCATION.--Lat 46°41'40", long 101°27'50", in NE¹/₄NE¹/₄SE¹/₄, sec.12, T.137 N., R.86 W., Morton County, Hydrologic Unit 10130203, on left bank 50 ft downstream from county highway bridge, 2 mi downstream from Hailstone Creek, 3 mi southeast of Almont, and 12 mi upstream from mouth.

DRAINAGE AREA.--456 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1945 to September 1970, October 1970 to September 1973 (annual maximum discharge), February 1991 to September 1991.

GAGE.--Water-stage recorder. Elevation of gage is 1,900 ft from topographic map. Prior to Sept. 5, 1952, non-recording gage at same site and datum.

REMARKS.--Records poor.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 565 ft³/s, June 20, gage height 10.38 ft, from floodmark; minimum recorded discharge, .20 ft³/s, July 25, 26, and Sept. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e1.5	e3.0	e2.0	e4.3	e134	e40	e.29	e.29
2	---	---	---	---	e1.6	e3.3	e2.5	e4.1	e31	e27	e.42	e.26
3	---	---	---	---	e1.6	e3.5	e2.3	e4.5	e13	e10	e.47	e.26
4	---	---	---	---	e1.4	e3.8	e2.0	e4.4	e8.5	e9.9	e.47	e.22
5	---	---	---	---	e1.2	e4.2	e2.0	e4.0	e8.3	e6.2	e.47	e.22
6	---	---	---	---	e1.1	e4.0	e1.8	e3.9	e11	e4.1	e.47	e.20
7	---	---	---	---	e1.0	e4.1	e1.6	e3.9	e7.5	e2.5	e.47	e.22
8	---	---	---	---	e.94	e4.5	e1.3	e3.6	e6.4	e1.6	e.47	e.25
9	---	---	---	---	e.85	e4.8	e1.1	e3.2	e6.2	e1.2	e.47	e.28
10	---	---	---	---	e.81	e5.1	e1.1	e2.7	e5.4	e1.2	e.47	e.31
11	---	---	---	---	e.87	e5.1	e1.7	e2.9	e4.5	e1.2	e.42	e.34
12	---	---	---	---	e1.0	e5.0	e2.4	e3.0	e4.0	e1.3	e.60	e.39
13	---	---	---	---	e1.1	e5.1	e3.5	e2.8	e3.5	e1.3	e.53	e.43
14	---	---	---	---	e1.2	e5.3	e4.6	e3.0	e3.3	e.75	e.53	e.45
15	---	---	---	---	e1.4	e5.5	e5.6	e3.3	e55	e.53	e.60	e.46
16	---	---	---	---	e1.6	e5.9	e6.4	e2.5	e24	e.47	e.53	e.44
17	---	---	---	---	e1.8	e6.3	e6.3	e1.6	e17	e.42	e.53	e.42
18	---	---	---	---	e2.0	e6.4	e6.3	e1.3	e11	e.33	e.47	e.40
19	---	---	---	---	e2.2	e6.2	e6.4	e1.2	e8.0	e.26	e.37	e.37
20	---	---	---	---	e2.4	e5.8	e6.2	e1.1	e150	e.26	e.47	e.36
21	---	---	---	---	e2.4	e6.1	e5.4	e1.1	e29	e.22	e.47	e.35
22	---	---	---	---	e2.5	e6.1	e4.8	e.94	e27	e.29	e.37	e.34
23	---	---	---	---	e2.6	e5.4	e4.4	e.84	e16	e.26	e.33	e.39
24	---	---	---	---	e2.5	e4.5	e4.6	e.75	e13	e.22	e.37	e.42
25	---	---	---	---	e2.4	e3.7	e5.6	e.75	e15	e.20	e.42	e.44
26	---	---	---	---	e2.5	e2.7	e6.5	e.84	e8.8	e.20	e.42	e.42
27	---	---	---	---	e2.6	e2.2	e6.0	e8.3	e6.4	e.22	e.47	e.41
28	---	---	---	---	e2.8	e1.9	e6.0	e5.6	e4.6	e.26	e.53	e.39
29	---	---	---	---	---	e2.1	e5.4	e3.7	e3.9	e.26	e.47	e.38
30	---	---	---	---	---	e2.2	e4.7	e2.6	e2.8	e.26	e.26	e.37
31	---	---	---	---	---	e2.3	---	e69	---	e.22	e.26	---
TOTAL	---	---	---	---	47.87	136.1	120.5	155.72	638.1	113.13	13.89	10.48
MEAN	---	---	---	---	1.71	4.39	4.02	5.02	21.3	3.65	.45	.35
MAX	---	---	---	---	2.8	6.4	6.5	69	150	40	.60	.46
MIN	---	---	---	---	.81	1.9	1.1	.75	2.8	.20	.26	.20

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1991, BY WATER YEAR (WY)

	MEAN	1.20	1.60	1.33	1.08	5.64	127	172	50.5	47.9	13.0	4.97	2.52
MAX	2.61	3.19	2.48	4.59	56.5	420	1160	540	405	54.6	28.2	15.2	
(WY)	1952	1952	1952	1947	1954	1948	1950	1970	1966	1962	1952	1953	
MIN	.39	.58	.35	.065	.000	.73	1.74	1.01	.43	.042	.12	.35	
(WY)	1962	1961	1949	1949	1966	1965	1961	1961	1961	1961	1961	1991	

SUMMARY STATISTICS

WATER YEARS 1946 - 1991

ANNUAL MEAN	a37.0
HIGHEST ANNUAL MEAN	a112 1950
LOWEST ANNUAL MEAN	a1.41 1961
HIGHEST DAILY MEAN	15000 Apr 17 1950
LOWEST DAILY MEAN	.00 Jan 28 1946
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 28 1946
INSTANTANEOUS PEAK FLOW	20200 Apr 17 1950
INSTANTANEOUS PEAK STAGE	b30.70 Apr 17 1950
10 PERCENT EXCEEDS	30
50 PERCENT EXCEEDS	1.7
90 PERCENT EXCEEDS	.37

e Estimated.

a Based on complete water years only (1945-70).

b From floodmark.

HEART RIVER BASIN

239

06347500 BIG MUDDY CREEK NEAR ALMONT, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--February to August 1991.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
FEB 20...	1530	2.4	2900	--	11.5	0.5	--	--	--	--	--	--
MAR a28...	1015	1.9	1390	8.0	-2.5	0.5	140	26	17	270	81	10
APR 04...	1240	2.0	1520	--	22.5	10.0	--	--	--	--	--	--
MAY 16...	1145	2.7	2050	--	20.0	16.0	--	--	--	--	--	--
JUN 14...	1155	3.3	1340	--	23.5	22.0	--	--	--	--	--	--
21...	1515	28	625	--	22.0	20.0	--	--	--	--	--	--
25...	1350	15	1080	--	24.0	22.5	--	--	--	--	--	--
AUG 23...	1320	0.33	2150	8.8	29.0	24.5	160	23	25	460	85	16
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
MAR a28...	3.9	580	0	480	270	3.1	0.70	11	881	889	1.20	
AUG 23...	12	890	28	780	440	7.5	1.4	5.3	1470	1440	2.00	
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR a28...	4.57	2	330	110	<1	30	20	<0.1	3	<1	440	
AUG 23...	1.31	10	680	30	<1	50	20	<0.1	<1	3	550	

a Replicate sample also collected for quality-assurance purposes.

HEART RIVER BASIN

06348000 HEART RIVER NEAR LARK, ND

LOCATION.--Lat 46°36'37", long 101°22'54", in SW¹/₄, NW¹/₄, SW¹/₄, sec.9, T.136 N., R.85 W., Grant County, Hydrologic Unit 10130203, on right bank 20 ft downstream from county highway bridge, 0.6 mi downstream from Big Muddy Creek, and 10 mi north of Lark.

DRAINAGE AREA.--2,750 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1946 to current year (seasonal records only since Oct. 1982).

GAGE.--Water-stage recorder. Datum of gage is 1,802.83 ft above National Geodetic Vertical Datum of 1929 (levels by U.S. Army Corps of Engineers). Prior to Nov. 16, 1948, nonrecording gage at same site and datum.

REMARKS.--Records fair except those for period of estimated discharges, which are poor. Flow regulated by Lake Tschida (06346000) 45 mi upstream since 1949.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,870 ft³/s, June 20, gage height, 7.57 ft³/s; minimum daily discharge during period Feb. 1 to Sept. 30, 3.2 ft³/s, May 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e2.8	e11	18	15	480	37	35	46
2	---	---	---	---	e2.9	e13	18	13	178	76	40	37
3	---	---	---	---	e3.0	e15	17	14	80	29	41	35
4	---	---	---	---	e2.8	e18	17	15	59	18	42	28
5	---	---	---	---	e2.5	e20	17	14	53	12	46	16
6	---	---	---	---	e2.3	e19	14	13	55	10	47	13
7	---	---	---	---	e2.1	e19	13	13	80	12	29	22
8	---	---	---	---	e1.8	e22	12	13	61	15	21	20
9	---	---	---	---	e1.6	e25	11	12	55	9.7	24	24
10	---	---	---	---	e1.5	e29	11	9.0	44	6.6	20	29
11	---	---	---	---	e1.6	e30	9.7	7.1	40	31	12	34
12	---	---	---	---	e1.8	e29	12	12	32	62	12	37
13	---	---	---	---	e2.1	e30	20	10	25	61	16	38
14	---	---	---	---	e2.5	e33	28	9.9	51	60	16	33
15	---	---	---	---	e3.0	e34	28	8.1	178	58	23	21
16	---	---	---	---	e3.4	e36	27	8.5	151	48	40	15
17	---	---	---	---	e3.9	e38	27	8.2	78	33	40	13
18	---	---	---	---	e4.8	e51	27	6.0	47	27	42	7.7
19	---	---	---	---	e5.8	e48	25	4.7	28	27	42	7.0
20	---	---	---	---	e6.5	e39	23	5.5	633	24	43	6.0
21	---	---	---	---	e6.3	e44	22	6.6	644	26	29	5.4
22	---	---	---	---	e6.3	e48	18	4.3	151	27	18	6.0
23	---	---	---	---	e6.8	e46	17	3.2	100	67	11	7.4
24	---	---	---	---	e7.2	e38	14	29	66	63	15	8.4
25	---	---	---	---	e6.8	e32	13	31	53	63	21	8.3
26	---	---	---	---	e7.2	e29	14	33	45	61	21	7.8
27	---	---	---	---	e8.2	e29	15	39	36	59	22	6.4
28	---	---	---	---	e9.4	e28	14	43	29	64	23	6.6
29	---	---	---	---	---	e21	13	44	24	65	34	8.4
30	---	---	---	---	---	e20	15	36	20	60	48	8.2
31	---	---	---	---	---	19	---	164	---	38	49	---
TOTAL	---	---	---	---	116.9	913	529.7	644.1	3576	1249.3	922	554.6
MEAN	---	---	---	---	4.17	29.5	17.7	20.8	119	40.3	29.7	18.5
MAX	---	---	---	---	9.4	51	28	164	644	76	49	46
MIN	---	---	---	---	1.5	11	9.7	3.2	20	6.6	11	5.4
AC-FT	---	---	---	---	232	1810	1050	1280	7090	2480	1830	1100

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1991, BY WATER YEAR (WY)

	MEAN	46.1	33.7	24.9	19.6	60.9	645	798	307	262	160	78.9	55.8
MAX	273	88.1	86.6	99.2	521	2695	4793	3221	1001	1100	172	138	
(WY)	1978	1957	1954	1973	1982	1982	1952	1970	1982	1969	1972	1977	
MIN	7.51	5.66	2.08	.048	.000	10.7	16.3	12.3	22.1	25.4	5.39	8.78	
(WY)	1950	1950	1950	1950	1950	1975	1981	1961	1990	1949	1946	1948	

SUMMARY STATISTICS

WATER YEARS 1946 - 1991

ANNUAL MEAN	a225	
HIGHEST ANNUAL MEAN	a684	1982
LOWEST ANNUAL MEAN	a30.0	1961
HIGHEST DAILY MEAN	23200	Apr 18 1950
LOWEST DAILY MEAN	.00	Jan 16 1950
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 16 1950
INSTANTANEOUS PEAK FLOW	b29200	Apr 17 1950
INSTANTANEOUS PEAK STAGE	20.70	Apr 17 1950
ANNUAL RUNOFF (AC-FT)	a163100	
10 PERCENT EXCEEDS	328	
50 PERCENT EXCEEDS	47	
90 PERCENT EXCEEDS	11	

e Estimated.

a Based on complete water years only (1947-82).

b From rating curve extended above 11,000 ft³/s on basis of contracted-opening measurement of peak flow.

HEART RIVER BASIN

241

06348000 HEART RIVER NEAR LARK, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 10...	1035	7.5	1700	--	12.0	5.0	--	--	--	--	--	--
FEB 20...	1330	6.5	1900	--	12.0	0.5	--	--	--	--	--	--
MAR 27...	1000	33	1190	7.8	-5.0	0.5	210	41	27	190	65	6
APR 04...	1130	17	1020	--	21.0	11.0	--	--	--	--	--	--
MAY 16...	1035	9.1	1490	--	18.0	16.5	--	--	--	--	--	--
JUN 14...	1100	15	1350	--	23.0	22.0	--	--	--	--	--	--
25...	1210	52	680	--	23.5	22.5	--	--	--	--	--	--
AUG 22...	1220	19	1520	8.4	31.5	24.0	320	52	45	230	60	6
DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	
MAR 27...	4.4	460	0	370	250	5.4	0.40	5.5	750	748	1.02	
AUG 22...	13	380	3	320	510	15	0.50	2.2	1090	1060	1.48	
DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	
MAR 27...	66.4	1	240	10	<1	40	70	0.1	<1	<1	550	
AUG 22...	55.6	2	390	20	<1	40	30	<0.1	<1	1	920	

HEART RIVER BASIN

06348300 HEART RIVER AT STARK BRIDGE NEAR JUDSON, ND

LOCATION.--Lat 46°42'11", long 101°12'37", in SE $\frac{1}{4}$,SW $\frac{1}{4}$,SW $\frac{1}{4}$, sec.6, T.137 N., R.83 W., Morton County, Hydrologic Unit 10130203, on right bank 50 ft upstream from county bridge, 9.5 mi southeast of Judson.

DRAINAGE AREA.--2,930 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1986 to September 1988 (maximum discharges only), October 1988 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,720 ft National Geodetic Vertical Datum, from topographic map.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow regulated by Lake Tschida (06346000) since 1949.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	17	e13	e.21	e4.0	e11	28	21	213	46	38	39
2	15	17	e12	e.21	e4.2	e14	25	20	288	53	44	40
3	15	17	e11	e.24	e4.3	e17	24	23	131	83	44	35
4	15	17	e13	e.23	e4.5	e21	25	24	66	49	45	34
5	16	18	e14	e.22	e4.4	e24	23	22	53	37	48	34
6	15	16	e15	e.23	e4.0	e26	23	21	43	31	50	27
7	17	18	e15	e.25	e3.5	e24	20	19	38	23	48	21
8	15	22	e16	e.23	e3.0	e24	17	18	56	18	28	24
9	15	30	e17	e.22	e2.6	e29	16	19	39	24	18	27
10	15	24	e16	e.22	e2.3	e34	14	17	35	19	18	28
11	15	19	e14	e.26	e2.0	e39	12	16	36	26	12	35
12	15	19	e13	e.30	e2.3	e36	19	16	35	34	6.4	38
13	15	19	e11	e.32	e2.8	e38	23	18	33	53	4.8	42
14	15	20	e9.4	e.30	e3.2	e42	26	15	39	52	4.8	43
15	14	19	e7.4	e.29	e3.8	e46	33	17	76	51	6.4	39
16	17	19	e6.1	e.27	e4.3	e51	37	15	177	47	6.0	35
17	20	19	e4.7	e.30	e5.1	e54	33	e15	144	36	23	29
18	21	20	e3.0	e.29	e6.3	e59	30	e12	84	27	29	25
19	18	21	e1.8	e.28	e8.0	e61	31	e10	56	19	29	22
20	17	21	e1.1	e.30	e9.5	e69	29	5.0	128	13	30	19
21	18	22	e.96	e.33	e8.8	e59	26	3.8	872	9.3	32	17
22	19	20	e.90	e.33	e8.0	e52	22	8.6	402	11	25	17
23	21	e19	e.80	e.34	e8.0	e51	20	16	184	14	13	15
24	18	e17	e.72	e.37	e8.7	e49	16	11	133	38	9.1	16
25	18	e16	e.65	e.40	e9.5	e45	12	8.7	94	38	4.4	18
26	18	e14	e.50	e.41	e9.0	e35	12	19	78	50	11	19
27	18	e13	e.35	e.38	e8.5	e28	16	22	62	60	17	17
28	19	e12	e.24	e.36	e9.3	e26	21	29	57	73	16	17
29	17	e13	e.22	e.36	---	e30	21	32	50	58	14	14
30	17	e14	e.24	e.45	---	e35	22	35	46	55	23	14
31	17	---	e.23	e1.5	---	30	---	44	---	49	38	---
TOTAL	521	552	219.31	10.40	153.9	1159	676	572.1	3748	1196.3	734.9	800
MEAN	16.8	18.4	7.07	.34	5.50	37.4	22.5	18.5	125	38.6	23.7	26.7
MAX	21	30	17	1.5	9.5	69	37	44	872	83	50	43
MIN	14	12	.22	.21	2.0	11	12	3.8	33	9.3	4.4	14

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1989 - 1991, BY WATER YEAR (WY)

	1989	1990	1989	1990	1991	1989	1990	1991	1989	1990	1991
MEAN	18.2	18.1	11.4	8.05	8.30	52.2	37.7	27.8	54.6	38.0	41.9
MAX	19.4	21.8	13.9	12.1	12.3	82.2	75.6	45.2	125	46.6	51.9
(WY)	1989	1990	1989	1989	1990	1989	1989	1989	1991	1989	1989
MIN	16.8	14.1	7.07	.34	5.50	37.1	15.0	18.5	14.5	28.8	23.7
(WY)	1991	1989	1991	1991	1991	1990	1990	1991	1990	1990	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1989 - 1991

ANNUAL TOTAL	7800.14	10342.91	
ANNUAL MEAN	21.4	28.3	28.6
HIGHEST ANNUAL MEAN			35.1
LOWEST ANNUAL MEAN			22.3
HIGHEST DAILY MEAN	144	Aug 19	872
LOWEST DAILY MEAN	.22	Dec 29	.21
ANNUAL SEVEN-DAY MINIMUM	.35	Dec 25	.22
INSTANTANEOUS PEAK FLOW			1410
INSTANTANEOUS PEAK STAGE			7.36
10 PERCENT EXCEEDS	42		51
50 PERCENT EXCEEDS	17		18
90 PERCENT EXCEEDS	4.6		.59

e Estimated.

HEART RIVER BASIN

243

06348300 HEART RIVER AT STARK BRIDGE NEAR JUDSON, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
29...	1210	17	1730	--	18.0	6.5	--	--	--	--	--	--
DEC												
10...	1315	16	--	--	5.0	0.5	--	--	--	--	--	--
JAN												
16...	1240	0.27	2450	--	-2.0	0.0	--	--	--	--	--	--
FEB												
20...	1115	9.5	1940	--	9.0	0.0	--	--	--	--	--	--
MAR												
27...	1230	28	1260	7.9	-2.0	0.5	250	48	31	180	61	5
APR												
03...	1430	28	1290	--	18.0	14.5	--	--	--	--	--	--
MAY												
16...	0915	17	1400	--	17.0	14.0	--	--	--	--	--	--
JUN												
14...	0920	32	1260	--	22.0	20.0	--	--	--	--	--	--
26...	1315	74	770	--	24.5	24.0	--	--	--	--	--	--
AUG												
22...	0940	31	1630	8.4	25.0	21.0	320	52	45	250	62	6
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
27...		4.1	420	4	350	270	7.8	0.30	3.4	749	754	1.02
AUG												
22...		13	400	5	330	530	15	0.50	3.4	1140	1110	1.55
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
27...		57.0	<1	250	30	<1	40	30	0.1	1	<1	610
AUG												
22...		96.0	2	420	30	<1	50	20	<0.1	<1	1	890

HEART RIVER BASIN

06349000 HEART RIVER NEAR MANDAN, ND
(National stream-quality accounting network station)

LOCATION.--Lat 46°50'02", long 100°58'27", in NW¹/₄, NE¹/₄, sec.25, T.139 N., R.82 W., Morton County, Hydrologic Unit 10130203, on left bank near downstream wingwall of bridge on county highway, 3 mi west of Mandan, and 4 mi downstream from Sweetbriar Creek.

DRAINAGE AREA.--3,310 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to September 1924, March 1928 to June 1933, August 1937 to current year. Published as "at Sunny" 1924, 1928-33.

REVISED RECORDS.--WSP 926: 1938. WSP 1209: Drainage area. WSP 1239: 1924, 1928-29, 1948.

GAGE.--Water-stage recorder. Datum of gage is 1,638.70 ft above National Geodetic Vertical Datum of 1929, and 1,623.03 ft above Burlington Northern Railway datum. See WSP 1729 or 1917 for history of changes prior to June 30, 1958.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow regulated by Lake Tschida (station 06346000) 105 mi upstream since 1949. Some diversions above station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	18	e12	e.21	e.39	e9.8	40	16	63	66	46	17
2	15	18	e13	e.23	e1.0	e10	35	14	115	57	39	43
3	15	15	e13	e.24	e3.0	e11	33	22	375	50	31	45
4	15	e18	e12	e.22	e4.1	e14	30	35	272	79	32	47
5	15	18	e11	e.21	e4.2	e18	29	36	163	66	31	43
6	15	e19	e12	e.24	e4.3	e23	29	32	100	44	38	47
7	14	e18	e13	e.24	e4.4	e28	25	27	87	34	37	47
8	15	e19	e14	e.23	e4.3	e28	23	24	76	26	43	58
9	15	e20	e15	e.24	e3.8	e27	20	24	83	20	37	42
10	16	21	e16	e.25	e3.2	e26	15	22	82	12	24	36
11	16	27	e16	e.24	e2.9	e31	12	24	66	15	14	36
12	16	22	e16	e.23	e2.0	e40	18	23	63	14	9.4	39
13	15	e20	e14	e.26	e1.7	e45	20	21	59	14	7.1	44
14	15	22	e12	e.29	e1.5	e48	29	15	56	25	4.4	54
15	14	20	e11	e.33	e1.5	e50	26	21	57	40	4.0	67
16	15	20	e9.2	e.32	e2.4	e53	29	20	70	39	4.2	59
17	17	e20	e7.5	e.30	e5.8	e59	36	18	167	36	2.5	52
18	19	e20	e6.1	e.29	e7.2	e66	40	18	165	27	1.2	43
19	19	21	e5.7	e.31	e8.1	e74	40	15	119	19	11	34
20	18	22	e2.4	e.32	e11	e81	37	16	103	15	28	30
21	18	23	e.96	e.31	e11	e90	38	17	185	9.3	25	25
22	17	e22	e.88	e.30	e10	e84	35	13	974	7.0	29	20
23	18	e21	e.82	e.31	e9.6	e79	28	13	e550	2.1	31	16
24	15	e20	e.76	e.33	e9.4	e68	22	9.5	e300	1.1	24	23
25	16	e19	e.71	e.35	e10	e63	16	14	e190	1.7	8.8	20
26	19	e18	e.68	e.36	e10	e56	13	17	e119	27	7.9	15
27	21	e17	e.63	e.38	e11	e41	14	12	102	34	2.5	12
28	20	e16	e.48	e.40	e11	e48	12	15	88	59	1.5	12
29	19	e14	e.16	e.42	---	e31	14	23	80	65	5.9	13
30	19	e13	e.18	e.40	---	e37	17	33	73	56	5.2	12
31	18	---	e.20	e.39	---	e51	---	73	---	48	4.0	---
TOTAL	515	581	237.36	9.15	158.79	1389.8	775	682.5	5002	1008.2	588.6	1051
MEAN	16.6	19.4	7.66	.30	5.67	44.8	25.8	22.0	167	32.5	19.0	35.0
MAX	21	27	16	.42	11	90	40	73	974	79	46	67
MIN	14	13	.16	.21	.39	9.8	12	9.5	56	1.1	1.2	12
AC-FT	1020	1150	471	18	315	2760	1540	1350	9920	2000	1170	2080

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1991, BY WATER YEAR (WY)

	MEAN	49.1	39.5	22.4	14.6	90.5	900	904	327	356	204	76.9	58.4
MAX	288	383	155	145	1046	3987	5885	3610	1925	1508	297	214	
(WY)	1978	1983	1983	1983	1930	1943	1950	1970	1941	1938	1928	1977	
MIN	5.41	6.95	.21	.000	.000	.28	25.2	20.5	23.4	11.3	3.65	1.43	
(WY)	1940	1938	1938	1938	1940	1965	1990	1931	1961	1990	1932	1932	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1924 - 1991

ANNUAL TOTAL	7032.84	11998.40	256	
ANNUAL MEAN	19.3	32.9	898	1982
HIGHEST ANNUAL MEAN			19.2	1990
LOWEST ANNUAL MEAN				
HIGHEST DAILY MEAN	150	Aug 25	28400	Apr 18 1950
LOWEST DAILY MEAN	.00	Jul 14	.00	Aug 20 1929
ANNUAL SEVEN-DAY MINIMUM	.43	Dec 25	.00	Feb 1 1930
INSTANTANEOUS PEAK FLOW			a30500	Apr 19 1950
INSTANTANEOUS PEAK STAGE			b25.75	Apr 4 1952
ANNUAL RUNOFF (AC-FT)	13950	23800	185200	
10 PERCENT EXCEEDS	44	66	394	
50 PERCENT EXCEEDS	16	18	46	
90 PERCENT EXCEEDS	2.5	.57	5.0	

e Estimated.

a About.

b Ice jam.

HEART RIVER BASIN

245

06349000 HEART RIVER NEAR MANDAN, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946-50, 1971-76, 1978 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CON-DUCT- ANCE (US/CM) (00095)	SPE-CIFIC CON-DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
OCT												
22...	1500	18	1730	--	--	16.0	9.5	--	--	--	--	--
NOV												
13...	1105	18	2030	--	--	6.0	0.0	--	--	--	--	--
27...	1030	17	2400	--	8.1	-11.0	0.5	2.2	13.7	96	K5	47
JAN												
14...	1130	0.29	1530	--	7.5	0.0	0.0	--	5.7	39	<2	34
FEB												
11...	1115	2.9	2700	--	7.8	3.5	0.0	4.5	4.1	28	K2	190
MAR												
27...	1440	88	1180	--	--	1.0	0.5	--	--	--	--	--
APR												
04...	0935	30	1390	--	--	10.5	8.0	--	--	--	--	--
18...	0835	40	1140	--	--	7.0	9.5	--	--	--	--	--
MAY												
16...	1350	21	1560	--	--	27.0	23.0	--	--	--	--	--
28...	0930	13	--	1850	8.2	22.0	20.5	7.3	--	--	180	300
JUN												
22...	1335	1160	763	--	--	24.0	19.5	--	--	--	--	--
26...	1130	119	610	--	--	25.0	24.0	--	--	--	--	--
JUL												
22...	1000	7.7	1690	--	8.5	21.5	20.5	4.0	8.2	91	39	120
AUG												
26...	0935	8.4	1740	--	8.5	24.5	23.0	4.6	9.1	106	130	510

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)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)
NOV											
27...	460	76	66	370	63	7	8.4	557	578	705	0
JAN											
14...	--	--	--	--	--	--	--	--	502	613	0
FEB											
11...	470	76	67	410	65	8	12	621	--	--	--
MAY											
28...	300	43	47	330	70	8	9.2	443	473	577	0
JUL											
22...	300	51	42	250	63	6	11	366	374	408	24
AUG											
26...	330	47	51	290	65	7	11	356	356	405	14

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
NOV											
27...	710	23	0.50	6.2	1510	1610	2.05	69.7	--	0.020	<0.010
JAN											
14...	--	--	--	--	--	--	--	--	--	0.010	0.010
FEB											
11...	750	56	0.60	10	1700	1760	2.31	13.2	0.290	0.030	0.010
MAY											
28...	550	27	1.1	3.9	1250	1300	1.70	42.5	--	0.010	<0.010
JUL											
22...	490	23	0.60	7.0	1090	1100	1.48	22.5	--	<0.010	<0.010
AUG											
26...	560	22	0.80	4.6	1210	1200	1.65	27.4	--	<0.010	<0.010

HEART RIVER BASIN

06349000 HEART RIVER NEAR MANDAN, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)
NOV 27...	<0.100	<0.100	0.040	0.040	0.70	--	<0.010	<0.010	<0.010	<0.010	20
JAN 14...	<0.100	<0.100	0.760	0.710	1.0	--	<0.010	<0.010	<0.010	<0.010	--
FEB 11...	0.200	0.300	0.380	0.360	1.2	--	0.040	0.010	0.020	<0.010	<10
MAY 28...	<0.050	<0.050	0.020	0.010	1.8	--	0.030	<0.010	<0.010	<0.010	<10
JUL 22...	<0.050	<0.050	0.020	0.020	0.70	0.50	0.040	0.010	<0.010	<0.010	<10
AUG 26...	<0.050	<0.050	<0.010	0.020	0.70	0.50	0.030	<0.010	<0.010	<0.010	--
DATE	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIIUM, 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)	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)
NOV 27...	<1	<100	<10	<1.0	<1	<1	2	30	1	90	20
FEB 11...	<1	100	<10	<1.0	<1	1	2	60	<1	100	270
MAY 28...	1	61	<0.5	<1.0	<1	<3	2	35	1	80	17
JUL 22...	<1	110	<0.5	<1.0	<1	<3	1	<3	<1	57	13
DATE	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)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 27...	<0.1	3	2	<1	<1.0	1200	2	<10	26	1.2	39
JAN 14...	--	--	--	--	--	--	--	--	52	0.04	45
FEB 11...	0.1	1	4	<1	<1.0	1100	5	<10	88	0.68	8
APR 18...	--	--	--	--	--	--	--	--	45	4.9	51
MAY 28...	0.2	<10	4	<1	<1.0	770	<6	3	18	0.61	--
JUL 22...	0.1	<10	2	<1	<1.0	760	<6	5	19	0.39	69
AUG 26...	--	--	--	--	--	--	--	--	35	0.79	84

MISSOURI RIVER MAIN STEM

247

06349070 MISSOURI RIVER BELOW MANDAN, ND

LOCATION.--Lat 46°44'32", long 100°49'54", at midsection of west half sec.30, T.138 N., R.80 W., Morton County, Hydrologic Unit 10130102, on right bank 1 mi south of Fort Lincoln State Park, 6 mi southeast of Mandan, and at mile 1,309.

DRAINAGE AREA.--189,800 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--September 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft above National Geodetic Vertical Datum of 1929 (U.S. Army Corps of Engineers benchmark).

REMARKS.--Stage regulated by Garrison Dam (station 06338490) 80.9 mi upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 29.71 ft, Mar. 17, 1972; minimum daily recorded, 17.40 ft, Apr. 1, 1968.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19.10	19.14	21.40	---	25.47	25.71	19.42	---	21.93	21.83	21.87	21.70
2	19.09	19.12	21.48	---	25.48	24.74	19.39	---	21.88	21.85	21.86	21.71
3	19.00	18.92	21.63	---	25.50	23.66	19.67	---	21.95	21.77	21.88	21.74
4	19.01	18.93	21.52	---	25.61	24.52	19.49	---	22.03	21.83	21.85	21.53
5	19.08	18.98	21.44	---	25.68	25.21	19.31	---	22.04	21.80	21.87	21.56
6	19.13	19.74	21.53	---	25.60	24.66	19.18	---	21.94	21.86	21.83	21.60
7	19.21	21.13	21.48	---	25.78	23.67	19.23	---	21.91	21.85	21.89	21.46
8	19.18	20.50	21.44	26.32	25.88	23.42	19.30	---	21.89	21.83	21.86	22.00
9	19.22	19.66	21.31	26.29	25.96	23.38	19.31	---	21.88	21.80	21.88	21.73
10	19.24	19.11	21.33	26.48	25.99	23.57	19.28	---	21.86	21.80	21.90	21.66
11	19.35	19.12	21.41	26.36	25.88	23.41	19.54	21.61	21.86	21.93	21.85	21.48
12	19.08	19.14	21.31	26.34	25.90	22.42	19.51	21.92	21.88	21.93	21.86	21.02
13	19.05	19.13	21.31	26.34	25.94	20.96	20.31	21.84	21.96	21.88	21.89	20.64
14	18.98	19.18	21.25	26.29	25.91	20.49	21.89	---	21.79	21.85	21.84	20.28
15	19.09	19.07	21.39	26.21	24.98	20.45	23.63	21.58	21.69	21.88	21.90	20.32
16	19.10	19.25	21.30	26.16	25.00	20.38	24.19	21.86	21.77	21.88	21.88	20.27
17	19.05	19.14	21.32	26.10	25.76	20.33	---	21.78	21.85	21.88	21.89	19.94
18	19.05	19.25	21.54	25.91	26.05	20.12	---	21.94	21.78	21.93	21.90	20.11
19	19.03	19.13	21.74	25.91	26.04	19.85	---	22.07	21.86	21.91	21.76	19.88
20	19.06	19.11	---	25.92	26.03	19.73	---	21.97	21.96	21.87	21.90	19.60
21	19.00	19.21	22.68	25.62	26.10	19.69	---	---	21.92	21.84	21.92	19.46
22	18.94	19.21	---	25.64	26.04	19.43	---	---	21.86	21.87	21.91	19.43
23	18.92	19.25	---	25.77	25.66	19.51	---	---	21.88	21.90	21.93	19.40
24	19.06	19.04	24.92	25.62	25.54	19.40	---	21.88	21.94	21.79	21.86	19.37
25	19.09	19.20	---	25.56	25.77	19.52	---	21.91	21.87	21.83	21.76	19.37
26	19.10	19.21	---	25.54	25.76	19.45	---	21.95	21.84	21.88	21.74	---
27	19.07	19.36	25.86	25.48	25.61	19.41	---	21.97	21.78	21.82	21.62	19.39
28	18.99	19.86	---	25.49	25.69	19.41	---	21.93	21.77	21.84	21.62	19.36
29	18.91	20.43	---	25.41	---	19.40	---	21.95	21.86	21.86	21.73	19.31
30	19.20	20.86	---	25.37	---	19.31	---	21.94	21.87	21.76	21.62	---
31	19.16	---	25.99	25.50	---	19.35	---	21.99	---	21.84	21.72	---
MEAN	19.08	19.41	---	---	25.74	21.44	---	---	21.88	21.85	21.83	---
MAX	19.35	21.13	---	---	26.10	25.71	---	---	22.04	21.93	21.93	---
MIN	18.91	18.92	---	---	24.98	19.31	---	---	21.69	21.76	21.62	---

APPLE CREEK BASIN

06349215 LONG LAKE CREEK ABOVE LONG LAKE NEAR MOFFIT, ND

LOCATION.--Lat 46°37'59", long 100°14'29", in NE $\frac{1}{4}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ sec.4, T.136 N., R.76 W., Emmons County, Hydrologic Unit 10130103, on left bank 2.5 mi upstream from Long Lake 4.5 mi southeast of Moffit.

DRAINAGE AREA.--250 mi² approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,720 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.17	e.27	.35	e.03	e.10	e.65	7.6	8.0	7.0	12	.15	.12
2	e.17	e.27	.32	e.04	e.20	e.80	7.3	8.9	6.0	10	.16	.24
3	e.18	e.27	.34	e.04	e.25	e1.2	6.5	13	5.0	8.8	.15	.08
4	e.18	e.26	.38	e.04	e.35	e1.0	6.2	13	5.0	7.5	.17	.03
5	e.18	e.25	.43	e.04	e.40	e.80	6.0	14	5.2	7.1	.10	.05
6	e.17	e.25	.42	e.05	e.50	e.90	5.5	19	5.2	6.4	.14	.08
7	e.17	e.25	.42	e.05	e1.8	e.90	4.9	18	5.2	5.9	.15	.17
8	e.18	e.25	.36	e.05	e2.0	e1.1	4.6	17	5.1	3.7	.17	.69
9	e.19	.20	.40	e.05	e1.7	e1.2	4.4	18	5.4	3.4	.19	.52
10	e.19	.20	.41	e.05	e1.5	e1.2	4.0	20	5.2	2.8	.20	.42
11	e.19	.20	.37	e.05	e1.7	e1.3	3.6	17	4.4	3.0	.15	.29
12	e.20	.25	.38	e.06	e4.5	e1.5	3.8	13	3.5	3.1	.10	.15
13	e.20	.37	.32	e.06	e3.0	e1.6	4.7	11	2.7	2.5	.05	.36
14	e.20	.36	.33	e.06	e2.2	e2.0	6.0	8.4	2.2	2.1	.08	.58
15	e.20	.32	.31	e.05	e.60	e2.3	6.3	53	2.8	1.5	.10	.55
16	e.22	.30	e.24	e.06	e.65	e2.5	7.3	112	2.0	1.4	.10	.39
17	e.35	.33	e.21	e.07	e.70	e2.3	8.6	84	1.6	1.1	.10	.35
18	e.33	.30	e.18	e.07	e.75	e2.3	8.6	57	1.3	1.1	.08	.20
19	e.30	.42	e.15	e.06	e.80	e2.5	8.2	44	1.3	.73	.05	.33
20	e.30	.55	e.12	e.06	e.88	e3.0	9.4	35	2.2	.70	.10	.61
21	e.30	.53	e.10	e.06	e.90	e4.0	12	28	2.2	.72	.10	.74
22	e.29	.57	e.08	e.06	e.80	e6.0	14	21	11	.60	.05	.65
23	e.29	.51	e.07	e.05	e.80	7.6	12	20	24	.45	.06	.52
24	e.29	.55	e.06	e.05	e.80	10	9.7	18	27	.40	.05	.52
25	e.29	.52	e.05	e.05	e.80	9.9	8.0	15	33	.37	.16	.73
26	e.28	.46	e.04	e.05	e.80	8.2	7.1	14	26	.36	.21	.42
27	e.28	.35	e.04	e.05	e.70	6.7	7.4	13	19	.35	.14	.04
28	e.28	.27	e.04	e.05	e.60	7.9	7.7	11	16	.32	.23	.06
29	e.28	.31	e.04	e.06	---	7.3	7.3	9.4	14	.26	.21	.23
30	e.27	.36	.00	e.06	---	7.7	7.2	8.2	13	.24	.15	.34
31	e.27	---	.01	e.07	---	7.5	---	8.0	---	.15	.08	---
TOTAL	7.39	10.30	6.97	1.65	30.78	113.85	215.9	748.9	263.5	89.05	3.93	10.46
MEAN	.24	.34	.22	.053	1.10	3.67	7.20	24.2	8.78	2.87	.13	.35
MAX	.35	.57	.43	.07	4.5	10	14	112	33	12	.23	.74
MIN	.17	.20	.00	.03	.10	.65	3.6	8.0	1.3	.15	.05	.03
AC-FT	15	20	14	3.3	61	226	428	1490	523	177	7.8	21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1989 - 1991, BY WATER YEAR (WY)

MEAN	.42	.82	.58	.57	2.02	32.1	10.5	12.5	5.79	1.32	3.08	1.99
MAX	.69	1.76	1.17	1.23	4.46	78.4	18.4	24.2	8.78	2.87	8.98	5.46
(WY)	1990	1990	1990	1990	1990	1989	1989	1991	1991	1991	1989	1989
MIN	.24	.34	.22	.053	.51	3.67	5.74	3.94	2.14	.32	.12	.15
(WY)	1991	1991	1991	1991	1989	1991	1990	1990	1989	1989	1990	1990

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1989 - 1991

ANNUAL TOTAL	1152.24	1502.68	
ANNUAL MEAN	3.16	4.12	6.02
HIGHEST ANNUAL MEAN			10.6
LOWEST ANNUAL MEAN			3.39
HIGHEST DAILY MEAN	31	Jun 20	359
LOWEST DAILY MEAN	.00	Dec 30	.00
ANNUAL SEVEN-DAY MINIMUM	.03	Dec 25	.03
INSTANTANEOUS PEAK FLOW			117
INSTANTANEOUS PEAK STAGE			2.54
INSTANTANEOUS LOW FLOW			.00
ANNUAL RUNOFF (AC-FT)	2290	2980	4360
10 PERCENT EXCEEDS	10	11	12
50 PERCENT EXCEEDS	.74	.50	.70
90 PERCENT EXCEEDS	.13	.06	.15

e Estimated.

APPLE CREEK BASIN

249

06349215 LONG LAKE CREEK ABOVE LONG LAKE NEAR MOFFIT, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--April 1988 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
NOV 08...	1230	0.25	--	--	6.0	4.5	--	--	--	--	--	--
JAN 11...	1035	0.05	1370	--	-1.5	0.0	--	--	--	--	--	--
FEB 20...	1204	0.88	2400	--	1.0	0.5	--	--	--	--	--	--
APR 01...	1026	7.6	820	8.4	12.5	2.5	180	38	21	120	58	4
MAY 30...	1213	8.6	876	--	32.0	23.5	--	--	--	--	--	--
JUN 20...	1309	2.2	965	--	23.0	22.0	--	--	--	--	--	--
AUG 15...	1050	0.08	1060	--	24.5	22.5	--	--	--	--	--	--
SEP 06...	1149	0.04	1080	8.6	26.0	20.0	240	47	29	160	58	5
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
APR 01...		6.7	330	0	270	150	4.7	0.30	9.9	490	513	0.67
SEP 06...		15	590	15	510	95	9.1	0.50	15	697	677	0.95
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
APR 01...		10.1	2	280	60	<1	140	70	0.1	1	<1	270
SEP 06...		0.08	12	490	20	<1	160	30	<0.1	2	1	410

APPLE CREEK BASIN

06349275 LONG LAKE CREEK BELOW LONG LAKE NEAR MOFFIT, ND

LOCATION.--Lat 47°41'30", long 100°17'10", in NW¹/₄NW¹/₄NW¹/₄ sec.16, T.137 N., R.76 W., Burleigh County, Hydrologic Unit 10130103, on right bank at road crossing of the outflow of Long Lake, 1.0 mi north of Moffit.

DRAINAGE AREA.--380 mi² contributing, approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,715 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records good. Some regulation by several U.S. Fish and Wildlife Service control structures on the Long Lake National Wildlife Refuge.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	e.00	.00	.00	.00	.01	.00	.00	.00
5	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
7	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
12	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	e.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	e.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	.11	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.11	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.14	.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	.07	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.02	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.01	.00	.00	.00	.00
30	.00	.00	.00	.00	---	.00	.00	.01	.00	.00	.00	.00
31	.00	---	.00	.00	---	.00	---	.01	---	.00	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.01	0.00	0.00	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	.022	.000	.000	.000	.000
MAX	.000	.000	.000	.000	.000	.000	.000	.16	.01	.00	.00	.00
MIN	.000	.000	.000	.000	.000	.000	.000	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	1.4	.02	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1989 - 1991, BY WATER YEAR (WY)

	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989
MEAN	.000	.000	.000	.000	.000	.002	1.54	1.40	.22	.014	.000	.000
MAX	.000	.000	.000	.000	.000	.005	4.62	4.18	.65	.043	.000	.000
(WY)	1989	1989	1989	1989	1989	1989	1989	1989	1989	1990	1989	1989
MIN	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
(WY)	1989	1989	1989	1989	1989	1990	1990	1990	1991	1989	1989	1989

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1989 - 1991

ANNUAL TOTAL	1.67	0.70	
ANNUAL MEAN	.005	.002	.27
HIGHEST ANNUAL MEAN			.79
LOWEST ANNUAL MEAN			.002
HIGHEST DAILY MEAN	.31 Jul 6	.16 May 25	8.5 May 11 1989
LOWEST DAILY MEAN	.00 Jan 1	.00 Oct 1	.00 Oct 1 1988
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Oct 1	.00 Oct 1 1988
INSTANTANEOUS PEAK FLOW		.68 May 22	12 May 11 1989
INSTANTANEOUS PEAK STAGE		1.48 May 22	1.81 May 11 1989
ANNUAL RUNOFF (AC-FT)	3.3	1.4	192
10 PERCENT EXCEEDS	.00	.00	.01
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

APPLE CREEK BASIN

251

06349500 APPLE CREEK NEAR MENOKEN, ND

LOCATION.--Lat 46°47'40", long 100°39'25", in NW¹/₄, NE¹/₄, sec.9, T.138 N., R.79 W., Burleigh County, Hydrologic Unit 10130103, on left bank 75 ft downstream from bridge on county highway, 4 mi upstream from Hay Creek, 6.3 mi west of Menoken, and 6.4 mi east of Bismarck.

DRAINAGE AREA.--1,680 mi², approximately, of which about 500 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March to June 1905, October 1945 to current year. Published as "near Bismarck" 1905.

REVISED RECORDS.--WSP 1209: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,638.61 ft above National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Sept. 30, 1953.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.04	.06	.06	.05	e.70	e.10	.99	e2.4	1.6	.65	.04	.02
2	.04	.06	.06	.05	e1.0	e.09	1.0	e2.4	1.5	.58	.06	.02
3	.05	.06	.07	.05	e1.4	e.10	1.0	e2.7	1.3	.45	.06	.03
4	.05	.07	.07	.06	e1.8	e.20	1.1	e3.0	1.1	.31	.06	.03
5	.04	.07	.07	.06	1.7	e.60	1.2	e3.4	1.2	.21	.05	.03
6	.04	.07	.07	.06	1.1	e.50	1.2	e3.3	1.3	.15	.05	.03
7	.03	.07	.08	.05	1.2	.41	1.2	e3.0	1.2	.11	.04	.03
8	.04	.07	.08	.05	.99	.32	1.0	e2.8	1.1	.09	.03	.35
9	.04	.07	.07	.05	.67	.60	.83	e2.7	1.1	.08	.03	.16
10	.04	.07	.08	.05	.56	.75	.70	e2.7	.87	.07	.02	.08
11	.05	.07	.07	.06	.60	.93	.72	e3.0	.73	.12	.02	.07
12	.04	.07	.08	.06	.44	3.1	1.3	e4.0	.65	.10	.02	.06
13	.04	.07	.07	.06	.37	5.7	2.2	e3.0	.51	.09	.01	.05
14	.05	.07	.07	.06	e.32	3.6	2.6	e2.8	.44	.09	.01	.06
15	.05	.07	.06	.06	e.24	2.4	2.7	7.3	.39	.07	.02	.06
16	.05	.07	.05	.07	e.27	1.6	2.7	7.1	.32	.06	.02	.06
17	.06	.07	.06	.07	e.22	1.4	2.4	5.8	.23	.05	.03	.08
18	.05	.07	.05	.09	e.20	1.5	2.0	4.6	.19	.05	.03	.08
19	.05	.07	.05	e.10	e.18	1.8	1.6	3.4	.16	.04	.02	.08
20	.05	.07	.05	e.09	e.20	2.1	1.2	2.4	.36	.05	.02	.09
21	.05	.07	.05	e.07	e.20	3.1	1.1	1.9	.49	.06	.02	.09
22	.05	.07	.05	e.05	e.18	2.6	.98	1.5	.39	.06	.02	.09
23	.05	.06	.06	e.04	e.16	2.4	.67	2.9	.26	.04	.03	.09
24	.05	.06	.06	e.04	e.14	1.9	.50	3.6	.23	.04	.03	.08
25	.05	.06	.07	e.04	e.12	1.7	.41	2.9	.23	.04	.03	.08
26	.05	.06	.06	e.04	e.12	1.5	.43	2.2	.52	.04	.03	.07
27	.05	.06	.05	e.04	e.11	1.3	1.3	1.5	.65	.05	.03	.08
28	.05	.06	.05	e.05	e.12	1.1	1.9	1.2	.68	.05	.03	.09
29	.05	.06	.05	e.10	---	1.0	2.0	1.1	.70	.04	.02	.09
30	.05	.06	.05	e.20	---	1.1	e2.3	.91	.67	.04	.02	.09
31	.05	---	.05	e.50	---	1.3	---	1.2	---	.04	.02	---
TOTAL	1.45	1.99	1.92	2.42	15.31	46.80	41.23	92.71	21.07	3.92	0.92	2.32
MEAN	.047	.066	.062	.078	.55	1.51	1.37	2.99	.70	.13	.030	.077
MAX	.06	.07	.08	.50	1.8	5.7	2.7	7.3	1.6	.65	.06	.35
MIN	.03	.06	.05	.04	.11	.09	.41	.91	.16	.04	.01	.02
AC-FT	2.9	3.9	3.8	4.8	30	93	82	184	42	7.8	1.8	4.6

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1991, BY WATER YEAR (WY)

	MEAN	2.87	2.16	1.79	1.29	5.89	81.3	178	57.7	34.2	14.7	4.31	3.88
MAX	50.2	18.9	9.65	8.90	82.6	557	1498	1038	346	195	62.6	84.6	
(WY)	1952	1952	1952	1987	1987	1987	1950	1950	1953	1952	1950	1951	
MIN	.047	.062	.062	.040	.095	.99	.53	.23	.066	.025	.030	.030	
(WY)	1991	1990	1991	1977	1975	1977	1990	1977	1977	1977	1991	1990	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1946 - 1991

ANNUAL TOTAL	112.06	232.06	
ANNUAL MEAN	.31	.64	32.3
HIGHEST ANNUAL MEAN			243
LOWEST ANNUAL MEAN			.31
HIGHEST DAILY MEAN	5.9 Mar 11	7.3 May 15	5590 Apr 18 1950
LOWEST DAILY MEAN	.01 Aug 30	.01 Aug 13	.00 Aug 25 1946
ANNUAL SEVEN-DAY MINIMUM	.01 Aug 29	.02 Aug 10	.00 Aug 25 1946
INSTANTANEOUS PEAK FLOW		7.8 May 15	6750 Apr 18 1950
INSTANTANEOUS PEAK STAGE		a4.49 May 12	17.46 Apr 19 1979
ANNUAL RUNOFF (AC-FT)	222	460	23380
10 PERCENT EXCEEDS	.75	2.2	50
50 PERCENT EXCEEDS	.09	.08	1.6
90 PERCENT EXCEEDS	.04	.04	.10

e Estimated.

a Backwater from debris.

APPLE CREEK BASIN

06349500 APPLE CREEK NEAR MENOKEN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1974 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 CAO3) (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 05...	1200	0.05	--	--	18.0	8.0	--	--	--	--	--	--
NOV 28...	1520	0.06	2210	--	-4.0	1.0	--	--	--	--	--	--
FEB 04...	1415	2.4	1920	--	11.5	0.5	--	--	--	--	--	--
MAR 27...	0900	1.3	1130	--	--	0.5	--	--	--	--	--	--
MAY 14...	1315	2.9	--	--	25.0	19.5	--	--	--	--	--	--
AUG 07...	1415	0.04	1660	9.5	24.0	19.5	160	18	29	340	81	12
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CAO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
AUG 07...		8.0	570	85	610	230	58	0.60	9.1	1120	1060	1.52
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
AUG 07...		0.12	8	1300	20	<1	120	130	0.1	<1	<1	310

MISSOURI RIVER MAIN STEM

253

06349700 MISSOURI RIVER NEAR SCHMIDT, ND

LOCATION.--Lat 46°39'22", long 100°44'18", in SW $\frac{1}{4}$ NE $\frac{1}{4}$, sec.26, T.137 N., R.80 W., Morton County, Hydrologic Unit 10130102, on right bank 2 mi southeast of abandoned townsite of Schmidt, 13 mi southeast of Mandan, and at mi 1,298.

DRAINAGE AREA.--191,700 mi², approximately.

GAGE-HEIGHT RECORDS

PERIOD OF RECORD.--September 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,600.00 ft National Geodetic Vertical Datum of 1929.

REMARKS.--Stage regulated by releases from Garrison Dam (station 06338490) 91.1 mi upstream, and backwater from Lake Oahe.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height recorded, 23.56 ft, Dec. 9, 1976; minimum daily recorded, 7.92 ft, May 30, 1967.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11.51	11.56	---	---	---	---	11.82	14.46	14.66	14.49	14.49	14.29
2	11.50	11.58	---	---	---	---	11.79	14.61	14.59	14.56	14.52	14.27
3	11.44	11.39	---	---	---	---	12.07	15.09	14.60	14.46	14.54	14.33
4	11.44	11.40	---	---	---	---	11.95	15.35	14.67	14.46	14.50	14.14
5	11.51	11.44	14.10	---	---	---	11.74	15.39	14.69	14.47	14.50	14.11
6	11.55	11.84	14.15	---	---	---	11.54	14.91	14.65	14.51	14.49	14.17
7	11.61	---	14.12	---	---	---	11.55	14.75	14.59	14.56	14.51	14.00
8	11.60	13.34	14.08	---	---	---	11.63	14.81	14.54	14.51	14.51	14.58
9	11.64	12.36	13.96	---	---	---	11.63	14.34	14.55	14.46	14.53	14.39
10	11.65	11.66	13.95	---	---	---	11.55	14.48	14.58	14.43	14.54	14.26
11	11.74	11.57	---	---	---	---	11.75	14.30	14.56	14.55	14.50	14.08
12	11.58	11.60	---	---	---	---	11.78	14.56	14.52	14.59	14.49	13.62
13	11.50	11.59	---	---	---	---	12.34	14.57	14.49	14.54	14.52	13.20
14	11.46	11.62	---	---	---	---	14.09	14.52	14.45	14.48	14.50	12.61
15	11.51	11.51	---	---	---	---	15.69	14.39	14.35	14.49	14.54	12.60
16	11.55	11.61	---	---	---	13.11	16.23	14.51	14.43	14.50	14.57	12.60
17	11.53	11.60	---	---	---	13.02	16.23	14.46	14.48	14.50	14.55	12.40
18	11.51	11.65	---	---	---	12.75	16.22	14.45	14.44	14.52	14.56	12.47
19	11.51	11.60	---	---	---	12.53	16.09	14.67	14.51	14.54	14.43	12.30
20	11.53	11.53	---	---	---	12.27	15.68	14.67	14.68	14.46	14.48	11.80
21	11.48	11.60	---	---	---	12.29	15.07	14.58	14.69	14.48	14.56	11.50
22	11.44	11.64	---	---	---	11.95	14.72	14.64	14.67	14.51	14.53	11.45
23	11.40	11.67	---	---	---	12.02	14.59	14.63	14.61	14.52	14.54	11.46
24	11.49	11.52	---	---	---	11.89	14.59	14.57	14.60	14.42	14.49	11.40
25	11.55	11.57	---	---	---	11.97	14.51	14.55	14.56	14.42	14.39	11.44
26	11.56	11.60	---	---	---	11.96	13.90	14.58	14.56	14.45	14.34	11.24
27	11.55	---	---	---	---	---	13.76	14.65	14.50	14.45	14.23	11.41
28	11.49	---	---	---	---	---	13.71	14.67	14.47	14.47	14.15	---
29	11.39	12.83	---	---	---	---	13.77	14.65	14.51	14.50	14.30	---
30	11.58	13.25	---	---	---	---	11.72	13.86	14.57	14.54	14.39	---
31	11.60	---	---	---	---	---	11.73	---	14.62	---	14.44	---
MEAN	11.53	---	---	---	---	---	13.53	14.65	14.56	14.49	14.46	---
MAX	11.74	---	---	---	---	---	16.23	15.39	14.69	14.59	14.57	---
MIN	11.39	---	---	---	---	---	11.54	14.30	14.35	14.39	14.15	---

CANNONBALL RIVER BASIN

06350000 CANNONBALL RIVER AT REGENT, ND

LOCATION.--Lat 46°25'36", long 102°33'05", in NE¹/₄, NE¹/₄, sec.13, T.134 N., R.95 W., Hettinger County, Hydrologic Unit 10130204, on right bank 400 ft from bridge on county highway, and 0.3 mi north of Regent.

DRAINAGE AREA.--580 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,422.90 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since 1914, 26.1 ft, Apr. 16, 1950, from floodmarks, discharge, 20,300 ft³/s, on basis of slope-area measurement at site 4 mi downstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	2.8	2.5	e.13	.48	3.5	6.1	3.9	4.7	36	1.8	1.1
2	1.5	2.7	2.5	e.12	.58	3.4	6.0	3.8	4.5	29	1.9	.90
3	1.4	2.2	2.3	e.11	.65	3.3	6.2	4.1	4.4	23	2.0	.79
4	1.5	1.2	2.2	e.12	.72	3.8	5.8	4.3	7.0	19	1.9	.79
5	1.4	.88	2.4	e.11	.81	4.4	5.7	4.3	24	16	1.9	.82
6	1.4	1.6	2.4	e.13	.82	4.5	5.6	4.4	14	13	1.8	.82
7	1.5	2.0	2.7	e.18	.87	4.7	5.2	4.1	10	11	1.9	.87
8	1.7	2.2	2.9	e.22	.98	4.9	4.9	3.7	7.7	9.4	1.9	.99
9	1.8	2.4	3.0	e.23	1.3	5.1	4.7	3.8	6.1	8.5	2.0	1.6
10	1.9	2.5	3.0	e.23	1.8	5.6	4.2	3.8	4.6	7.8	1.9	1.8
11	1.9	2.7	2.9	.24	1.8	5.9	4.3	3.7	3.7	8.1	1.6	2.1
12	2.0	2.7	2.9	.22	1.7	6.3	5.3	3.7	3.0	6.7	1.4	2.6
13	2.0	2.7	2.7	.26	1.9	6.3	6.8	3.6	21	5.8	1.3	4.2
14	2.1	2.8	2.5	.27	1.9	6.5	7.5	3.6	42	5.4	1.2	3.7
15	2.2	2.7	2.5	.34	1.8	6.5	7.3	4.4	51	5.0	1.3	3.0
16	2.1	2.7	2.4	.39	1.9	6.6	7.5	4.2	47	4.7	1.6	2.7
17	2.4	2.8	2.3	.45	1.8	6.4	7.2	3.8	97	4.6	1.9	2.9
18	2.5	2.9	2.2	.50	2.0	6.3	6.8	3.4	100	4.2	1.9	2.5
19	3.1	4.1	1.9	.58	2.1	7.0	6.7	3.2	64	3.8	1.8	2.4
20	3.2	4.0	1.4	.55	2.8	8.2	6.3	3.2	49	3.9	1.6	2.5
21	2.7	3.1	.93	.52	3.3	9.0	5.9	3.0	239	3.7	1.6	2.7
22	2.8	2.9	.70	.57	3.5	9.2	5.2	2.9	231	3.5	1.8	2.5
23	2.7	2.8	.66	.59	3.7	8.0	4.8	2.9	253	3.2	2.0	2.3
24	2.6	2.9	.70	.53	3.6	7.3	4.6	2.5	280	2.9	2.1	2.5
25	2.7	2.7	e.62	.48	3.5	7.5	4.4	2.2	158	2.8	1.9	2.6
26	2.9	2.4	e.54	.48	3.4	7.2	4.3	2.5	106	2.5	1.7	2.3
27	2.6	2.2	e.56	.43	3.5	5.5	4.1	3.0	74	2.4	1.6	2.0
28	2.6	2.2	e.45	.44	3.6	6.0	4.0	3.5	55	2.5	1.5	1.9
29	2.6	2.3	e.29	.44	---	6.3	4.2	3.5	42	2.4	1.2	2.0
30	2.7	2.4	e.11	.43	---	6.3	4.0	3.8	37	2.3	1.3	1.9
31	2.8	---	e.12	.46	---	6.3	---	4.8	---	2.0	1.2	---
TOTAL	68.8	76.48	55.28	10.75	56.81	187.8	165.6	111.6	2039.7	255.1	52.5	61.78
MEAN	2.22	2.55	1.78	.35	2.03	6.06	5.52	3.60	68.0	8.23	1.69	2.06
MAX	3.2	4.1	3.0	.59	3.7	9.2	7.5	4.8	280	36	2.1	4.2
MIN	1.4	.88	.11	.11	.48	3.3	4.0	2.2	3.0	2.0	1.2	.79
AC-FT	136	152	110	21	113	373	328	221	4050	506	104	123

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1991, BY WATER YEAR (WY)

	MEAN	9.06	6.16	4.21	5.31	24.3	143	131	68.2	86.5	28.1	19.7	5.30
MAX	124	51.6	15.7	63.2	393	963	1127	523	512	331	299	20.4	
(WY)	1983	1983	1983	1973	1982	1978	1952	1972	1957	1969	1981	1986	
MIN	1.25	1.87	.52	.000	.000	3.23	3.80	3.60	1.57	.78	.67	.70	
(WY)	1961	1961	1951	1952	1959	1964	1961	1991	1990	1989	1959	1960	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1951 - 1991

ANNUAL TOTAL	1958.72	3142.20	
ANNUAL MEAN	5.37	8.61	44.2
HIGHEST ANNUAL MEAN			168
LOWEST ANNUAL MEAN			4.57
HIGHEST DAILY MEAN	59	Mar 1	7880
LOWEST DAILY MEAN	.00	May 24	.00
ANNUAL SEVEN-DAY MINIMUM	.08	Jul 23	.00
INSTANTANEOUS PEAK FLOW			422
INSTANTANEOUS PEAK STAGE			6.77
ANNUAL RUNOFF (AC-FT)	3890	6230	32050
10 PERCENT EXCEEDS	12	7.7	47
50 PERCENT EXCEEDS	2.7	2.7	5.0
90 PERCENT EXCEEDS	.94	.58	1.3

e Estimated.

CANNONBALL RIVER BASIN

255

06350000 CANNONBALL RIVER AT REGENT, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1964-66, 1971 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
09...	1115	1.8	1710	--	13.0	7.5	--	--	--	--	--	--
NOV												
27...	1045	2.3	1750	--	-4.0	2.0	--	--	--	--	--	--
JAN												
08...	1310	0.22	2850	--	-20.0	1.0	--	--	--	--	--	--
FEB												
12...	1010	1.6	1810	--	5.0	2.0	--	--	--	--	--	--
MAR												
26...	1055	7.3	980	8.4	-2.0	2.5	190	38	23	150	63	5
MAY												
07...	1025	4.1	1580	--	12.5	9.0	--	--	--	--	--	--
JUN												
18...	1035	107	1240	--	20.5	22.0	--	--	--	--	--	--
21...	1415	365	1120	--	21.0	20.0	--	--	--	--	--	--
JUL												
01...	1140	35	990	--	23.0	22.5	--	--	--	--	--	--
AUG												
13...	1030	1.3	1850	8.4	28.0	21.0	350	63	47	280	62	7
SEP												
11...	1330	2.2	1800	--	28.5	19.5	--	--	--	--	--	--

DATE	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
------	--	---	--	--	--	--	---	--	---	--	--

MAR											
26...	3.5	300	0	250	260	7.0	0.30	3.2	654	635	0.89
AUG											
13...	12	500	0	350	560	11	0.60	8.6	1290	1230	1.75

DATE	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
------	--	---	---	---	---	---	---	---	--	--	---

MAR											
26...	12.9	<1	240	20	<1	20	30	<0.1	<1	<1	710
AUG											
13...	4.56	6	600	20	<1	40	90	<0.1	2	2	120

CANNONBALL RIVER BASIN

06351680 WHITE BUTTE FORK CEDAR CREEK NEAR SCRANTON, ND

LOCATION.--Lat 46°19'20", long 102°59'45", in NW¼, sec.21, T.133 N., R.98 W., Slope County, Hydrologic Unit 10130205, on left bank 1,200 ft downstream from county highway bridge, and 13 mi northeast of Scranton.

DRAINAGE AREA.--42.9 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1965 to current year (seasonal records only since 1984).

GAGE.--Water-stage recorder. Elevation of gage is 2,825 ft above National Geodetic Vertical Datum from topographic map.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3.1 ft³/s, May 1, gage height, 2.47 ft; no flow for several months.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e.00	.00	.00	1.5	.08	.13	.00	.00
2	---	---	---	---	e.00	.00	.00	1.0	.08	.11	.00	.00
3	---	---	---	---	e.00	.00	.00	.58	.05	.11	.00	.00
4	---	---	---	---	e.00	.00	.00	.30	.04	.08	.00	.00
5	---	---	---	---	e.00	.00	.00	.17	.05	.04	.00	.00
6	---	---	---	---	e.00	.00	.00	.11	.03	.02	.00	.00
7	---	---	---	---	e.00	.00	.00	.05	.02	.00	.00	.00
8	---	---	---	---	e.00	.00	.00	.03	.03	.00	.00	.00
9	---	---	---	---	e.00	.00	.00	.01	.15	.00	.00	.00
10	---	---	---	---	e.00	.00	.00	.01	.10	.00	.00	.00
11	---	---	---	---	e.00	.00	.00	.00	.10	.00	.00	.00
12	---	---	---	---	e.00	.00	.00	.01	.07	.00	.00	.00
13	---	---	---	---	e.00	.00	.00	.00	.48	.00	.00	.00
14	---	---	---	---	e.00	.00	.05	.00	.55	.00	.00	.00
15	---	---	---	---	.00	.00	.21	.00	.24	.00	.00	.00
16	---	---	---	---	.00	.00	.19	.00	.11	.00	.00	.00
17	---	---	---	---	.00	e.00	.17	.00	.05	.00	.00	.00
18	---	---	---	---	.00	e.00	.17	.00	.01	.00	.00	.00
19	---	---	---	---	.00	e.00	.20	.00	.00	.00	.00	.00
20	---	---	---	---	.00	e.00	.19	.00	.06	.00	.00	.00
21	---	---	---	---	.00	e.00	.13	.00	.01	.00	.00	.00
22	---	---	---	---	.00	e.00	.08	.00	.00	.00	.00	.00
23	---	---	---	---	.00	e.00	.05	.00	.00	.00	.00	.00
24	---	---	---	---	.00	e.00	.04	.00	.19	.00	.00	.00
25	---	---	---	---	.00	e.00	.02	.00	.29	.00	.00	.00
26	---	---	---	---	.00	e.00	.03	.01	.36	.00	.00	.00
27	---	---	---	---	.00	e.00	.03	.00	.27	.00	.00	.00
28	---	---	---	---	.00	e.00	.06	.00	.21	.00	.00	.00
29	---	---	---	---	---	.00	.12	.00	.16	.00	.00	.00
30	---	---	---	---	---	.00	.19	.01	.15	.00	.00	.00
31	---	---	---	---	---	.00	---	.03	---	.00	.00	---
TOTAL	---	---	---	---	0.00	0.00	1.93	3.82	3.94	0.49	0.00	0.00
MEAN	---	---	---	---	.000	.000	.064	.12	.13	.016	.000	.000
MAX	---	---	---	---	.00	.00	.21	1.5	.55	.13	.00	.00
MIN	---	---	---	---	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	---	---	---	---	.00	.00	3.8	7.6	7.8	1.0	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1991, BY WATER YEAR (WY)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.58	.43	.22	.68	2.03	12.3	11.8	8.69	4.64	2.47	.94	.038															
MAX	20.3	2.52	.85	7.20	10.6	70.0	47.3	36.4	29.3	37.6	15.2	.31															
(WY)	1983	1983	1973	1973	1982	1971	1979	1975	1971	1969	1970	1971															
MIN	.000	.000	.000	.000	.000	.000	.048	.011	.000	.000	.000	.000															
(WY)	1967	1968	1969	1966	1966	1991	1990	1990	1990	1977	1965	1965															

SUMMARY STATISTICS

WATER YEARS 1965 - 1991

ANNUAL MEAN	a4.45
HIGHEST ANNUAL MEAN	a11.9
LOWEST ANNUAL MEAN	a.066
HIGHEST DAILY MEAN	475
LOWEST DAILY MEAN	.00
ANNUAL SEVEN-DAY MINIMUM	.00
INSTANTANEOUS PEAK FLOW	645
INSTANTANEOUS PEAK STAGE	7.76
ANNUAL RUNOFF (AC-FT)	a3220
10 PERCENT EXCEEDS	4.4
50 PERCENT EXCEEDS	.08
90 PERCENT EXCEEDS	.00

e Estimated.

a Based on complete water years only (1966-83).

CANNONBALL RIVER BASIN

257

06351680 WHITE BUTTE FORK CEDAR CREEK NEAR SCRANTON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)
MAY 09...	1350	0.01	4200	8.1	25.0	19.0	1700	340	210	540	40	6
JUN 20...	1415	0.04	4280	8.4	22.0	23.0	1600	260	220	580	45	6
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAY 09...	16	420	0	340	2300	36	0.20	5.4	3930	3660	5.34	
JUN 20...	13	170	0	140	2600	31	0.20	0.80	4010	3790	5.45	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAY 09...	0.11	<1	1100	50	<1	110	100	<0.1	5	1	6100	
JUN 20...	0.43	1	900	40	1	120	20	<0.1	2	1	5800	

CANNONBALL RIVER BASIN

06352000 CEDAR CREEK NEAR HAYNES, ND

LOCATION.--Lat 46°09'15", long 102°28'25", in W $\frac{1}{2}$ sec.20, T.131 N., R.94 W., Adams County, Hydrologic Unit 10130205, on left bank 30 ft downstream from bridge on State Highway 8, and 12.5 mi north of Haynes.

DRAINAGE AREA.--553 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 2,472.90 ft above National Geodetic Vertical Datum of 1929, North Dakota Highway Department benchmark. Prior to May 20, 1951, nonrecording gage on former bridge 400 ft upstream at same datum.

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Apr. 17, 1950, reached a stage of about 23 ft, discharge, 26,900 ft³/s, by slope-area measurement at site 9 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.57	1.2	1.4	e.00	e.00	e.90	1.9	2.3	2.0	24	.29	.17
2	.59	1.2	1.4	e.00	e.00	e.75	1.8	2.1	1.9	27	.33	.15
3	.57	1.4	1.6	e.00	e.00	e.80	1.7	2.3	2.0	24	.34	.15
4	.60	1.2	1.5	e.00	e.25	e1.0	1.4	2.4	1.6	20	.33	.11
5	.49	1.3	1.6	e.00	e.50	e1.0	1.1	2.7	1.2	16	.32	.12
6	.45	1.3	1.6	e.00	e.80	e1.5	1.1	2.7	1.2	13	.36	.14
7	.62	1.4	1.4	e.00	e1.0	e1.0	1.1	2.7	1.0	9.5	.42	.16
8	.61	1.5	1.5	e.00	e1.2	e1.0	1.0	2.4	1.1	7.3	.41	.23
9	.66	1.3	1.4	e.00	e1.1	e1.0	.85	2.4	1.3	5.8	.36	.64
10	.66	1.7	1.5	e.00	e1.0	e1.0	.87	2.3	1.8	4.5	.27	.66
11	.65	1.6	1.4	e.00	e1.2	e1.5	1.2	2.2	2.3	4.5	.14	.76
12	.69	1.7	1.6	e.00	e1.4	e2.0	1.9	2.4	2.3	3.6	.18	.64
13	1.2	1.7	e1.5	e.00	e1.5	e2.5	3.5	2.4	1.8	2.9	.23	1.5
14	.91	1.5	e1.5	e.00	e1.5	e3.0	3.4	2.3	1.3	2.2	.35	1.0
15	.88	1.5	e1.5	e.00	e1.0	e4.0	3.2	2.8	.99	1.8	.49	.66
16	1.0	1.6	e1.4	e.00	e1.5	e5.0	3.4	2.9	.68	1.4	.52	.69
17	2.6	1.7	e1.3	e.00	e1.5	e6.0	4.1	2.7	.50	1.0	.43	.96
18	1.2	1.6	e1.3	e.00	e1.5	e7.5	4.0	2.3	.70	.75	.35	1.2
19	1.1	1.5	e1.0	e.00	e1.5	e8.0	3.8	1.9	.80	.52	.21	1.3
20	1.1	1.5	e.70	e.00	e2.0	e6.0	3.7	1.8	1.3	.51	.15	1.2
21	1.1	1.9	e.50	e.00	e2.5	4.9	3.3	1.5	1.7	.65	.19	.85
22	1.1	2.3	e.45	e.00	e2.0	5.5	2.8	1.3	1.9	.67	.19	.62
23	1.0	2.3	e.35	e.00	e1.5	4.9	2.6	1.4	17	.57	.28	.66
24	.85	1.5	e.25	e.00	e1.5	4.8	2.3	1.3	180	.60	.31	.73
25	.78	1.4	e.20	e.00	e1.0	4.3	2.1	1.1	190	.62	.36	1.1
26	.87	1.3	e.20	e.00	e1.0	3.5	2.4	1.1	102	.54	.56	1.3
27	.87	1.3	e.10	e.00	e1.0	3.6	2.9	1.1	84	.48	.39	.59
28	1.0	1.3	e.06	e.00	e1.0	2.5	3.1	2.0	64	.47	.29	.57
29	.91	1.5	e.02	e.00	---	2.7	2.5	1.9	45	.44	.18	.46
30	.91	1.5	e.00	e.00	---	2.4	2.3	2.1	31	.32	.16	.52
31	1.1	---	e.00	e.00	---	2.1	---	2.6	---	.23	.20	---
TOTAL	27.64	45.7	30.23	0.00	31.95	96.65	71.32	65.4	744.37	175.87	9.59	19.84
MEAN	.89	1.52	.98	.000	1.14	3.12	2.38	2.11	24.8	5.67	.31	.66
MAX	2.6	2.3	1.6	.00	2.5	8.0	4.1	2.9	190	27	.56	1.5
MIN	.45	1.2	.00	.00	.00	.75	.85	1.1	.50	.23	.14	.11
AC-FT	55	91	60	.00	63	192	141	130	1480	349	19	39

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1951 - 1991, BY WATER YEAR (WY)

	MEAN	4.49	4.76	3.39	4.54	14.9	112	120	58.7	59.1	16.8	10.4	3.03
MAX	43.2	54.4	20.4	59.4	242	837	1159	522	339	177	94.1	20.0	
(WY)	1983	1983	1983	1973	1982	1978	1952	1975	1964	1969	1981	1977	
MIN	.25	.60	.22	.000	.000	1.05	1.58	1.66	.77	.000	.000	.000	.000
(WY)	1961	1962	1962	1962	1962	1964	1961	1961	1956	1961	1959	1960	1960

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1951 - 1991

ANNUAL TOTAL	2389.02	1318.56	
ANNUAL MEAN	6.55	3.61	34.4
HIGHEST ANNUAL MEAN			122
LOWEST ANNUAL MEAN			1.04
HIGHEST DAILY MEAN	110	Mar 3	7060
LOWEST DAILY MEAN	.00	Dec 30	.00
ANNUAL SEVEN-DAY MINIMUM	.08	Dec 25	.00
INSTANTANEOUS PEAK FLOW			345
INSTANTANEOUS PEAK STAGE			8.43
ANNUAL RUNOFF (AC-FT)	4740	2620	7870
10 PERCENT EXCEEDS	15	3.5	22.05
50 PERCENT EXCEEDS	1.5	1.2	24940
90 PERCENT EXCEEDS	.36	.01	39
			3.0
			.60

e Estimated.

CANNONBALL RIVER BASIN

259

06352000 CEDAR CREEK NEAR HAYNES, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 09...	1540	0.66	1700	--	16.5	8.5	--	--	--	--	--	--
NOV 27...	1415	1.3	2050	--	2.0	1.0	--	--	--	--	--	--
FEB 12...	1305	1.4	2140	--	12.0	0.5	--	--	--	--	--	--
MAR 26...	1535	3.5	1200	8.7	-2.0	3.5	270	46	37	170	57	5
MAY 07...	1455	2.6	1740	--	16.0	14.0	--	--	--	--	--	--
JUN 18...	1440	0.73	1750	--	26.5	24.5	--	--	--	--	--	--
26...	1305	97	620	--	26.0	21.0	--	--	--	--	--	--
AUG 13...	1450	0.25	1360	9.3	31.0	22.5	250	22	48	210	63	6
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 26...	5.0	350	0	290	350	7.4	0.30	1.7	813	790	1.11	
AUG 13...	13	280	55	320	390	7.2	0.40	1.1	906	883	1.23	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 26...	7.62	1	240	20	<1	30	20	<0.1	<1	<1	820	
AUG 13...	0.61	4	480	20	<1	60	20	<0.1	1	1	700	

CANNONBALL RIVER BASIN

06353000 CEDAR CREEK NEAR RALEIGH, ND

LOCATION.--Lat 46°05'30", long 101°20'00", in NE¹/₄SE¹/₄, sec.8, T.130 N., R.85 W., Grant County, Hydrologic Unit 10130205, on left bank at upstream side of bridge on N.D. Highway 31, 6 mi upstream from mouth, and 19 mi south of Raleigh.

DRAINAGE AREA.--1,750 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to September 1939, March 1962 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,881.23 ft above National Geodetic Vertical Datum of 1929. Prior to June 6, 1962, nonrecording gage at same site and datum, and June 6, 1962, to Sept. 7, 1972, at site 1 mi upstream at datum 9.58 ft higher.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage known since 1950, about 18 ft, Apr. 18, 1950; discharge 45,000 ft³/s, on basis of slope-area measurement 5 mi upstream.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.01	.11	e.00	e.00	e.07	e.52	e.31	71	46	e.74	e.00
2	.00	.02	e.08	e.00	e.00	e.07	e.47	e.36	24	39	e.68	e.00
3	.00	.02	e.06	e.00	e.01	e.08	e.41	e.41	12	34	e.72	e.00
4	.00	.02	e.04	e.00	e.03	e.10	e.40	e.42	7.6	29	e.55	e.00
5	.00	.02	e.05	e.00	e.07	e.14	e.35	e.36	5.9	24	e.46	e.00
6	.00	.03	e.05	e.00	e.09	e.13	e.30	e.34	5.6	20	e.38	e.00
7	.00	.03	e.05	e.00	e.10	e.12	e.27	e.32	4.5	16	e.28	e.00
8	.00	.04	e.05	e.00	e.10	e.12	e.25	e.32	4.9	14	e.21	e.00
9	.00	.04	e.05	e.00	e.09	e.14	e.24	e.34	4.9	12	e.14	e.00
10	.00	.05	e.05	e.00	e.10	e.15	e.20	e.36	4.2	10	e.11	e.00
11	.00	.07	e.05	e.00	e.11	e.19	e.16	e.38	4.4	13	e.09	e.00
12	.00	.08	e.05	e.00	e.13	e.18	e.16	e.39	4.0	14	e.08	e.00
13	.00	.11	e.05	e.00	e.13	e.14	e.15	e.37	4.0	13	e.03	e.00
14	.00	.13	e.05	e.00	e.08	e.13	e.14	e.35	3.8	9.1	e.02	e.00
15	.00	.16	e.05	e.00	e.09	e.14	e.13	e.34	3.0	7.6	e.02	e.00
16	.00	.20	e.04	e.00	e.10	e.17	e.13	e.34	2.4	6.7	e.01	e.00
17	.25	.20	e.03	e.00	e.10	e.23	e.19	e.33	1.8	6.2	e.00	e.00
18	.02	.29	e.02	e.00	e.11	e.30	e.26	e.34	1.3	5.8	e.00	e.00
19	.01	.29	e.01	e.00	e.12	e.37	e.47	e.35	.98	5.1	e.00	e.00
20	.01	.34	e.00	e.00	e.14	e.50	e.48	e.38	1.4	4.2	e.00	e.00
21	.01	.34	e.00	e.00	e.12	e.60	e.47	e.40	3.7	4.4	e.00	e.00
22	.01	.34	e.00	e.00	e.10	e.75	e.50	e.50	2.6	4.3	e.00	e.00
23	.01	.34	e.00	e.00	e.09	e.90	e.57	e3.2	2.1	3.2	e.00	e.00
24	.01	.40	e.00	e.00	e.08	e1.0	e.57	e2.9	2.0	2.9	e.00	e.00
25	.01	.40	e.00	e.00	e.08	e.90	e.54	e2.7	1.7	2.8	e.00	e.00
26	.01	.40	e.00	e.00	e.09	e.80	e.52	e2.4	1.6	2.5	e.00	e.00
27	.01	.34	e.00	e.00	e.10	e.71	e.47	e2.3	1.3	e1.8	e.00	e.00
28	.01	.34	e.00	e.00	e.09	e.75	e.41	e2.4	1.2	e1.4	e.00	e.00
29	.01	.29	e.00	e.00	---	e.70	e.36	e2.6	1.4	e1.2	e.00	e.00
30	.01	.24	e.00	e.00	---	e.66	e.32	e7.1	9.7	e1.0	e.00	e.00
31	.01	---	e.00	e.00	---	e.60	---	73	---	e.90	e.00	---
TOTAL	0.40	5.58	0.94	0.00	2.45	11.84	10.41	106.61	198.98	355.10	4.52	0.00
MEAN	.013	.19	.030	.000	.087	.38	.35	3.44	6.63	11.5	.15	.000
MAX	.25	.40	.11	.00	.14	1.0	.57	73	71	46	.74	.00
MIN	.00	.01	.00	.00	.00	.07	.13	.31	.98	.90	.00	.00
AC-FT	.8	11	1.9	.00	4.9	23	21	211	395	704	9.0	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1939 - 1991, BY WATER YEAR (WY)

MEAN	9.83	8.35	6.52	12.8	39.4	355	261	187	111	64.9	20.2	6.90
MAX	66.4	48.8	31.3	217	664	1640	1460	1043	605	537	96.9	59.2
(WY)	1978	1983	1983	1973	1982	1978	1982	1975	1964	1969	1984	1977
MIN	.000	.000	.000	.000	.000	.25	.35	3.33	3.09	.25	.000	.000
(WY)	1965	1964	1964	1964	1964	1964	1991	1980	1990	1990	1974	1939

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1939 - 1991

ANNUAL TOTAL	3919.48		696.83						
ANNUAL MEAN	10.7		1.91			92.8			
HIGHEST ANNUAL MEAN						307			1982
LOWEST ANNUAL MEAN							1.91		1991
HIGHEST DAILY MEAN	189	Aug 18	73	May 31	10900				Mar 28 1978
LOWEST DAILY MEAN	.00	Aug 9	.00	Oct 1		.00			Aug 1 1939
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 9	.00	Oct 1		.00			Aug 20 1939
INSTANTANEOUS PEAK FLOW			126	May 31	13400				Mar 28 1978
INSTANTANEOUS PEAK STAGE			2.63	May 31		13.70			Mar 28 1978
ANNUAL RUNOFF (AC-FT)	7770		1380			67210			
10 PERCENT EXCEEDS	24		4.1			156			
50 PERCENT EXCEEDS	.32		.11			8.6			
90 PERCENT EXCEEDS	.00		.00			.00			

e Estimated.

CANNONBALL RIVER BASIN

261

06353000 CEDAR CREEK NEAR RALEIGH, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 29...	0940	0.01	1420	--	10.0	6.5	--	--	--	--	--	--
DEC 10...	1035	0.05	1920	--	4.0	1.5	--	--	--	--	--	--
FEB 14...	1100	0.08	2450	--	-8.5	0.0	--	--	--	--	--	--
MAR 25...	1320	0.90	1130	7.7	18.0	7.0	160	31	20	170	69	6
APR 03...	1145	0.41	1280	--	20.0	12.0	--	--	--	--	--	--
MAY 30...	1340	7.1	720	--	25.0	22.5	--	--	--	--	--	--
JUN 20...	1127	1.5	1000	--	24.5	22.0	--	--	--	--	--	--
JUL 23...	1210	3.2	1140	7.7	26.0	24.0	210	33	30	180	64	5
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 25...	4.7	290	0	240	290	5.4	0.30	3.2	648	668	0.88	
JUL 23...	13	400	2	330	290	7.0	0.50	7.6	768	759	1.04	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 25...	1.57	1	220	40	1	40	30	0.2	4	<1	430	
JUL 23...	6.72	3	430	20	<1	50	10	<0.1	<1	1	670	

CANNONBALL RIVER BASIN

06354000 CANNONBALL RIVER AT BREIEN, ND
(National stream-quality accounting network station)

LOCATION.--Lat 46°22'33", long 100°56'03", in sec.36, T.134 N., R.82 W., Morton County, Hydrologic Unit 10130206, on left bank at downstream side of bridge on State Highway 6, 1,100 ft downstream from Dogtooth Creek, and 0.6 mi southeast of Brien.

DRAINAGE AREA.--4,100 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1934 to current year.

REVISED RECORDS.--WSP 786: 1934. WSP 1146: 1943. WSP 1279: 1936-37(M), 1947(M). WSP 1509: 1955(M).

GAGE.--Water-stage recorder. Datum of gage is 1,673.54 ft above National Geodetic Vertical Datum of 1929. From June 12, 1973, to July 1, 1985, at site 450 ft downstream. Prior to June 12, 1973, at site 50 ft upstream at datum 3.00 ft higher. June 13, 1973, to April 8, 1980, at datum 2.00 ft higher.

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor. Some storage in several small lakes above station.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.18	.39	4.6	e.00	e.21	e14	26	31	136	209	4.8	.00
2	.18	.33	4.5	e.00	e.23	e15	21	27	175	220	7.0	.00
3	.15	.33	5.0	e.00	e.27	e19	19	29	96	211	8.1	.00
4	.16	.39	6.0	e.00	e.32	e21	18	38	74	185	6.7	.00
5	.17	.46	7.1	e.00	e.38	e23	16	46	112	162	5.3	.00
6	.14	.39	6.7	e.00	e.40	e24	15	53	62	139	5.2	.00
7	.14	.48	7.0	e.00	e.45	e25	14	38	57	116	5.4	.00
8	.14	.54	7.8	e.00	e1.1	e27	13	28	108	99	5.3	.04
9	.11	.52	9.3	e.00	e3.8	e29	15	25	130	85	4.9	.10
10	.17	.57	9.9	e.00	e4.0	e31	16	22	135	75	3.8	.03
11	.18	.66	9.4	e.00	e4.0	e35	15	21	117	212	3.0	.03
12	.17	.83	8.6	e.00	e4.2	e35	27	31	91	209	2.4	.23
13	.19	.93	9.3	e.00	e4.2	e36	59	30	87	136	1.9	.94
14	.18	.91	8.8	e.00	e4.2	e36	65	21	86	92	2.1	e.85
15	.21	5.1	e8.0	e.00	e4.3	e36	76	82	179	65	7.8	e.68
16	.24	12	e7.6	e.04	e4.2	e35	101	53	112	50	6.5	e.50
17	.28	13	e7.2	e.08	e4.4	e37	84	127	54	38	3.6	e.51
18	.31	10	e6.3	e.13	e4.8	e43	55	73	33	27	2.6	e.47
19	.33	11	e4.0	e.20	e5.4	e49	45	45	26	23	1.8	e.46
20	.33	9.2	e.00	e.20	e8.5	e53	39	28	943	20	1.3	e.48
21	.34	7.3	e.00	e.19	e12	e56	35	20	473	21	.98	e.49
22	.40	6.0	e.00	e.20	e14	e50	30	144	204	54	.78	e.46
23	.41	5.9	e.00	e.20	e14	e43	28	198	96	23	.50	e.44
24	.36	6.1	e.00	e.21	e14	e39	26	485	73	17	.55	e.47
25	.40	5.9	e.00	e.19	e13	e37	23	172	113	17	.52	e.45
26	.43	4.0	e.00	e.18	e14	35	22	95	116	15	.37	e.41
27	.55	3.9	e.00	e.17	e14	35	25	69	205	14	.27	e.38
28	.44	3.7	e.00	e.16	e15	37	48	68	266	12	.18	e.36
29	.38	3.8	e.00	e.16	---	39	41	69	299	11	.12	e.36
30	.47	3.9	e.00	e.17	---	30	36	43	260	8.3	.07	e.35
31	.46	---	e.00	e.19	---	26	---	65	---	6.6	.01	---
TOTAL	8.60	118.53	137.10	2.67	169.36	1050	1053	2276	4918	2571.9	93.85	9.49
MEAN	.28	3.95	4.42	.086	6.05	33.9	35.1	73.4	164	83.0	3.03	.32
MAX	.55	13	9.9	.21	15	56	101	485	943	220	8.1	.94
MIN	.11	.33	.00	.00	.21	14	13	20	26	6.6	.01	.00
AC-FT	17	235	272	5.3	336	2080	2090	4510	9750	5100	186	19

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1991, BY WATER YEAR (WY)

	30.3	26.2	14.8	15.3	63.6	824	902	344	409	189	61.0	33.3
MEAN	30.3	26.2	14.8	15.3	63.6	824	902	344	409	189	61.0	33.3
MAX	281	238	71.6	342	1058	4260	10070	2399	2384	1409	380	267
(WY)	1978	1983	1983	1973	1982	1943	1950	1975	1937	1969	1981	1977
MIN	.21	.63	.38	.000	.000	3.29	17.1	10.3	3.10	.17	.12	.010
(WY)	1961	1961	1935	1941	1935	1965	1961	1961	1936	1936	1974	1974

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1934 - 1991

ANNUAL TOTAL	10033.68	12408.50	
ANNUAL MEAN	27.5	34.0	243
HIGHEST ANNUAL MEAN			994
LOWEST ANNUAL MEAN			9.90
HIGHEST DAILY MEAN	393	Aug 19	63100
LOWEST DAILY MEAN	.00	Dec 20	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Dec 20	.00
INSTANTANEOUS PEAK FLOW		1970	a94800
INSTANTANEOUS PEAK STAGE		7.29	b22.30
ANNUAL RUNOFF (AC-FT)	19900	24610	176100
10 PERCENT EXCEEDS	85	96	391
50 PERCENT EXCEEDS	7.5	6.7	26
90 PERCENT EXCEEDS	.18	.03	.60

e Estimated.

a From rating extended above 16,000 ft³/s on basis of indirect measurement of peak flow.

b From floodmark.

CANNONBALL RIVER BASIN

263

06354000 CANNONBALL RIVER AT BREIEN, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1946-50, 1970-72, 1974 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

		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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAI, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI KF AGAR (COLS. PER 100 ML) (31673)
OCT 29...	0835	0.32	2050	--	6.5	4.5	--	--	--	--	--
DEC 03...	1130	5.5	2750	8.1	-10.5	0.0	8.5	11.3	79	K19	79
FEB 13...	1100	4.2	1850	8.1	1.0	0.5	10	10.1	71	K10	600
MAR 25...	1125	37	1420	--	10.0	4.0	--	--	--	--	--
APR 03...	1020	20	1350	--	15.0	11.0	--	--	--	--	--
MAY 30...	0930	44	940	--	21.0	20.0	--	--	--	--	--
JUN 21...	1130	491	288	--	17.5	17.5	--	--	--	--	--
JUN 24...	1120	62	800	8.0	21.0	20.0	95	8.0	88	990	1800
JUL 23...	1010	24	1020	--	22.0	21.0	--	--	--	--	--
AUG 27...	1015	0.23	1400	8.7	31.5	25.0	3.0	7.7	93	K96	140
SEP 30...	1025	0.35	1700	--	11.0	11.0	--	--	--	--	--
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)	ALKA-LINITY WAT DIS TOT IT FIELD (MG/L AS CaCO3) (39086)	BICAR-BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)	CAR-BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)
DEC 03...	500	77	74	440	65	9	17	607	626	764	0
FEB 13...	270	50	36	320	71	8	11	529	--	--	--
JUN 24...	190	38	22	110	55	4	9.8	209	206	251	0
AUG 27...	160	24	24	270	77	9	10	469	456	527	14
DATE	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N) (00618)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)
DEC 03...	880	23	0.60	6.4	1780	1900	2.42	26.2	--	0.010	<0.010
FEB 13...	460	24	0.70	10	1190	1230	1.62	13.4	0.180	0.040	0.020
JUN 24...	210	6.6	0.40	11	542	532	0.74	90.6	0.079	0.090	0.010
AUG 27...	270	23	1.1	3.1	902	899	1.23	0.56	--	0.030	<0.010
DATE	NITRO-GEN, NO2+NO3 DIS-SOLVED 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, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGANIC DIS-SOLVED (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)
DEC 03...	<0.100	<0.100	0.030	0.030	0.90	--	0.040	<0.010	<0.010	<0.010	10
FEB 13...	0.200	0.200	0.030	0.040	0.70	--	0.060	0.030	0.020	<0.010	40
JUN 24...	0.095	0.089	0.140	0.080	1.0	--	0.180	0.030	0.090	0.010	<10
AUG 27...	<0.050	<0.050	0.020	0.020	0.90	0.70	0.090	0.010	0.030	<0.010	<10

CANNONBALL RIVER BASIN

06354000 CANNONBALL RIVER AT BREIEN, ND--CONTINUED
(National stream-quality accounting network station)

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	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)
DEC 03...	<1	<100	<10	<1.0	<1	<1	2	10	<1	100	30
FEB 13...	<1	50	<0.5	<1.0	<1	<3	2	58	<1	74	110
JUN 24...	2	74	<0.5	<1.0	<1	<3	3	41	<1	35	10
AUG 27...	2	56	<0.5	<1.0	<1	<3	2	5	<1	64	2
DATE	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)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
DEC 03...	<0.1	5	5	<1	<1.0	1200	4	<10	54	0.79	64
FEB 13...	<0.1	<10	4	<1	<1.0	560	<6	<3	51	0.57	56
JUN 24...	<0.1	<10	4	<1	<1.0	420	<6	<3	221	37	83
AUG 27...	0.2	<10	4	<1	<1.0	360	<6	<3	83	0.05	96

BEAVER CREEK BASIN

265

06354580 BEAVER CREEK BELOW LINTON, ND

LOCATION.--Lat 46°16'07", long 100°15'05", in NW¹/₄, NW¹/₄, SW¹/₄, sec.7, T.132 N., R.76 W., Emmons County, Hydrologic Unit 10130104, on left bank 25 ft upstream from bridge on county road, 0.7 mi west of Linton and 0.5 mi downstream from Spring Creek.

DRAINAGE AREA.--765 mi², of which about 100 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1989 to current year. Records for August 1949 to September 1989 at site 1.5 mi upstream published as "at Linton, ND" (station 06354580) are not equivalent because of difference in drainage area.

GAGE.--Water-stage recorder and artificial control. Elevation of gage is 1,690 ft from topographic map.

REMARKS.--Records fair except those periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.22	e.18	e.50	.25	.33	1.4	6.7	12	7.5	57	e3.0	e.00
2	e.18	e.17	e.49	.24	.46	1.2	6.5	24	6.8	39	e2.6	.00
3	e.14	e.16	e.45	e.25	.73	1.2	6.6	23	6.8	28	e2.2	.00
4	e.10	e.15	e.35	e.20	1.3	1.6	7.2	20	e6.8	23	e2.0	.00
5	e.11	e.18	e.40	.21	2.0	3.6	5.3	18	e6.0	20	e1.7	.00
6	e.12	e.16	e.45	e.20	2.1	2.1	5.1	17	e5.5	18	e1.5	.00
7	e.14	e.15	e.47	.19	1.5	2.3	5.1	15	e6.0	16	e1.4	.00
8	e.14	e.17	e.50	.19	1.4	2.2	4.9	14	e5.5	15	e1.2	.00
9	e.15	e.21	e.47	.25	1.4	2.2	4.8	14	e4.5	13	e1.1	.00
10	e.15	e.27	e.45	.24	1.8	2.3	4.3	15	e4.0	12	e1.2	.00
11	e.15	e.35	e.45	e.25	2.3	3.0	4.1	14	e3.5	12	e1.1	.00
12	e.15	e.34	e.44	.20	1.8	4.2	4.2	12	e3.1	e12	e1.1	.00
13	e.15	e.33	e.40	.23	1.6	3.6	4.5	11	2.2	e11	e1.1	.00
14	e.15	e.33	e.35	.23	1.1	3.8	5.0	9.8	2.5	e10	e1.1	e.00
15	e.16	e.32	e.40	.23	.92	3.7	5.9	30	2.5	e9.5	e1.1	e.05
16	e.16	e.31	e.39	.24	.83	3.7	6.2	105	1.9	e9.0	e1.0	e.20
17	e.16	e.30	e.38	.30	.94	3.6	5.8	133	1.7	e8.5	e1.0	e.15
18	e.16	e.32	e.38	.36	1.1	3.9	5.8	76	1.7	e8.0	e1.0	e.14
19	e.17	e.33	.37	.50	1.1	5.3	6.0	56	2.0	e7.5	e.90	e.13
20	e.18	e.36	.37	.46	1.3	7.9	6.7	38	272	e7.0	e.80	e.12
21	e.17	e.40	.28	.42	1.3	8.1	7.1	26	92	e7.4	e.70	e.13
22	e.16	e.50	.30	.38	1.4	8.1	7.1	20	226	e7.6	e.60	e.12
23	e.16	e.47	e.30	.40	1.4	8.4	7.3	17	285	e6.8	e.50	e.12
24	e.16	e.40	.29	.37	1.4	8.9	7.5	14	160	e6.0	e.40	e.11
25	e.16	e.43	e.25	.27	1.4	11	6.9	12	104	e5.0	e.30	e.12
26	e.17	e.47	e.25	.34	1.3	12	7.4	11	88	e4.5	e.20	e.12
27	e.17	e.44	e.25	.40	1.3	8.3	8.8	10	76	e4.0	e.10	e.12
28	e.17	e.40	.24	.40	1.4	8.0	9.3	10	66	e3.7	e.05	e.11
29	e.18	e.31	e.20	.27	---	6.8	9.1	9.8	56	e3.3	e.00	e.07
30	e.18	e.35	e.20	.35	---	7.3	8.3	8.5	52	e3.0	e.00	e.08
31	e.19	---	e.20	.33	---	6.9	---	7.7	---	e2.5	e.00	---
TOTAL	4.91	9.16	11.22	9.15	36.91	156.6	189.5	802.8	1557.5	389.3	30.95	1.89
MEAN	.16	.31	.36	.30	1.32	5.05	6.32	25.9	51.9	12.6	1.00	.063
MAX	.22	.50	.50	.50	2.3	12	9.3	133	285	57	3.0	.20
MIN	.10	.15	.20	.19	.33	1.2	4.1	7.7	1.7	2.5	.00	.00
AC-FT	9.7	18	22	18	73	311	376	1590	3090	772	61	3.7

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1991, BY WATER YEAR (WY)

	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991	1990	1991
MEAN	1.50	1.95	1.16	1.17	3.32	12.3	8.65	16.1	27.6	6.71	.56	.15
MAX	2.85	3.59	1.97	2.04	5.32	19.6	11.0	25.9	51.9	12.6	1.00	.24
(WY)	1990	1990	1990	1990	1990	1990	1990	1991	1991	1991	1991	1990
MIN	.16	.31	.36	.30	1.32	5.05	6.32	6.25	3.29	.87	.12	.063
(WY)	1991	1991	1991	1991	1991	1991	1991	1990	1990	1990	1990	1991

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1990 - 1991

ANNUAL TOTAL	1505.05	3199.89	
ANNUAL MEAN	4.12	8.77	6.76
HIGHEST ANNUAL MEAN			8.77 1991
LOWEST ANNUAL MEAN			4.76 1990
HIGHEST DAILY MEAN	47	285	285 Jun 23 1991
LOWEST DAILY MEAN	.00	.00	.00 Aug 29 1990
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00 Aug 29 1990
INSTANTANEOUS PEAK FLOW		525	525 Jun 20 1991
INSTANTANEOUS PEAK STAGE		7.21	7.21 Jun 20 1991
ANNUAL RUNOFF (AC-FT)	2990	6350	4900
10 PERCENT EXCEEDS	13	14	14
50 PERCENT EXCEEDS	1.4	1.1	2.1
90 PERCENT EXCEEDS	.16	.14	.16

e Estimated.

BEAVER CREEK BASIN

06354580 BEAVER CREEK BELOW LINTON, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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 23...	1330	0.16	1250	--	11.5	6.0	--	--	--	--	--	--
DEC 11...	1030	0.45	1370	--	0.5	1.0	--	--	--	--	--	--
JAN 10...	1035	0.25	--	--	-5.0	0.0	--	--	--	--	--	--
FEB 12...	1410	1.6	1260	--	6.5	0.0	--	--	--	--	--	--
MAR 26...	1345	12	905	7.7	0.0	1.0	290	65	31	78	36	2
APR 05...	1000	5.1	890	--	18.0	10.5	--	--	--	--	--	--
MAY 24...	1000	15	620	--	21.5	20.0	--	--	--	--	--	--
JUN 12...	0950	3.1	990	--	20.0	18.5	--	--	--	--	--	--
20...	1300	520	1120	--	24.0	18.0	--	--	--	--	--	--
21...	1015	89	1120	--	19.5	18.5	--	--	--	--	--	--
AUG 08...	1035	1.2	870	8.2	20.5	21.0	270	60	28	89	40	2
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR 26...	9.1	310	0	250	200	6.6	0.20	13	548	555	0.75	
AUG 08...	18	410	0	340	140	10	0.20	16	586	565	0.80	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR 26...	18.5	2	150	40	<1	130	80	0.2	7	<1	400	
AUG 08...	1.95	10	270	20	<1	120	130	<0.1	<1	<1	450	

GRAND RIVER BASIN

267

06354988 BOWMAN-HALEY LAKE NEAR HALEY, ND

LOCATION.--Lat 45°59'06", long 103°14'43", in NE $\frac{1}{4}$ sec.24, T.129 N., R.101 W., Bowman County, Hydrologic Unit 10130301, at dam on North Fork Grand River, and 6 mi west of Haley.

DRAINAGE AREA.--446 mi², approximately.

RESERVOIR-ELEVATION AND CONTENTS RECORDS

PERIOD OF RECORD.--August 1966 to current year.

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

REMARKS.--Reservoir is formed by a rolled earth-fill dam; storage began Aug. 22, 1966; dam completed April 1967. Total capacity is 93,000 acre-ft at maximum pool, elevation, 2,777.0 ft. Dead storage is 4,280 acre-ft below lowest point of outlet, elevation, 2,740.0 ft. Normal operating storage is 20,100 acre-ft at elevation 2,755.0 ft, crest of spillway. Figures given herein represent total contents. Controlled releases are through a 30-inch or 8-inch gate valve. The spillway is uncontrolled "glory hole" type and discharges through a conduit 9 ft in diameter. The reservoir is for flood control, water supply, and recreation.

COOPERATION.--Records of elevations and contents furnished by U.S. Army Corps of Engineers. Elevations affected by wind. Monthend elevations interpolated from furnished readings when necessary. Extremes are those observed.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 37,540 acre-ft, Mar. 28, 1978, elevation, 2,762.66 ft; minimum since first reaching spillway level, 10,410 acre-ft, Sept. 29, Oct. 1, 1991, elevation, 2,748.76 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 11,880 acre-ft, Oct. 1, elevation, 2,750.04 ft; minimum, 10,410 acre-ft, Sept. 29, elevation, 2,748.76 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	2,750.04	11,880	--
Oct. 31-----	2,749.73	11,510	-370
Nov. 30-----	2,749.57	11,320	-190
Dec. 31-----	2,749.54	11,290	-30
CAL YR 1990-----	--	--	-2,690
Jan. 31-----	2,749.50	11,240	-50
Feb. 28-----	2,749.49	11,230	-10
Mar. 31-----	2,749.50	11,240	+10
Apr. 30-----	2,749.69	11,460	+220
May 31-----	2,749.70	11,480	+20
June 30-----	2,749.91	11,720	+240
July 31-----	2,749.77	11,560	-160
Aug. 31-----	2,749.17	10,860	-700
Sept. 30-----	2,748.77	11,420	-440
WTR YR 1991-----	--	--	-1,460

GRAND RIVER BASIN

06355000 NORTH FORK GRAND RIVER AT HALEY, ND

LOCATION.--Lat 45°57'39", long 103°07'09", at southwest corner of sec.30, T.129 N., R.99 W., Bowman County, Hydrologic Unit 10130301, on left bank 10 ft downstream from county highway bridge at Haley, and 1 mi north of North Dakota-South Dakota state boundary.

DRAINAGE AREA.--509 mi².

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1908 to September 1917, October 1945 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS (WATER YEARS).--WSP 1239: 1908-10, 1913-15 (M), 1917 (M).

GAGE.--Water-stage recorder. Datum of gage is 2,658.60 ft 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.--Records poor. Flow regulated since August 1966 by Bowman-Haley Lake (station 06354988) 8 mi upstream. There are some small diversions for irrigation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.15	e.80	1.1	.00	.00	1.1	1.7	2.1	1.1	.44	e.05	.02
2	e.16	e.80	1.1	.00	.00	.96	1.9	1.7	.80	.12	e.06	.01
3	e.20	e.80	1.1	.00	.00	1.0	2.3	1.7	.60	.10	e.08	.02
4	e.22	e.80	1.1	.00	.00	1.5	2.2	1.1	.40	.03	e.10	.01
5	e.24	e.80	1.3	.00	.00	2.0	2.3	.97	.20	.02	e.10	.02
6	e.26	e.80	1.3	.00	.00	1.9	2.6	.60	.20	.00	e.10	.02
7	e.30	e.80	1.4	.00	.64	1.6	3.0	.46	.24	.00	e.10	.01
8	e.30	e.80	1.5	.00	2.1	1.5	2.7	.60	.31	.00	e.10	.02
9	e.30	e.80	1.6	.00	2.2	1.5	2.9	.76	.46	.00	e.10	.01
10	e.34	e.80	e1.8	.00	1.3	1.7	3.1	e.60	.60	.05	e.10	.02
11	e.36	e.80	e1.5	.00	1.2	1.8	4.3	e.35	.39	1.7	e.12	.02
12	.39	e.78	e1.5	.00	1.2	1.8	8.2	e.25	.31	.36	e.12	.02
13	.52	e.76	e1.4	.00	1.5	1.6	8.8	e.20	.46	.02	e.12	.02
14	.85	e.76	e1.3	.00	1.2	1.5	8.0	e.15	.46	.00	e.12	.02
15	.77	e.75	e1.2	.00	.27	1.4	6.9	e.10	.46	.00	e.19	.04
16	.76	e.75	e1.0	.00	.73	1.4	6.2	e.03	.39	.00	.27	.04
17	.91	e.75	e.90	.00	.95	1.3	5.8	e.00	.31	.00	.11	.05
18	.97	e.75	e.80	.00	.94	1.3	5.4	e.00	.19	.00	.06	.05
19	1.0	e.75	.76	.00	.95	1.3	5.4	e.00	.31	.00	.07	.06
20	1.0	e.75	.31	.00	1.0	1.3	5.2	e.00	.60	.00	.07	.07
21	e.98	e.75	.05	.00	1.5	1.1	4.8	e.00	.96	e.01	.04	.08
22	e.98	e.75	.03	.00	2.3	1.1	3.9	e.00	1.0	e.02	.05	.07
23	e.96	e.75	.00	.00	2.3	1.5	3.8	e.00	1.1	e.02	.05	.08
24	e.96	e.75	.00	.00	2.0	1.5	3.5	e.00	2.8	e.03	.08	.09
25	e.94	e.70	.00	.00	1.3	1.2	3.7	e.00	2.8	e.04	.11	.08
26	e.92	e.68	.00	.00	1.2	1.1	5.6	e.00	2.1	e.04	.10	.08
27	e.90	e.64	.00	.00	1.1	.94	4.8	e.00	2.4	e.05	.07	.10
28	e.88	e.68	.00	.00	1.2	1.0	3.6	e.00	2.3	e.06	.05	.11
29	e.86	.76	.00	.00	---	1.2	3.0	e.00	2.2	e.02	.06	.11
30	e.84	.90	.00	.00	---	1.2	2.6	e9.0	.90	e.03	.04	.08
31	e.82	---	.00	.00	---	.99	---	4.9	---	e.04	.03	---
TOTAL	20.04	22.96	24.05	0.00	29.08	42.29	128.2	25.57	27.35	3.20	2.82	1.43
MEAN	.65	.77	.78	.000	1.04	1.36	4.27	.82	.91	.10	.091	.048
MAX	1.0	.90	1.8	.00	2.3	2.0	8.8	9.0	2.8	1.7	2.7	.11
MIN	.15	.64	.00	.00	.00	.94	1.7	.00	.19	.00	.03	.01
AC-FT	40	46	48	.00	58	84	254	51	54	63	5.6	2.5

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1908 - 1991, BY WATER YEAR (WY)

MEAN	2.11	2.45	1.53	3.04	8.35	75.9	107	34.0	45.0	19.8	5.47	1.78
MAX	23.0	32.9	12.3	56.4	97.5	457	1683	266	291	210	49.1	27.0
(WY)	1983	1983	1983	1973	1947	1972	1952	1982	1953	1915	1914	1951
MIN	.16	.17	.029	.000	.000	.70	.69	.82	.20	.065	.000	.048
(WY)	1962	1962	1962	1909	1949	1915	1961	1991	1990	1961	1961	1991

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1908 - 1991

ANNUAL TOTAL	597.60		326.99					
ANNUAL MEAN	1.64		.90			25.4		
HIGHEST ANNUAL MEAN						143		1952
LOWEST ANNUAL MEAN						.88		1988
HIGHEST DAILY MEAN	9.0	Feb 12	9.0	May 30	13100		Apr 7	1952
LOWEST DAILY MEAN	.00	Jul 3	.00	Dec 23	.00		Aug 9	1908
ANNUAL SEVEN-DAY MINIMUM	.00	Jul 3	.00	Dec 23	.00		Aug 9	1908
INSTANTANEOUS PEAK FLOW			16	May 30	14100		Apr 7	1952
INSTANTANEOUS PEAK STAGE						17.10	Apr 15	1950
ANNUAL RUNOFF (AC-FT)	1190		649			18420		
10 PERCENT EXCEEDS	4.2		2.2			31		
50 PERCENT EXCEEDS	1.0		.44			1.5		
90 PERCENT EXCEEDS	.04		.00			.20		

GRAND RIVER BASIN

269

06355000 NORTH FORK GRAND RIVER AT HALEY, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1951, 1972 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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												
11...	1425	0.36	3430	--	10.0	11.0	--	--	--	--	--	--
NOV												
29...	1345	0.76	3460	--	13.0	1.5	--	--	--	--	--	--
FEB												
12...	1625	1.5	3010	--	10.0	0.5	--	--	--	--	--	--
MAR												
28...	1115	1.0	2040	8.6	3.0	3.0	250	46	33	390	77	11
MAY												
09...	1050	0.79	2680	--	18.0	15.5	--	--	--	--	--	--
JUN												
20...	1130	0.78	2770	--	22.0	21.0	--	--	--	--	--	--
AUG												
15...	1205	0.24	3260	8.8	24.0	22.0	260	33	43	670	84	18
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
MAR												
28...	5.5	420	6	350	750	8.0	0.50	4.2	1490	1450	2.03	
AUG												
15...	13	590	18	510	1100	12	0.80	3.5	2290	2180	3.11	
DATE		SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)
MAR												
28...	4.14	1	820	10	<1	40	80	<0.1	<1	1	820	
AUG												
15...	1.48	2	1800	30	1	70	30	<0.1	<1	2	770	

MISSOURI-OAHE RIVER BASIN

06439980 LAKE OAHE NEAR PIERRE, SD

LOCATION.--Lat 44°27'30", long 100°23'29", in NE $\frac{1}{4}$ sec.1, T.111 N., R.80 W., 5th principal meridian, Hughes County, Hydrologic Unit 10130105, in Pier A of Control Tower No. 1 of powerhouse intake structure of dam on Missouri River, 6.0 mi northwest of Pierre, 7.1 mi upstream from Bad River, and at mile 1,072.3.

DRAINAGE AREA.--243,500 mi², approximately.

PERIOD OF RECORD.--August 1958 to current year (monthend contents only). Prior to October 1967, published as Oahe Reservoir near Pierre.

GAGE.--Water-stage recorder. Datum of gage is National Geodetic Vertical Datum of 1929. Prior to Jan. 14, 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.

REVISED RECORDS.--WDR SD-88-1: September monthend elevation.

REMARKS.--Reservoir is formed by an earthfill dam; storage began in August 1958. Maximum capacity, 23,338,000 acre-ft below elevation 1,620.0 ft (top of spillway gates). Normal maximum, 22,240,000 acre-ft below 1,617.0 ft, of which about 2,390,000 acre-ft is designated for flood control. Inactive storage, 5,451,000 acre-ft below elevation 1,540.0 ft. Dead storage, 1,970 acre-ft below elevation 1,425.0 ft (invert of lowest outlet tunnel). Figures given herein represent elevations at powerhouse intake structure and total contents adjusted for wind effect.

The spillway consists of a gated chute with flat crest at elevation 1,596.5 ft, 8 gates, 50 by 23.5 ft each; design capacity, 300,000 ft³/s. The outlet works consist of 7 turbines with a generating capacity of 85,000 kilowatts each. Water is used for flood control, navigation, power, and incidental uses.

COOPERATION.--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, 12,071,000 acre-ft, Oct. 30, 1989, Nov. 1, 1989.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 14,945,000 acre-ft, June 30; minimum contents, 12,111,000 acre-ft, Oct. 28.

MONTHEND ELEVATION AND CONTENTS AT 2400 HOURS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	1,583.49	12,633,000	--
Oct. 31-----	1,581.18	12,142,000	-491,000
Nov. 30-----	1,582.21	12,378,000	+236,000
Dec. 31-----	1,582.17	12,365,000	-13,000
CAL YR 1990-----	--	--	-386,000
Jan. 31-----	1,583.43	12,649,000	+284,000
Feb. 28-----	1,585.97	13,223,000	+574,000
Mar. 31-----	1,587.87	13,710,000	+487,000
Apr. 30-----	1,587.17	13,486,000	-224,000
May 31-----	1,588.50	13,844,000	+358,000
June 30-----	1,592.90	14,945,000	+1,101,000
July 31-----	1,591.17	14,506,000	-439,000
Aug. 31-----	1,588.50	13,862,000	-644,000
Sept. 30-----	1,583.31	12,633,000	-1,229,000
WTR YR 1991-----	--	--	0

NOTE.--Lake frozen over Dec. 31 to Mar. 25.

JAMES RIVER BASIN

271

06467600 JAMES RIVER NEAR MANFRED, ND

LOCATION.--Lat 47°38'40", long 99°49'40", near midpoint of north line sec.15, T.148 N., R.72 W., Wells County, Hydrologic Unit 10160001, on right upstream wingwall of bridge on county highway, and 5 mi southwest of Manfred.

DRAINAGE AREA.--253 mi², of which about 197 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1954 to August 1957 (annual maximum only), September 1957 to current year (seasonal records only from 1982 to 1985).

GAGE.--Water-stage recorder. Datum of gage is 1,605.73 ft above National Geodetic Vertical Datum of 1929. Prior to Sept. 16, 1957, crest-stage gage only on downstream side of bridge at same datum.

REMARKS.--Records good.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY 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
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	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	---	.00	.00	.00	.00	.00	.00	.00
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	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
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	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1958	.31	2.65	1986	.000	1959
1959	.28	4.05	1987	.000	1959
1960	.076	.87	1988	.000	1959
1961	.005	.094	1989	.000	1959
1962	.82	17.6	1990	.000	1959
1963	16.7	82.4	1991	.000	1961
1964	18.6	118	1992	.000	1977
1965	5.00	31.5	1993	.000	1977
1966	4.98	58.5	1994	.000	1961
1967	3.46	43.8	1995	.000	1961
1968	.77	13.8	1996	.000	1958
1969	.30	2.90	1997	.000	1958

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1958 - 1991

ANNUAL MEAN			3.81
HIGHEST ANNUAL MEAN			13.6
LOWEST ANNUAL MEAN			.000
HIGHEST DAILY MEAN			1000
LOWEST DAILY MEAN			.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
INSTANTANEOUS PEAK FLOW	.00	Jan 1	.00
INSTANTANEOUS PEAK STAGE			a2000
ANNUAL RUNOFF (AC-FT)			b9.20
10 PERCENT EXCEEDS	.00		2760
50 PERCENT EXCEEDS	.00		5.0
90 PERCENT EXCEEDS	.00		.00

a About.

b From high-water mark, backwater from snow.

JAMES RIVER BASIN

06468170 JAMES RIVER NEAR GRACE CITY, ND

LOCATION.--Lat 47°33'29", long 98°51'45", in NW¹/₄,NW¹/₄,NW¹/₄, sec.17, T.147 N., R.64 W., Foster County, Hydrologic Unit 10160001, on left bank on upstream side of county highway bridge and 2.5 mi northwest of Grace City.

DRAINAGE AREA.--1,060 mi², approximately, of which about 650 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1968 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,457.60 ft, above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.18	.12	e.11	e.00	e.00	e.00	e.70	.22	.12	.48	e.01	e.00
2	.22	.12	e.09	e.00	e.00	e.01	e.60	.18	.07	.18	e.00	e.00
3	.18	.06	e.07	e.00	e.00	e.05	e.50	.21	.06	.12	e.00	e.00
4	.15	.06	e.06	e.00	e.00	e.08	e.54	.26	.06	.13	e.01	e.00
5	.14	.08	e.04	e.00	e.00	e.10	e.56	.30	.06	.14	e.01	e.00
6	.12	.12	e.05	e.00	e.00	e.50	e.58	.25	.06	.12	e.00	e.00
7	.12	.12	e.06	e.00	e.00	e.30	e.60	.24	.06	.12	e.00	e.00
8	.12	.12	e.15	e.00	e.00	e.10	.60	.27	.06	.12	e.00	e.10
9	.12	.12	e.25	e.00	e.00	e1.0	.49	.28	.11	.12	e.00	e.15
10	.12	.08	e.30	e.00	e.00	e2.0	.48	.24	.12	.12	e.00	e.10
11	.12	.06	e.15	e.00	e.00	e3.0	.45	.18	.12	.51	e.00	e.10
12	.12	.06	e.10	e.00	e.00	e2.0	.42	.18	.06	.56	e.00	e.10
13	.12	.06	e.08	e.00	e.00	e1.0	.42	.13	.06	.48	e.00	e.10
14	.12	.06	e.07	e.00	e.00	e.80	.42	.12	.07	.49	e.00	e.10
15	.12	.06	e.05	e.00	e.00	e.70	.42	.12	.12	.53	e.00	e.15
16	.12	.06	e.03	e.00	e.00	e.60	.42	.12	.12	e.40	e.00	e.20
17	.16	.06	e.03	e.00	e.00	e.50	.42	.12	.06	e.35	e.00	e.18
18	.20	.06	e.03	e.00	e.00	e.60	.39	.12	.05	e.25	e.00	e.16
19	.32	.06	e.02	e.00	e.00	e.80	.35	.12	.00	e.15	e.00	e.14
20	.39	.06	e.00	e.00	e.00	e.90	.30	.12	.05	e.30	e.00	e.12
21	.38	.11	e.00	e.00	e.00	e5.0	.24	.12	.28	e.20	e.00	e.12
22	.42	.06	e.00	e.00	e.00	e4.0	.23	.13	.55	e.15	e.00	e.12
23	.38	.09	e.00	e.00	e.00	e3.0	.18	.18	.55	e.09	e.00	e.12
24	.24	.12	e.00	e.00	e.00	e2.5	.18	.18	.50	e.06	e.00	.12
25	.29	.12	e.00	e.00	e.00	e2.0	.20	.18	.48	e.04	e.00	.09
26	.39	e.10	e.00	e.00	e.00	e1.7	.22	.18	.35	e.10	e.00	.09
27	.15	e.09	e.00	e.00	e.00	e1.3	.44	.18	.12	e.07	e.00	.12
28	.12	e.09	e.00	e.00	e.00	e1.1	.44	.18	.12	e.05	e.00	.12
29	.12	e.10	e.00	e.00	---	e1.0	.34	.17	.12	e.03	e.00	.12
30	.12	e.12	e.00	e.00	---	e.90	.25	.12	.38	e.02	e.00	.06
31	.12	---	e.00	e.00	---	e.80	---	.12	---	e.02	e.00	---
TOTAL	5.99	2.60	1.74	0.00	0.00	38.34	12.38	5.52	4.94	6.50	0.03	2.78
MEAN	.19	.087	.056	.000	.000	1.24	.41	.18	.16	.21	.001	.093
MAX	.42	.12	.30	.00	.00	5.0	.70	.30	.55	.56	.01	.20
MIN	.12	.06	.00	.00	.00	.00	.18	.12	.00	.02	.00	.00
AC-FT	12	5.2	3.5	.00	.00	.76	25	11	9.8	13	.06	5.5

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1991, BY WATER YEAR (WY)

	MEAN	1.75	2.11	.80	.26	3.11	65.7	159	55.3	19.9	12.6	4.56	2.94
MAX	14.0	19.0	6.65	2.28	49.9	471	775	264	99.9	112	25.6	44.0	
(WY)	1983	1981	1981	1981	1981	1983	1969	1974	1980	1979	1980	1980	
MIN	.000	.000	.000	.000	.000	.000	.29	.18	.11	.022	.000	.000	
(WY)	1977	1977	1977	1969	1969	1969	1977	1991	1973	1973	1988	1976	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1968 - 1991

ANNUAL TOTAL	772.54	80.82											
ANNUAL MEAN	2.12	.22								27.4			
HIGHEST ANNUAL MEAN										70.5		1969	
LOWEST ANNUAL MEAN										.21		1977	
HIGHEST DAILY MEAN	221	Jun 29				5.0	Mar 21		2930		Apr 13	1969	
LOWEST DAILY MEAN	.00	Jan 1				.00	Dec 20		.00		Jan 1	1969	
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1				.00	Dec 20		.00		Jan 1	1969	
INSTANTANEOUS PEAK FLOW						6.0	Mar 21		3100		Apr 13	1969	
INSTANTANEOUS PEAK STAGE						unknown			12.00		Apr 13	1969	
ANNUAL RUNOFF (AC-FT)	1530					160	unknown		19880				
10 PERCENT EXCEEDS	1.3					.50			46				
50 PERCENT EXCEEDS	.15					.11			.50				
90 PERCENT EXCEEDS	.00					.00			.00				

e Estimated.

JAMES RIVER BASIN

273

06468170 JAMES RIVER NEAR GRACE CITY, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	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)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)
NOV 26...	1300	0.10	2100	7.8	-6.0	1.0	--	--	300	53	41	360
MAR 20...	1100	0.89	1210	--	4.0	0.0	--	--	--	--	--	--
27...	1400	1.3	1220	--	-5.0	0.5	--	--	--	--	--	--
APR 03...	1240	0.51	1120	--	17.0	4.0	--	--	--	--	--	--
08...	1400	0.61	1370	8.1	10.0	9.5	12.6	109	160	28	23	260
MAY 22...	1100	0.10	1670	8.2	24.0	20.0	7.4	81	200	32	30	300
JUL 08...	1340	0.14	1730	8.5	22.0	23.5	12.6	146	160	20	27	350
DATE	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)	SOLIDS, RESIDUE AT 180 DEG. C (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE TOTAL (MG/L AS N) (00615)
NOV 26...	71	9	14	647	300	130	0.50	1320	1290	1.80	0.36	--
APR 08...	76	9	11	472	190	86	0.20	866	882	1.18	1.43	<0.010
MAY 22...	75	9	14	534	240	110	0.30	1060	1050	1.44	0.29	0.010
JUL 08...	80	12	25	525	240	120	0.30	1150	1100	1.56	0.43	--
DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	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)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-SOLVED (UG/L AS AS) (01000)	
NOV 26...	0.010	--	<0.100	--	0.140	--	0.020	--	<0.010	--	2	
APR 08...	<0.010	<0.050	<0.050	0.020	<0.010	0.170	0.050	0.030	<0.010	3	3	
MAY 22...	<0.010	<0.050	<0.050	0.020	0.020	0.110	0.040	<0.010	<0.010	3	3	
JUL 08...	<0.010	--	<0.050	--	0.050	--	0.100	--	0.060	6	7	
DATE	BORON, DIS-SOLVED (UG/L AS B) (01020)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	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)	ACETA-NALDES SCREEN WAT, WH REC (UG/L) (01145)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (34757)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
NOV 26...	390	20	20	<0.1	--	<1	--	--	56	0.02	40	
APR 08...	310	16	86	<0.1	<1	<1	--	--	14	0.02	61	
MAY 22...	410	23	110	<0.1	<1	<1	<0.1	<0.1	4	0.00	--	
JUL 08...	420	38	56	0.1	<1	<1	<0.1	<0.1	31	0.01	20	

JAMES RIVER BASIN

06468250 JAMES RIVER ABOVE ARROWWOOD LAKE NEAR KENSAL, ND

LOCATION.--Lat 47°23'59", long 98°47'50", in SW¹/₄,SW¹/₄,SW¹/₄, sec.2, T.145 N., R.64 W., Foster County, Hydrologic Unit 10160003, on left bank 20 ft upstream from bridge.

DRAINAGE AREA.--1,200 mi², approximately, of which about 750 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Elevation of gage is 1,440.00 ft above National Geodetic Vertical Datum of 1929, from topographic map.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	e.20	e.00	e.00	e.00	e1.9	3.2	e.40	.00	.00	.00
2	.00	.00	e.25	e.00	e.00	e.00	e1.8	3.2	e.35	.00	.00	.00
3	.00	.00	e.20	e.00	e.00	e.00	e1.8	3.2	e.30	.00	.00	.00
4	.00	.00	e.15	e.00	e.00	e.00	e2.0	3.4	e.27	.00	.00	.00
5	.00	.00	e.10	e.00	e.01	e.00	2.3	3.7	e.24	.00	.00	.00
6	.00	.00	e.11	e.00	e1.0	e.00	2.6	3.8	e.20	.00	.00	.00
7	.00	.00	e.13	e.00	e2.0	e.00	2.6	3.9	e.17	.00	.00	.00
8	.00	.00	e.15	e.00	e1.0	e.00	2.8	3.7	e.14	.00	.00	.00
9	.00	.00	e.20	e.00	e.50	e.00	2.8	3.6	e.10	.00	.00	.00
10	.00	.00	e.30	e.00	e.20	e.00	2.6	3.4	e.07	.00	.00	.00
11	.00	.00	e.40	e.00	e.10	e.00	2.9	3.2	e.05	.00	.00	.00
12	.00	.00	e.60	e.00	e.05	e.00	3.0	2.6	e.02	.00	.00	.00
13	.00	.00	e.80	e.00	e.01	e.00	3.0	2.4	e.01	.00	.00	.00
14	.00	.00	e1.0	e.00	e.00	e.00	3.0	2.2	e.00	.00	.00	.00
15	.00	.00	e1.0	e.00	e.00	e.10	3.0	2.6	.00	.00	.00	.00
16	.00	.00	e.90	e.00	e.00	e.80	3.0	2.5	.00	.00	.00	.00
17	.00	.00	e.60	e.00	e.00	e.70	3.0	2.3	.00	.00	.00	.00
18	.00	.00	e.30	e.00	e.00	e.70	2.6	2.0	.00	.00	.00	.00
19	.00	.00	e.20	e.00	e.00	e1.0	2.5	1.9	.00	.00	.00	.00
20	.00	.00	e.15	e.00	e.00	e2.0	2.6	1.8	.00	.00	.00	.00
21	.00	.00	e.10	e.00	e.00	e1.7	2.5	1.5	.00	.00	.00	.00
22	.00	.00	e.05	e.00	e.00	e2.2	2.6	e1.6	.00	.00	.00	.00
23	.00	.00	e.02	e.00	e.00	e2.0	2.5	e1.5	.00	.00	.00	.00
24	.00	.00	e.01	e.00	e.00	e2.3	2.2	e1.2	.00	.00	.00	.00
25	.00	.00	e.00	e.00	e.00	e2.5	2.1	e1.0	.00	.00	.00	.00
26	.00	.00	e.00	e.00	e.00	e2.0	2.1	e.90	.00	.00	.00	.00
27	.00	.00	e.00	e.00	e.00	e1.9	2.7	e.80	.00	.00	.00	.00
28	.00	.00	e.00	e.00	e.00	e2.0	2.9	e.70	.00	.00	.00	.00
29	.00	e.02	e.00	e.00	---	e1.9	3.1	e.60	.00	.00	.00	.00
30	.00	e.10	e.00	e.00	---	e2.0	3.2	e.50	.00	.00	.00	.00
31	.00	---	e.00	e.00	---	e1.9	---	e.45	---	.00	.00	---
TOTAL	0.00	0.12	7.92	0.00	4.87	27.70	77.7	69.35	2.32	0.00	0.00	0.00
MEAN	.000	.004	.26	.000	.17	.89	2.59	2.24	.077	.000	.000	.000
MAX	.00	.10	1.0	.00	2.0	2.5	3.2	3.9	.40	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	1.8	.45	.00	.00	.00	.00
AC-FT	.00	.2	16	.00	9.7	55	154	138	4.6	.00	.00	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1986 - 1991, BY WATER YEAR (WY)

	MEAN	1.01	.81	.86	.39	.67	80.5	96.0	20.4	3.81	4.29	2.73	3.27
MAX	4.20	2.23	2.08	1.51	1.92	225	406	84.0	7.26	18.8	15.2	15.2	
(WY)	1988	1987	1987	1987	1987	1987	1987	1986	1987	1990	1987	1987	
MIN	.000	.000	.000	.000	.000	.000	.21	2.59	2.24	.077	.000	.000	.000
(WY)	1989	1989	1989	1989	1989	1989	1990	1991	1991	1991	1991	1988	1988

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1986 - 1991

ANNUAL TOTAL	884.10	189.98		
ANNUAL MEAN	2.42	.52	17.9	
HIGHEST ANNUAL MEAN			58.5	1987
LOWEST ANNUAL MEAN			.52	1991
HIGHEST DAILY MEAN	105	Jul 4	3.9	May 7
LOWEST DAILY MEAN	.00	Jan 1	.00	Oct 1
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00	Oct 1
INSTANTANEOUS PEAK FLOW			4.1	May 7
INSTANTANEOUS PEAK STAGE			a2.52	Mar 26
ANNUAL RUNOFF (AC-FT)	1750	377	13000	Mar 28 1987
10 PERCENT EXCEEDS	3.9	2.5	19	
50 PERCENT EXCEEDS	.00	.00	.80	
90 PERCENT EXCEEDS	.00	.00	.00	

e Estimated.

a Backwater from ice.

06468250 JAMES RIVER ABOVE ARROWWOOD LAKE NEAR KENSAL, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water year 1985 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L) (00310)	HARD-NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	
MAR 20...	0925	2.0	730	--	0.0	0.0	--	--	--	--	--	--	
MAR 27...	1240	1.9	780	--	-5.0	0.5	--	--	--	--	--	--	
APR 03...	1350	1.8	860	--	18.0	9.0	--	--	--	--	--	--	
APR 08...	1500	2.8	750	7.6	12.0	9.5	1.5	9.6	83	6.9	220	43	
MAY 22...	1300	1.6	980	7.6	26.0	21.0	1.2	5.8	65	2.3	280	49	
DATE		MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION RATIO (00931)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY LAB AS CACO3 (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	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)	
APR 08...	28	73	40	2	10	280	91	23	0.20	465	436	0.63	
MAY 22...	38	110	45	3	12	396	120	36	0.30	624	603	0.85	
DATE		SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00615)	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00630)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITRO-GEN, AM-MONIA + ORGANIC DIS-SOLVED (MG/L AS N) (00625)	NITRO-GEN, AM-MONIA + ORGANIC DIS-SOLVED (MG/L AS N) (00623)	PHOS-PHORUS TOTAL (MG/L AS P) (00665)	PHOS-PHORUS DIS-SOLVED (MG/L AS P) (00666)	
APR 08...	3.48	5	0.020	<0.010	<0.010	<0.050	0.020	0.020	1.3	0.90	0.100	0.040	
MAY 22...	2.76	5	0.010	<0.010	<0.010	<0.050	0.020	0.040	1.4	0.70	0.160	0.120	
DATE		PHOS-PHORUS ORTHO-TOTAL (MG/L AS P) (70507)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	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)	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)
APR 08...	0.030	<0.010	1	1	140	--	<10	<1	--	34	<1	--	--
MAY 22...	0.109	0.100	2	2	250	<1	<10	1	40	22	1	40	40
DATE		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)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE DIS-SOLVED (MG/L AS CN) (00720)	CYANIDE DIS-SOLVED (MG/L AS CN) (00723)	ACETA-NALIDES SCREEN WAT, WH REC (UG/L) (01045)	DICAMBA (MED-IBEN) (BAN-VEL D) TOTAL (UG/L) (82052)	PICLO-RAM (TOR-DON) TOTAL (UG/L) (39720)	SILVEX, TOTAL (UG/L) (39760)
APR 08...	10	<0.1	<1	<1	<1	<3	12	<0.010	<0.01	--	--	--	--
MAY 22...	23	<0.1	<1	<1	<1	4	16	<0.010	<0.01	<0.1	<0.01	0.01	<0.01
DATE		TRIAZIN SCREEN (ELISA) REC, AS ATRAZIN (UG/L) (34757)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)	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. # FINER THAN .062 MM (70331)	
APR 08...	--	--	--	--	--	3.70	<0.500	1150	1170	6	0.05	50	--
MAY 22...	0.1	0.02	<0.01	<0.01	<0.01	<1.70	<1.20	1080	1090	2	0.01	--	--

JAMES RIVER BASIN

06469000 JAMESTOWN RESERVOIR NEAR JAMESTOWN, ND

LOCATION.--Lat 46°55'50", long 98°42'23", in SE $\frac{1}{4}$, NW $\frac{1}{4}$, sec.24, T.140 N., R.64 W., Stutsman County, Hydrologic Unit 10160001, on left bank in control house below Jamestown Dam on James River, 1.7 mi north of Jamestown Post Office, and 3.3 mi upstream from Pipestem Creek.

DRAINAGE AREA.--1,760 mi², approximately, of which about 1,010 mi² is probably noncontributing.

RESERVOIR-ELEVATION AND CONTENTS RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,400.00 ft above National Geodetic Vertical Datum of 1929; gage readings have been reduced to elevations NGVD. From June 22, 1959, to June 3, 1971, site was located 0.2 mi upstream at same datum. Prior to June 22, 1959, nonrecording gages at different locations.

REMARKS.--Reservoir is formed by earth-fill dam, completed Oct. 1, 1953. Closure made May 7, 1953, and filling of dead storage started. Gates initially closed Feb. 8, 1954. Usable capacity, 229,470 acre-ft between elevations 1,400 ft, sill of outlet, and 1,454 ft, crest of spillway. Dead storage below elevation 1,400 ft, 820 acre-ft. Maximum design pool, 389,000 acre-ft, elevation, 1,464.6 ft. Figures given herein represent total contents based on capacity table dated Oct. 1, 1965. Reservoir is used for flood control and municipal supply. Elevations are adjusted for wind effect.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 103,100 acre-ft, May 1, 1969, elevation, 1,443.60 ft; minimum since initial filling of reservoir, 16,820 acre-ft, Sept. 30, 1991, elevation, 1,422.68 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 19,970 acre-ft, Oct. 1, elevation, 1,424.82 ft; minimum, 16,820 acre-ft, Sept. 30, elevation, 1,422.68 ft.

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30-----	1,424.82	19,970	--
Oct. 31-----	1,424.53	19,520	-450
Nov. 30-----	1,424.31	19,190	-330
Dec. 31-----	1,424.29	19,160	-30
CAL YR 1990-----	--	--	-3,370
Jan. 31-----	1,424.14	18,930	-230
Feb. 28-----	1,424.16	18,960	+30
Mar. 31-----	1,424.20	19,020	+60
Apr. 30-----	1,424.19	19,000	-20
May 31-----	1,424.28	19,140	+140
June 30-----	1,424.07	18,820	-320
July 31-----	1,423.59	18,120	-700
Aug. 31-----	1,423.08	17,380	-740
Sept. 30-----	1,422.68	16,820	-560
WTR YR 1991-----	--	--	-3,150

JAMES RIVER BASIN

277

06469000 JAMESTOWN RESERVOIR NEAR JAMESTOWN, ND--CONTINUED

WATER-QUALITY RECORDS

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

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAM- PLING DEPTH (FEET) (000003)	RESER- VOIR DEPTH (FEET) (72025)	BARO- METRIC PRES- SURE (MM OF HG) (000025)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (000095)	PH (STAND- ARD UNITS) (000400)	TEMPER- ATURE AIR (DEG C) (000020)	TEMPER- ATURE WATER (DEG C) (000010)	COLOR (PLAT- INUM- COBALT DISK) (IN) (000080)	TRANS- PAR- ENCY (SECCHI DISK) (IN) (000077)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (000300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (MG/L) (000301)
NOV												
21...	1137	3.30	24.1	735	755	8.3	7.5	3.0	14	57.6	14.4	111
JAN												
15...	1144	3.30	23.0	772	835	8.1	1.0	2.0	12	125	9.6	69
JUN												
25...	1043	3.30	28.0	758	765	8.3	21.0	21.0	16	25.0	7.0	79
SEP												
10...	0931	3.30	23.2	706	814	8.5	15.0	20.5	--	18.0	8.4	101
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 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)
NOV												
21...		98	19	12	23	32	1	6.1	206	110	13	0.30
JAN												
15...		300	59	36	71	33	2	17	312	160	17	0.20
JUN												
25...		260	52	32	62	32	2	16	268	130	16	0.30
SEP												
10...		270	51	34	72	35	2	22	284	140	19	0.30
DATE		SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	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)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	BORON, DIS- SOLVED (UG/L AS B) (01020)
NOV												
21...		9.0	404	317	0.55	--	0.020	<0.100	0.060	0.070	0.060	130
JAN												
15...		11	549	559	0.75	--	0.010	<0.100	0.160	0.110	0.100	160
JUN												
25...		11	493	483	0.67	0.160	0.030	0.190	0.050	0.070	0.040	1900
SEP												
10...		18	521	528	0.71	--	<0.010	0.095	0.110	0.120	0.070	170

JAMES RIVER BASIN

06469000 JAMESTOWN RESERVOIR NEAR JAMESTOWN, ND--CONTINUED

WATER QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SAM- PLING DEPTH (FEET) (00003)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	CLOUD COVER (PER- CENT) (00032)	WIND SPEED (MILES PER HOUR) (00035)	WIND DIREC- TION (DEG. FROM TRUE NORTH) (00036)
NOV										
21...	1135	0.0	754	8.2	3.0	14.6	112	--	--	--
21...	1136	1.60	754	8.3	3.0	14.5	111	--	--	--
21...	1137	3.30	755	8.3	3.0	14.4	111	90	23	270
21...	1138	6.60	755	8.3	3.0	14.4	111	--	--	--
21...	1139	13.1	755	8.3	3.0	14.4	111	--	--	--
21...	1140	19.7	755	8.4	3.0	14.3	110	--	--	--
21...	1141	24.1	756	8.4	3.0	14.3	110	--	--	--
JAN										
15...	1140	0.0	841	8.0	1.0	9.8	69	--	--	--
15...	1142	1.60	843	8.1	1.0	9.8	68	--	--	--
15...	1144	3.30	835	8.1	2.0	9.6	69	0	3.0	270
15...	1145	6.60	835	8.1	2.5	9.4	68	--	--	--
15...	1147	13.1	838	8.1	3.0	8.0	59	--	--	--
15...	1148	19.7	853	8.0	3.0	6.5	48	--	--	--
15...	1150	23.0	857	8.0	3.5	5.7	42	--	--	--
JUN										
25...	1040	0.0	770	8.3	21.0	7.0	79	--	--	--
25...	1042	1.60	765	8.3	21.0	7.0	79	--	--	--
25...	1043	3.30	765	8.3	21.0	7.0	79	100	10	160
25...	1048	6.60	765	8.3	21.0	6.9	78	--	--	--
25...	1052	13.2	765	8.3	21.0	6.9	78	--	--	--
25...	1056	19.8	765	8.3	21.0	6.8	77	--	--	--
25...	1100	26.4	765	8.3	21.0	6.8	77	--	--	--
25...	1105	28.0	765	8.3	21.0	6.8	77	--	--	--
SEP										
10...	0928	0.0	816	8.2	20.5	8.5	102	--	--	--
10...	0930	1.60	815	8.4	20.5	8.4	101	--	--	--
10...	0931	3.30	814	8.5	20.5	8.4	101	20	5.0	360
10...	0932	6.60	816	8.5	20.5	8.4	101	--	--	--
10...	0933	13.2	816	8.5	20.5	8.4	101	--	--	--
10...	0934	19.8	815	8.5	20.5	8.3	100	--	--	--
10...	0935	23.1	815	8.5	20.5	8.3	100	--	--	--

JAMES RIVER BASIN

279

06469400 PIPESTEM CREEK NEAR PINGREE, ND

LOCATION.--Lat 47°10'03", long 98°58'07", in NE¹/₄NE¹/₄NW¹/₄ sec.31, T.143 N., R.65 W., Stutsman County, Hydrologic Unit 10160002, on right bank on downstream side of State Highway 36 bridge, and 3 mi west of Pingree.

DRAINAGE AREA.--700 mi², of which about 440 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1973 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,500.63 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records poor.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

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	.32	.14	.07	.75	e.00
2	.00	.00	.00	e.00	e.00	e.00	e.00	.29	.14	.40	.62	e.00
3	.00	.00	.00	e.00	e.00	e.00	e.00	.29	.13	.23	.62	e.00
4	.00	.00	.00	e.00	e.00	e.00	e.00	.32	.12	.31	.49	e.00
5	.00	.00	.00	e.00	e.00	e.00	e.00	.38	.12	.29	.37	e.00
6	.00	.00	.00	e.00	e.00	e.00	e.00	.42	.11	.26	.35	e.00
7	.00	.00	.00	e.00	e.00	e.00	e.00	.42	.09	.23	e.25	e.00
8	.00	.00	.00	e.00	e.00	e.00	e.00	.38	.05	.17	e.18	e.00
9	.00	.00	.00	e.00	e.00	e.00	e.00	.27	.05	.15	e.10	e.00
10	.00	.00	.00	e.00	e.00	e.00	e.00	.25	e.04	.12	e.08	e.00
11	.00	.00	.00	e.00	e.00	e.00	e.00	.27	e.03	.10	e.07	e.00
12	.00	.00	.00	e.00	e.00	e.00	.01	.28	e.03	.90	e.06	e.00
13	.00	.00	.00	e.00	e.00	e.00	.05	.24	e.03	5.6	e.05	e.00
14	.00	.00	.00	e.00	e.00	e.00	.08	.22	e.02	3.5	e.04	e.00
15	.00	.00	.00	e.00	e.00	e.00	.10	.26	e.03	2.8	e.02	e.00
16	.00	.00	.00	e.00	e.00	e.00	.13	.24	e.02	2.8	e.01	e.00
17	.00	.00	.00	e.00	e.00	e.00	.14	.25	.00	e2.8	e.00	e.00
18	.00	.00	.00	e.00	e.00	e.00	.16	.21	.00	e2.8	e.00	e.00
19	.00	.00	.00	e.00	e.00	e.00	.16	.17	.00	e2.8	e.00	e.00
20	.00	.00	.00	e.00	e.00	e.00	.14	.16	.00	2.8	e.00	e.00
21	.00	.00	.00	e.00	e.00	e.00	.13	.15	.00	2.8	e.00	e.00
22	.00	.00	.00	e.00	e.00	e.00	.12	.18	.00	3.4	e.00	e.00
23	.00	.00	e.00	e.00	e.00	e.00	.12	.35	.00	3.1	e.00	e.00
24	.00	.00	e.00	e.00	e.00	e.00	.13	.34	.00	2.7	e.00	e.00
25	.00	.00	e.00	e.00	e.00	e.00	.11	.26	.00	2.1	e.00	e.00
26	.00	.00	e.00	e.00	e.00	e.01	.12	.27	.00	1.7	e.00	e.00
27	.00	.00	e.00	e.00	e.00	e.02	.25	.29	.00	1.7	e.00	e.00
28	.00	.00	e.00	e.00	e.00	e.02	.25	.30	.00	1.7	e.00	e.00
29	.00	.00	e.00	e.00	---	e.02	.30	.27	.00	1.4	e.00	e.00
30	.00	.00	e.00	e.00	---	e.02	.37	.23	.00	1.4	e.00	e.00
31	.00	---	e.00	e.00	---	e.01	---	.20	---	1.2	e.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.10	2.87	8.48	1.15	244.57	4.06	0.00
MEAN	.000	.000	.000	.000	.000	.003	.096	.27	.038	7.89	.13	.000
MAX	.00	.00	.00	.00	.00	.02	.37	.42	.14	.31	.75	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.15	.00	.07	.00	.00
AC-FT	.00	.00	.00	.00	.00	.2	5.7	17	2.3	485	8.1	.00

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1991, BY WATER YEAR (WY)

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
MEAN	1.47	1.57	.62	.19	4.74	84.6	116	26.7	12.5	10.1	3.84	4.10						
MAX	9.27	20.1	6.53	2.36	39.7	474	451	118	53.4	50.3	33.1	30.2						
(WY)	1981	1981	1981	1981	1981	1983	1975	1975	1983	1983	1987	1989						
MIN	.000	.000	.000	.000	.000	.003	.096	.038	.017	.000	.000	.000						
(WY)	1974	1977	1977	1974	1974	1991	1991	1977	1977	1985	1976	1976						

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1974 - 1991

ANNUAL TOTAL	583.40	261.23	
ANNUAL MEAN	1.60	.72	22.2
HIGHEST ANNUAL MEAN			61.2
LOWEST ANNUAL MEAN			.035
HIGHEST DAILY MEAN	19 Jun 3	31 Jul 4	2200 Apr 19 1975
LOWEST DAILY MEAN	.00 Jan 1	.00 Oct 1	.00 Oct 1 1973
ANNUAL SEVEN-DAY MINIMUM	.00 Jan 1	.00 Oct 1	.00 Oct 1 1973
INSTANTANEOUS PEAK FLOW		37 Jul 3	2520 Apr 20 1979
INSTANTANEOUS PEAK STAGE		a5.54 Jul 3	b11.60 Apr 20 1979
ANNUAL RUNOFF (AC-FT)	1160	518	16100
10 PERCENT EXCEEDS	6.6	.39	36
50 PERCENT EXCEEDS	.02	.00	.27
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

a Backwater from beaver dam.

b Backwater from ice.

JAMES RIVER BASIN

06469400 PIPESTEM CREEK NEAR PINGREE, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1974 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	
MAY 23...	1000	0.30	980	7.9	19.0	20.0	330	55	46	100	39	2	
JUL 11...	1100	11	940	7.5	23.0	21.0	370	75	45	80	31	2	
DATE		POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINIT LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)
MAY 23...	11	450	0	360	180	15	0.20	4.1	655	631	0.89	0.53	
JUL 11...	15	330	0	270	220	15	0.20	35	661	648	0.90	18.9	
DATE		ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	ACETA- NALIDES SCREEN WAT, WH REC (UG/L)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (34757)
MAY 23...	3	70	40	<1	70	100	<0.1	<1	<1	340	<0.1	<0.1	
JUL 11...	5	130	70	<1	60	90	<0.1	<1	<1	360	<0.1	<0.1	

06470000 JAMES RIVER AT JAMESTOWN, ND

LOCATION.--Lat 46°53'22", long 98°40'58", in NW¹/₄, NE¹/₄ sec.6, T.139 N., R.63 W., Stutsman County, Hydrologic Unit 10160003, on left bank 200 ft upstream from Interstate 94 bridge at southeast corner of Jamestown, and 3 mi downstream from Pipestem Creek.

DRAINAGE AREA.--2,820 mi², approximately, of which about 1,650 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1928 to September 1933, March to May 1935, August 1937 to September 1939, April 1943 to current year. Monthly discharge only for some periods, published in WSP 1309.

REVISED RECORDS.--WSP 1239: 1938(M). WSP 1917: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,373.27 ft above National Geodetic Vertical Datum of 1929. Oct. 1, 1949, to Sept. 30, 1965, at former bridge 0.5 mi upstream at datum 2.00 ft higher. See WSP 1729 or 1917 for history of changes prior to Oct. 1, 1949.

REMARKS.--Records good except those for periods of estimated daily discharges, which are poor. Flow regulated by Arrowwood, Jim, and Pipestem Lakes, and Jamestown Reservoir, combined capacity, 393,000 acre-ft. Regulation by Jamestown Reservoir (station 06469000) 6 mi since 1953 and by Pipestem Lake, capacity 147,000 acre-ft, since 1973.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.3	1.3	1.4	e.35	e.30	e1.2	2.9	6.2	.84	13	.70	1.5
2	1.4	1.7	1.4	e.35	e.50	e1.3	3.1	5.3	.59	5.9	.65	.98
3	1.6	1.8	e1.3	e.35	e.70	e1.4	3.7	7.6	.50	4.2	.56	1.3
4	1.4	1.9	e1.3	e.35	e.90	e2.0	3.4	16	3.2	3.5	.52	2.0
5	1.3	1.8	e1.2	e.35	e1.0	e1.0	3.2	14	1.5	2.6	.49	2.0
6	1.3	1.6	e1.2	e.35	e2.0	e7.0	3.1	8.1	1.6	2.1	.32	1.8
7	1.1	1.5	e1.2	e.35	e2.0	5.9	2.8	7.0	1.5	1.9	.26	1.8
8	1.1	1.6	e1.2	e.35	e1.8	3.3	3.0	6.3	1.6	1.6	.40	37
9	1.1	1.6	e1.2	e.30	e1.5	3.0	4.5	5.0	1.3	1.8	1.5	16
10	1.1	1.6	e1.2	e.30	e1.5	3.2	5.0	4.4	.74	1.4	1.6	9.9
11	1.4	1.6	e1.1	e.30	e1.5	3.0	4.0	4.2	.40	1.4	1.5	8.0
12	1.8	1.6	e1.1	e.30	e1.3	2.9	4.6	4.1	.28	1.3	2.1	8.8
13	2.2	1.6	e1.1	e.30	e1.3	3.4	12	4.0	11	1.1	1.9	6.0
14	1.5	1.6	e1.1	e.30	e1.3	4.0	11	3.5	12	1.0	1.4	6.9
15	.93	1.6	e1.1	e.30	e1.1	3.7	7.6	20	58	.84	1.3	18
16	1.1	1.6	e1.0	e.30	e1.1	3.4	8.6	8.5	10	.84	1.1	21
17	4.5	1.6	e.80	e.30	e1.1	2.7	7.8	7.0	5.1	.84	.04	13
18	3.5	1.6	e.70	e.30	e1.1	2.7	7.4	7.0	3.3	.58	.05	6.7
19	3.4	1.6	e.60	e.30	e1.1	2.7	7.1	5.7	2.5	.23	.71	5.5
20	2.7	1.6	e.50	e.30	e1.1	2.7	6.8	4.8	8.5	1.3	1.9	4.6
21	2.4	1.6	e.50	e.30	e1.1	2.7	6.8	3.2	6.2	.51	.65	3.6
22	2.4	1.4	e.50	e.30	e1.1	2.7	6.4	7.9	4.8	11	.20	3.0
23	2.2	2.1	e.50	e.25	e1.1	3.1	6.6	111	3.7	4.3	3.0	1.9
24	2.2	1.5	e.50	e.25	e1.0	2.9	6.3	22	3.2	2.9	.14	1.8
25	1.8	1.4	e.40	e.20	e1.0	2.7	6.5	10	2.6	2.0	.39	e1.5
26	1.6	1.4	e.40	e.20	e1.0	2.7	8.2	6.6	2.0	1.3	.22	e1.2
27	1.1	1.5	e.40	e.20	e1.1	2.7	37	4.0	1.5	.84	.45	e.90
28	1.1	1.6	e.40	e.20	e1.2	2.7	15	2.7	3.3	.70	.00	e.70
29	1.1	1.6	e.40	e.20	---	2.9	8.8	2.2	1.6	1.7	.00	e.60
30	.99	1.6	e.40	e.20	---	2.9	7.0	2.1	15	.72	.24	e.50
31	.98	---	e.35	e.20	---	2.9	---	1.1	---	.70	1.3	---
TOTAL	53.60	48.1	26.45	8.90	32.80	100.4	220.2	321.5	168.35	74.10	25.59	188.48
MEAN	1.73	1.60	.85	.29	1.17	3.24	7.34	10.4	5.61	2.39	.83	6.28
MAX	4.5	2.1	1.4	.35	2.0	10	37	111	58	13	3.0	37
MIN	.93	1.3	.35	.20	.30	1.2	2.8	1.1	.28	.23	.00	.50
AC-FT	106	95	52	18	65	199	437	638	334	147	51	374

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1991, BY WATER YEAR (WY)

	MEAN	31.4	15.8	6.39	3.62	9.45	79.4	229	152	101	62.2	40.3	32.0
MAX	291	166	38.6	35.7	111	731	2434	2559	430	367	294	296	
(WY)	1976	1980	1966	1966	1930	1966	1950	1950	1969	1969	1975	1975	
MIN	.29	.35	.66	.29	.60	1.74	1.00	1.06	1.27	.67	.23	.20	
(WY)	1990	1939	1939	1991	1939	1944	1939	1939	1931	1933	1933	1933	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1928 - 1991

ANNUAL TOTAL	985.44	1268.47	
ANNUAL MEAN	2.70	3.48	
HIGHEST ANNUAL MEAN			62.7
LOWEST ANNUAL MEAN			460
HIGHEST DAILY MEAN	35	Jun 2	2.38
LOWEST DAILY MEAN	.00	Sep 2	6170
ANNUAL SEVEN-DAY MINIMUM	.17	Sep 11	.00
INSTANTANEOUS PEAK FLOW			.00
INSTANTANEOUS PEAK STAGE			a6390
ANNUAL RUNOFF (AC-FT)	1950	2520	a15.82
10 PERCENT EXCEEDS	5.1	7.5	45420
50 PERCENT EXCEEDS	1.7	1.6	194
90 PERCENT EXCEEDS	.56	.34	5.8
			1.2

e Estimated.

a Site and datum then in use.

JAMES RIVER BASIN

06470000 JAMES RIVER AT JAMESTOWN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1950-51, 1958 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED SATUR- ATION (00301)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY (MG/L) (00310)	HARD- NESS TOTAL (MG/L AS CACO3) (00900)
NOV 20...	1400	1.5	960	7.3	5.0	4.5	4.3	10.4	80	--	340
JAN 07...	1600	0.35	1300	7.4	-15.0	0.0	4.0	--	--	--	470
FEB 19...	1100	1.1	1120	7.5	-3.0	1.5	2.3	11.5	81	--	310
MAR 19...	1300	2.7	900	--	16.0	2.5	--	--	--	--	--
MAR 27...	1055	2.7	850	--	-5.0	3.0	--	--	--	--	--
APR 02...	1200	3.1	730	--	15.0	6.0	--	--	--	--	--
APR 09...	0900	3.4	750	7.6	0.5	9.5	15	6.6	57	6.3	260
MAY 28...	1100	2.9	770	7.6	20.0	21.0	5.2	5.8	64	2.5	260
JUL 09...	0830	1.6	760	7.3	18.0	22.0	10	2.4	27	--	260
AUG 26...	1335	0.18	910	7.9	31.0	24.5	10	4.3	51	2.3	310
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- LITY 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)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
NOV 20...	81	34	84	34	2	8.6	306	190	33	0.20	586
JAN 07...	120	41	110	33	2	8.6	502	220	42	0.30	900
FEB 19...	78	27	110	43	3	7.6	350	120	84	0.20	685
APR 09...	65	23	54	31	1	6.8	214	160	30	0.20	470
MAY 28...	63	24	67	35	2	7.2	243	110	24	0.20	480
JUL 09...	62	26	68	35	2	8.1	249	120	25	0.20	473
AUG 26...	73	30	95	40	2	8.1	268	190	38	0.30	591
DATE	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	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)
NOV 20...	615	0.80	2.39	2	--	--	<0.010	--	<0.100	--	0.060
JAN 07...	846	1.22	0.85	16	--	--	<0.010	--	<0.050	--	0.540
FEB 19...	639	0.93	2.11	<1	0.052	--	0.010	--	0.062	--	0.270
APR 09...	468	0.64	4.29	38	--	0.020	<0.010	<0.050	<0.050	0.010	<0.010
MAY 28...	442	0.65	3.80	12	--	<0.010	0.010	<0.050	<0.050	<0.010	0.020
JUL 09...	459	0.64	2.06	26	--	--	<0.010	--	<0.050	--	<0.010
AUG 26...	599	0.80	0.29	12	0.210	0.020	0.010	0.220	0.220	0.130	0.120

06470000 JAMES RIVER AT JAMESTOWN, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS. (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (MG/L AS B) (01020)	CADMIUM TOTAL RECOV- ERABLE (UG/L AS CD) (01027)	CADMIUM DIS- SOLVED (UG/L AS CD) (01025)
NOV 20...	--	0.50	--	0.030	--	0.040	--	<1	290	--	<10
JAN 07...	--	1.2	--	0.100	--	0.090	--	1	390	--	10
FEB 19...	--	1.0	--	0.090	--	0.110	--	1	310	--	<10
APR 09...	0.80	0.30	0.110	0.020	0.022	<0.010	2	1	210	<1	<10
MAY 28...	0.90	0.50	0.110	0.060	0.065	0.030	3	2	240	<1	<10
JUL 09...	--	0.60	--	0.030	--	0.030	--	2	230	--	<10
AUG 26...	1.1	0.50	0.710	0.560	0.573	0.550	3	2	360	<1	<10

DATE	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	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 TOTAL SOLVED (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)
NOV 20...	1	--	12	<1	--	270	<0.1	--	<1	<3
JAN 07...	<1	--	75	<1	--	2000	<0.1	--	<2	<3
FEB 19...	1	--	77	1	--	1200	0.1	--	<1	4
APR 09...	<1	900	11	<1	1200	930	<0.1	<1	<1	9
MAY 28...	<1	360	13	<1	600	340	<0.1	<1	<1	13
JUL 09...	<1	--	12	<1	--	340	<0.1	--	<1	13
AUG 26...	<1	510	9	<1	850	780	<0.1	<1	<1	22

DATE	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)	ACETA- NALIDES SCREEN WAT, WH (UG/L) (34757)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (70953)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	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- PENDE (MG/L) (80154)
NOV 20...	--	--	<0.01	--	--	--	--	--	--	66
JAN 07...	--	--	<0.01	--	--	--	--	--	--	154
FEB 19...	--	--	<0.01	--	--	--	--	--	--	42
APR 09...	7.2	<0.010	<0.01	--	--	8.10	0.800	1120	1130	42
MAY 28...	9.3	<0.010	<0.01	<0.1	<0.1	--	--	--	--	13
JUL 09...	--	--	<0.01	<0.1	0.1	--	--	--	--	44
AUG 26...	9.3	<0.010	<0.01	--	--	6.90	1.00	2260	2290	--

DATE	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 20...	0.27	55
JAN 07...	0.15	44
FEB 19...	0.13	36
APR 09...	0.38	81
MAY 29...	0.10	--
JUL 09...	0.19	72
AUG 26...	--	--

JAMES RIVER BASIN

06470500 JAMES RIVER AT LA MOURE, ND

LOCATION.--Lat 46°21'20", long 98°18'15", in NE¹/₄, NE¹/₄, sec.11, T.133 N., R.61 W., LaMoure County, Hydrologic Unit 10160003, on left bank 80 ft downstream from bridge on State Highway 13, 0.5 mi west of LaMoure, and 12 mi upstream from Cottonwood Creek.

DRAINAGE AREA.--4,390 mi², approximately, of which about 2,600 mi² is probably noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to July 1903 (gage-height record only), April 1950 to current year. Gage-height records for 1902-11 are contained in reports of the National Oceanic and Atmospheric Administration.

REVISED RECORDS.--WSP 1917: Drainage area.

GAGE.--Water-stage recorder and rubble-masonry control. Datum of gage is 1,290.00 ft above National Geodetic Vertical Datum of 1929. See WSP 1729 or 1917 for history of changes prior to Apr. 19, 1950.

REMARKS.--Records fair except those for periods of estimated daily discharge, which are poor. Flow regulated by Arrowwood, Jim, and Pipestem Lakes and Jamestown Reservoir, combined capacity, 393,000 acre-ft. Regulation by Jamestown Reservoir (station 06469000) 85 mi upstream since 1953 and by Pipestem Lake, capacity 147,000 acre-ft, since 1973. On approximately Aug. 1, left wingwall on control structure eroded and failed. For the period Aug. 1 to Sept. 30, discharges were estimated using data from the James River at Grand Rapids, located approximately 6 mi upstream, provided by the North Dakota State Water Commission.

EXTREMES OUTSIDE PERIOD OF RECORD.--Prior to flood of Apr. 14, 1969, a long-time resident said that the flood of May 16, 1950, was the highest since 1881, with stage in either 1942 or 1943 being almost as high owing to large ice jam.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.4	11	21	5.1	3.5	9.8	19	6.3	31	125	e6.4	e3.7
2	4.7	12	21	5.1	4.1	26	17	18	22	77	e5.9	e3.6
3	6.0	7.2	21	e4.2	5.4	26	16	29	18	44	e5.7	e3.6
4	3.2	3.7	18	e4.0	7.8	14	23	35	24	31	e5.5	e3.4
5	4.8	5.7	16	e3.5	8.9	15	20	30	26	29	e5.5	e3.4
6	4.4	8.2	15	3.5	9.7	14	21	22	23	24	e5.7	e3.3
7	.12	7.1	13	3.5	11	13	19	13	19	30	e5.9	e3.1
8	.23	7.5	13	4.0	13	14	16	12	19	16	e5.7	e5.7
9	.48	8.2	12	3.5	13	13	14	15	23	19	e5.5	e5.7
10	1.0	8.2	12	3.2	13	13	7.9	17	15	13	e5.5	e5.5
11	7.5	8.6	10	3.7	14	14	31	31	11	14	e5.7	e5.3
12	1.6	8.1	12	3.8	14	16	20	15	12	17	e5.7	e5.3
13	4.4	7.9	10	3.9	14	15	25	18	11	7.5	e5.5	e5.5
14	7.7	9.0	9.2	4.2	23	14	24	15	27	4.6	e5.3	e5.1
15	2.2	11	9.2	4.3	30	14	20	114	23	6.3	e5.3	e7.6
16	4.4	9.0	9.2	4.9	14	13	18	56	9.2	11	e5.1	e7.4
17	31	7.8	9.2	4.9	11	14	18	37	19	5.3	e5.1	e7.1
18	.00	9.9	8.1	4.6	10	15	21	27	29	7.0	e4.9	e6.9
19	1.1	8.9	8.1	5.4	9.3	16	17	17	37	2.9	e4.9	e6.6
20	11	6.9	8.1	5.1	9.2	19	16	15	112	4.0	e4.7	e6.9
21	1.9	19	7.0	4.5	9.6	21	15	16	75	2.4	e4.9	e6.6
22	4.2	7.5	7.0	4.5	10	22	23	36	43	7.3	e4.9	e6.9
23	9.5	8.2	6.0	4.2	11	24	11	43	33	1.2	e4.7	e6.9
24	4.6	16	6.0	4.0	13	23	5.2	23	29	1.7	e4.5	e6.6
25	3.7	2.6	7.0	3.4	12	24	8.8	19	33	.00	e4.5	e6.9
26	9.9	12	6.0	3.1	9.9	25	8.4	26	36	.00	e4.5	e6.9
27	15	19	5.1	3.0	9.2	22	21	36	25	12	e4.4	e6.6
28	.36	19	6.0	3.5	8.9	25	18	44	28	7.1	e4.2	e6.9
29	4.7	18	6.0	3.8	---	22	31	49	27	2.7	e4.0	e6.9
30	4.9	18	5.1	3.9	---	22	38	39	86	3.0	e3.9	e6.9
31	5.9	---	4.2	3.6	---	22	---	39	---	2.1	e3.9	---
TOTAL	164.89	305.2	320.5	125.9	321.5	559.8	541.3	912.3	925.2	527.10	157.9	172.8
MEAN	5.32	10.2	10.3	4.06	11.5	18.1	18.0	29.4	30.8	17.0	5.09	5.76
MAX	31	19	21	5.4	30	26	38	114	112	125	6.4	7.6
MIN	.00	2.6	4.2	3.0	3.5	9.8	5.2	6.3	9.2	.00	3.9	3.1
AC-FT	327	605	636	250	638	1110	1070	1810	1840	1050	313	343

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1991, BY WATER YEAR (WY)

	MEAN	55.2	35.2	17.0	11.5	14.0	153	315	227	170	116	61.7	52.4
MAX	351	192	52.2	39.4	44.4	1202	1697	3114	578	825	292	291	
(WY)	1976	1980	1966	1966	1954	1966	1969	1950	1950	1962	1969	1975	
MIN	5.32	8.42	6.83	3.69	1.90	4.57	18.0	12.4	8.10	1.93	3.20	2.56	
(WY)	1991	1962	1989	1959	1959	1969	1991	1977	1973	1973	1961	1990	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1950 - 1991

ANNUAL TOTAL	4059.22	5034.39	95.9
ANNUAL MEAN	11.1	13.8	293
HIGHEST ANNUAL MEAN			11.7
LOWEST ANNUAL MEAN			1966
HIGHEST DAILY MEAN	51	Jun 8	6420
LOWEST DAILY MEAN	.00	Aug 15	.00
ANNUAL SEVEN-DAY MINIMUM	.69	Aug 15	.01
INSTANTANEOUS PEAK FLOW			6800
INSTANTANEOUS PEAK STAGE			16.17
ANNUAL RUNOFF (AC-FT)	8050	9990	69460
10 PERCENT EXCEEDS	23	27	269
50 PERCENT EXCEEDS	8.1	9.2	22
90 PERCENT EXCEEDS	2.2	3.6	7.1

e Estimated.

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1957 to current year.

PERIOD OF DAILY RECORDS.--

SPECIFIC CONDUCTANCE: October 1976 to current year.

WATER TEMPERATURE: June 1953 to September 1975, October 1976 to current year.

INSTRUMENTATION.--Temperature recorder from June 1953 to September 1978. Water-quality monitor since October 1982.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum, 2,160 microsiemens, Jan. 9, 1990; minimum, 183 microsiemens, Mar. 30, 1989.

WATER TEMPERATURE: Maximum, 33.0°C, July 12, 13, 1957; July 23, 1977; minimum, 0.0°C on many days during winter months.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 1,480 microsiemens, Dec. 16; minimum, 470 microsiemens, July 10, 11, 13, and 14.

WATER TEMPERATURE: Maximum, 29.0°C, July 17; minimum, 0.0°C on many days during winter months.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	COLOR (PLAT-INUM-COBALT UNITS) (00080)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	OXYGEN DEMAND, BIO-CHEM-ICAL, 5 DAY (MG/L) (00310)
NOV 19...	1200	7.8	1200	8.0	5.0	3.0	12	4.0	13.8	101	--
JAN 08...	1000	4.1	2350	7.5	-15.0	0.0	22	5.2	15.3	102	--
FEB 19...	1400	8.9	1270	7.6	-1.0	0.5	3	3.6	12.8	87	--
MAR 26...	1130	26	700	--	-2.0	0.5	--	--	--	--	--
APR 05...	0900	--	530	--	5.0	8.5	--	--	--	--	--
09...	1200	21	660	7.9	3.0	7.5	25	33	9.6	78	7.3
MAY 29...	1200	51	840	7.9	21.0	21.0	14	19	8.7	96	4.4
JUL 09...	1200	20	510	7.6	25.0	23.0	25	16	6.8	78	--
AUG 26...	1200	8.3	1140	8.0	33.0	25.0	20	22	9.6	115	6.1
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)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
NOV 19...	340	71	39	130	45	3	11	335	220	69	0.20
JAN 08...	740	170	76	270	44	4	19	678	460	150	0.80
FEB 19...	380	91	36	120	40	3	12	365	220	65	0.30
APR 09...	200	48	19	57	37	2	6.9	193	120	35	0.20
MAY 29...	300	69	30	68	32	2	12	280	130	35	0.20
JUL 09...	180	42	18	39	31	1	8.9	174	62	23	0.20
AUG 26...	340	76	37	92	36	2	14	290	180	68	0.30
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)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)	NITRO-GEN, NITRITE (MG/L AS N) (00615)	NITRO-GEN, NITRITE (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3 (MG/L AS N) (00630)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA (MG/L AS N) (00610)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)
NOV 19...	710	742	0.97	15.0	8	--	<0.010	--	<0.100	--	0.110
JAN 08...	1590	1550	2.16	17.4	11	--	0.010	--	<0.100	--	0.160
FEB 19...	661	765	0.90	15.8	<1	--	<0.010	--	<0.050	--	0.020
APR 09...	414	403	0.56	23.1	89	0.030	<0.010	<0.050	<0.050	0.020	<0.010
MAY 29...	543	513	0.74	75.4	43	0.030	<0.010	<0.050	<0.050	0.010	<0.010
JUL 09...	334	298	0.45	18.2	37	--	<0.010	--	<0.050	--	<0.010
AUG 26...	636	642	0.86	14.2	53	0.020	<0.010	<0.050	<0.050	0.030	0.020

JAMES RIVER BASIN

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	NITRO- GEN, AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN, AM- MONIA + ORGANIC DIS- (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC TOTAL (UG/L AS AS) (01002)	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)
NOV 19...	--	0.90	--	0.060	--	0.050	--	2	390	--	<10
JAN 08...	--	1.1	--	0.100	--	0.096	--	<1	880	--	10
FEB 19...	--	0.70	--	0.060	--	0.050	--	1	410	--	<10
APR 09...	0.90	0.30	0.140	0.030	0.056	<0.010	2	1	230	<1	<10
MAY 29...	1.6	1.5	0.180	0.090	0.118	0.050	5	4	260	<1	<10
JUL 09...	--	0.60	--	0.150	--	0.180	--	7	180	--	<10
AUG 26...	2.1	0.90	0.500	0.130	0.241	0.090	11	5	360	<1	<10

DATE	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	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 TOTAL (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01147)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, DIS- SOLVED (UG/L AS 2N) (01090)
NOV 19...	2	--	9	<1	--	71	0.1	--	<1	6
JAN 08...	1	--	30	<1	--	330	<0.1	--	<2	<10
FEB 19...	2	--	38	<1	--	740	0.1	--	<1	8
APR 09...	<1	2100	11	<1	730	450	<0.1	<1	<1	<3
MAY 29...	1	1300	10	<1	950	570	<0.1	<1	<1	<10
JUL 09...	3	--	8	<1	--	300	<0.1	--	<1	5
AUG 26...	<1	3000	<3	<1	1400	400	<0.1	<1	<1	4

DATE	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)	ACETA- NALIDES SCREEN WAT, WH (UG/L) (34757)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (70953)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)	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- PENDE (MG/L) (80154)
NOV 19...	--	--	<0.01	--	--	--	--	--	--	58
JAN 08...	--	--	<0.01	--	--	--	--	--	--	200
FEB 19...	--	--	<0.01	--	--	--	--	--	--	88
APR 09...	6.4	<0.010	<0.01	--	--	8.80	0.500	1210	1230	72
MAY 29...	13	<0.010	<0.01	<0.1	0.2	--	--	--	--	44
JUL 09...	--	--	<0.01	<0.1	<0.1	--	--	--	--	45
AUG 26...	17	<0.010	<0.01	--	--	29.0	<0.100	1190	1210	89

DATE	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
NOV 19...	1.2	8
JAN 08...	2.2	8
FEB 19...	2.1	20
APR 09...	4.0	94
MAY 29...	6.1	--
JUL 09...	2.5	85
AUG 26...	2.0	70

JAMES RIVER BASIN

287

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	1240	1210	1230	1190	1180	1180	1320	1270	1290	---	---	---
2	1240	1220	1230	1200	1160	1180	1330	1290	1300	---	---	---
3	1240	1230	1240	1170	1160	1170	1330	1310	1320	---	---	---
4	1250	1230	1240	1190	1160	1170	1370	1330	1340	---	---	---
5	1260	1240	1250	1170	1160	1170	1380	1350	1370	---	---	---
6	1260	1250	1250	1180	1170	1170	1390	1370	1380	---	---	---
7	1260	1250	1250	1190	1170	1180	1390	1370	1380	---	---	---
8	1270	1250	1260	1200	1190	1200	1380	1320	1360	---	---	---
9	1270	1250	1260	1210	1200	1210	1320	1170	1250	---	---	---
10	1280	1250	1260	1210	1190	1200	1170	1080	1120	---	---	---
11	1270	1250	1250	1220	1190	1200	1090	1080	1080	---	---	---
12	1260	1240	1250	1210	1190	1210	1190	1080	1110	---	---	---
13	1260	1250	1250	1230	1200	1210	1260	1180	1230	---	---	---
14	1280	1240	1260	1220	1200	1210	1330	1260	1300	---	---	---
15	1250	1240	1250	1210	1190	1200	1360	1320	1340	---	---	---
16	1280	1250	1260	1220	1190	1200	1480	1340	1420	---	---	---
17	1260	1240	1250	1200	1190	1190	---	---	---	---	---	---
18	1250	1240	1240	1200	1190	1190	---	---	---	---	---	---
19	1250	1240	1240	1200	1190	1190	---	---	---	---	---	---
20	1250	1230	1240	1200	1190	1190	---	---	---	---	---	---
21	1240	1230	1230	1200	1190	1200	---	---	---	---	---	---
22	1230	1220	1230	1210	1200	1200	---	---	---	---	---	---
23	1250	1200	1220	1210	1200	1200	---	---	---	---	---	---
24	1210	1190	1200	1220	1200	1200	---	---	---	---	---	---
25	1200	1180	1190	1220	1200	1200	---	---	---	---	---	---
26	1210	1180	1190	1220	1200	1210	---	---	---	---	---	---
27	1180	1170	1180	1260	1210	1230	---	---	---	---	---	---
28	1180	1170	1180	1260	1230	1240	---	---	---	---	---	---
29	1190	1170	1180	1280	1250	1260	---	---	---	---	---	---
30	1190	1170	1180	1290	1270	1280	---	---	---	---	---	---
31	1210	1170	1180	---	---	---	---	---	---	---	---	---
MONTH	1280	1170	1230	1290	1160	1200	---	---	---	---	---	---

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	---	---	---	810	770	780
2	---	---	---	---	---	---	---	---	---	810	780	790
3	---	---	---	---	---	---	530	490	500	800	780	800
4	---	---	---	---	---	---	520	500	510	800	770	790
5	---	---	---	---	---	---	560	510	540	800	760	780
6	---	---	---	---	---	---	560	540	550	760	740	760
7	---	---	---	---	---	---	570	540	560	760	740	750
8	---	---	---	---	---	---	640	560	600	770	740	750
9	---	---	---	---	---	---	670	640	660	790	760	770
10	---	---	---	---	---	---	690	670	680	810	760	780
11	---	---	---	---	---	---	720	680	700	820	770	800
12	---	---	---	---	---	---	720	690	700	850	790	820
13	---	---	---	---	---	---	700	690	690	850	810	820
14	---	---	---	---	---	---	690	670	690	860	820	840
15	---	---	---	---	---	---	700	670	690	820	720	750
16	---	---	---	---	---	---	720	690	710	730	690	700
17	---	---	---	---	---	---	720	700	700	710	640	680
18	---	---	---	---	---	---	760	710	740	640	570	600
19	---	---	---	---	---	---	740	710	730	650	590	610
20	---	---	---	---	---	---	730	710	720	730	650	690
21	---	---	---	---	---	---	730	700	720	810	700	740
22	---	---	---	---	---	---	750	720	730	840	700	770
23	---	---	---	---	---	---	760	740	750	830	790	800
24	---	---	---	---	---	---	770	750	760	840	790	820
25	---	---	---	---	---	---	790	770	770	840	780	820
26	---	---	---	---	---	---	780	750	770	880	780	830
27	---	---	---	---	---	---	770	750	760	830	780	800
28	---	---	---	---	---	---	780	760	770	820	770	780
29	---	---	---	---	---	---	780	740	760	820	770	800
30	---	---	---	---	---	---	770	740	750	870	770	820
31	---	---	---	---	---	---	---	---	---	890	770	830
MONTH	---	---	---	---	---	---	---	---	---	890	570	770

JAMES RIVER BASIN

06470500 JAMES RIVER AT LAMOUR, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	880	780	800	880	770	820	780	680	760	---	---	---
2	890	780	810	880	870	880	810	770	780	---	---	---
3	900	780	830	880	870	880	780	770	780	---	---	---
4	900	790	840	920	820	880	820	770	790	---	---	---
5	900	890	890	780	680	710	820	780	800	---	---	---
6	930	890	890	630	580	620	820	810	820	---	---	---
7	950	900	920	590	480	520	820	810	820	---	---	---
8	940	900	910	540	530	530	880	770	820	---	---	---
9	940	900	910	540	480	510	910	780	880	---	---	---
10	960	900	920	520	470	490	920	870	890	---	---	---
11	960	910	920	520	470	490	920	880	900	---	---	---
12	960	820	920	520	480	500	920	870	900	---	---	---
13	970	910	940	570	470	520	920	870	900	---	---	---
14	960	820	880	580	470	520	970	870	900	---	---	---
15	930	920	930	610	570	580	980	870	920	---	---	---
16	970	920	940	620	570	610	970	870	910	---	---	---
17	940	840	930	620	570	590	980	870	930	---	---	---
18	930	830	860	580	570	580	---	---	---	---	---	---
19	880	830	850	610	570	590	---	---	---	---	---	---
20	880	740	830	620	570	600	---	---	---	---	---	---
21	840	740	790	620	610	610	---	---	---	---	---	---
22	750	580	640	620	570	610	---	---	---	---	---	---
23	590	540	580	670	570	610	---	---	---	---	---	---
24	660	540	640	670	570	610	---	---	---	---	---	---
25	660	550	610	680	570	650	---	---	---	---	---	---
26	750	650	690	680	580	660	---	---	---	---	---	---
27	810	660	730	680	580	660	---	---	---	---	---	---
28	800	760	770	720	670	700	---	---	---	---	---	---
29	810	770	790	770	670	710	---	---	---	---	---	---
30	810	760	790	780	670	720	---	---	---	---	---	---
31	---	---	---	820	680	790	---	---	---	---	---	---
MONTH	970	540	820	920	470	640	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	14.6	11.0	12.3	9.5	7.4	8.2	1.9	.2	.9	.0	.0	.0
2	13.8	11.2	12.4	8.1	5.4	6.6	1.3	.0	.5	.0	.0	.0
3	13.0	11.4	12.1	5.3	2.7	4.1	.0	.0	.0	.0	.0	.0
4	11.2	9.9	10.7	3.0	1.6	2.4	.0	.0	.0	.0	.0	.0
5	12.6	10.1	11.2	2.3	1.0	1.6	.0	.0	.0	.0	.0	.0
6	12.3	8.6	10.0	1.7	.9	1.3	.0	.0	.0	.0	.0	.0
7	8.8	7.1	8.1	2.5	.6	1.6	.0	.0	.0	.0	.0	.0
8	9.6	7.1	8.1	2.9	2.1	2.4	.0	.0	.0	.0	.0	.0
9	8.3	6.6	7.4	3.2	2.0	2.6	.0	.0	.0	.0	.0	.0
10	8.0	5.9	7.2	3.6	2.5	3.1	.2	.0	.0	.0	.0	.0
11	7.8	6.9	7.4	3.7	2.8	3.4	.2	.0	.0	.0	.0	.0
12	7.8	6.2	7.1	3.9	2.8	3.6	1.6	.0	.3	.0	.0	.0
13	9.3	6.6	7.8	3.8	2.8	3.3	.9	.0	.3	.0	.0	.0
14	8.4	6.9	7.8	4.7	3.0	3.6	.0	.0	.0	.0	.0	.0
15	7.9	6.5	7.3	4.1	3.1	3.7	.0	.0	.0	.0	.0	.0
16	7.3	6.6	7.0	3.1	2.1	2.7	.1	.0	.0	.0	.0	.0
17	7.0	2.5	4.9	2.7	1.3	2.1	.1	.0	.0	.0	.0	.0
18	3.2	1.0	2.2	2.5	1.3	2.1	.0	.0	.0	.0	.0	.0
19	3.1	2.2	2.6	3.2	1.6	2.4	.0	.0	.0	.0	.0	.0
20	4.2	3.0	3.4	4.5	2.0	2.9	.0	.0	.0	.0	.0	.0
21	4.1	2.3	3.3	5.0	3.6	4.6	.0	.0	.0	.0	.0	.0
22	5.3	3.3	4.1	3.5	1.6	2.6	.0	.0	.0	.0	.0	.0
23	5.6	3.6	4.7	1.6	.0	.2	.0	.0	.0	.0	.0	.0
24	5.5	3.5	4.7	1.0	.0	.2	.0	.0	.0	.0	.0	.0
25	5.5	3.8	4.8	.0	.0	.0	.0	.0	.0	.0	.0	.0
26	7.4	4.7	5.9	.1	.0	.0	.0	.0	.0	.0	.0	.0
27	6.8	5.2	6.1	.4	.0	.2	.0	.0	.0	.0	.0	.0
28	6.3	4.6	5.5	1.1	.0	.4	.0	.0	.0	.0	.0	.0
29	6.5	4.7	5.8	1.1	.1	.5	.0	.0	.0	.0	.0	.0
30	7.0	4.9	6.0	.8	.0	.4	.0	.0	.0	.0	.0	.0
31	7.7	5.9	6.8	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	14.6	1.0	6.9	9.5	.0	2.4	1.9	.0	.1	.0	.0	.0

JAMES RIVER BASIN

289

06470500 JAMES RIVER AT LAMOURE, ND--CONTINUED

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.0	.0	.0	.0	.0	.0	.0	.0	.0	6.7	5.4	5.9
2	.0	.0	.0	.0	.0	.0	3.9	.0	1.7	5.0	3.8	4.5
3	.0	.0	.0	.0	.0	.0	6.6	2.1	3.9	4.6	3.5	3.9
4	.0	.0	.0	.0	.0	.0	9.7	6.3	8.1	6.7	3.3	4.8
5	.0	.0	.0	.0	.0	.0	12.6	8.6	10.3	6.1	4.8	5.5
6	.0	.0	.0	.0	.0	.0	13.1	10.3	11.6	5.8	4.1	5.0
7	.0	.0	.0	.0	.0	.0	11.9	10.5	11.1	10.8	5.1	7.3
8	.0	.0	.0	.0	.0	.0	10.4	9.1	9.7	12.0	8.1	9.8
9	.0	.0	.0	.0	.0	.0	10.0	7.3	8.7	16.8	11.4	13.8
10	.0	.0	.0	.0	.0	.0	10.5	7.7	9.1	19.3	15.8	17.4
11	.0	.0	.0	.0	.0	.0	9.6	6.6	8.1	21.1	18.0	19.5
12	.0	.0	.0	.0	.0	.0	6.5	3.8	5.0	22.2	19.3	20.8
13	.0	.0	.0	.0	.0	.0	3.6	2.1	2.7	21.1	19.0	20.3
14	.0	.0	.0	.0	.0	.0	4.8	1.7	3.0	22.3	18.7	20.4
15	.0	.0	.0	.0	.0	.0	5.6	3.4	4.5	19.9	17.8	18.6
16	.0	.0	.0	.0	.0	.0	8.3	4.4	6.2	18.7	17.3	18.1
17	.0	.0	.0	.0	.0	.0	11.3	6.8	9.0	18.8	16.1	17.5
18	.0	.0	.0	.0	.0	.0	10.0	8.5	9.3	17.6	15.0	16.4
19	.0	.0	.0	.0	.0	.0	9.4	6.6	8.0	16.9	14.5	15.8
20	.0	.0	.0	.0	.0	.0	14.0	7.2	9.9	18.6	15.3	16.7
21	.0	.0	.0	.0	.0	.0	11.1	8.4	9.8	20.8	17.3	18.8
22	.0	.0	.0	.0	.0	.0	10.0	8.3	9.3	22.8	19.5	21.0
23	.0	.0	.0	.1	.0	.0	11.6	6.3	8.6	21.5	20.0	20.8
24	.0	.0	.0	.4	.0	.1	12.1	8.3	10.2	21.5	19.5	20.4
25	.0	.0	.0	.9	.0	.2	14.9	10.9	12.7	21.7	20.0	20.9
26	.0	.0	.0	1.5	.0	.2	14.3	13.1	13.7	25.5	20.0	21.7
27	.0	.0	.0	.0	.0	.0	13.5	11.3	12.7	21.7	19.5	20.6
28	.0	.0	.0	.0	.0	.0	11.7	9.6	10.7	21.7	20.0	20.7
29	---	---	---	.0	.0	.0	10.9	8.4	9.6	24.7	19.5	21.8
30	---	---	---	.0	.0	.0	8.3	6.5	7.3	24.2	21.0	22.6
31	---	---	---	.0	.0	.0	---	---	---	26.2	21.0	23.7
MONTH	.0	.0	.0	1.5	.0	.0	14.9	.0	8.1	26.2	3.3	16.0

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	24.0	21.5	22.6	21.7	20.0	21.1	21.7	20.0	20.8	---	---	---
2	24.7	20.5	22.2	21.7	20.0	20.6	26.2	20.0	22.0	---	---	---
3	24.2	21.2	22.7	19.7	18.0	19.0	21.7	20.2	21.1	---	---	---
4	22.7	18.7	20.6	25.7	18.5	21.2	21.7	19.5	20.6	---	---	---
5	19.0	18.0	18.4	24.0	22.0	23.2	21.7	19.5	20.7	---	---	---
6	21.0	18.0	19.6	26.0	21.5	23.2	20.7	19.5	20.2	---	---	---
7	23.0	19.5	21.3	23.2	22.0	22.6	19.7	16.5	18.7	---	---	---
8	22.0	20.5	21.1	24.0	20.2	22.1	21.7	16.5	19.3	---	---	---
9	23.2	20.0	21.5	26.2	20.2	23.6	21.5	20.0	20.7	---	---	---
10	26.2	20.5	23.1	25.7	20.5	23.1	21.7	20.0	20.9	---	---	---
11	25.5	22.0	23.8	26.5	21.0	23.3	24.2	20.0	21.5	---	---	---
12	26.5	22.5	24.5	24.7	20.0	21.2	24.7	20.0	22.3	---	---	---
13	26.7	24.5	25.5	25.7	20.0	22.2	25.7	20.0	22.6	---	---	---
14	25.7	23.5	24.6	24.7	20.0	22.2	25.0	20.0	22.5	---	---	---
15	24.2	21.5	22.9	26.0	20.0	22.9	29.0	21.0	24.1	---	---	---
16	23.2	20.5	22.0	26.5	24.5	25.6	26.0	20.5	23.3	---	---	---
17	25.7	21.0	23.0	29.2	25.0	26.3	24.7	20.0	21.8	---	---	---
18	24.2	22.2	23.5	26.7	25.0	26.1	---	---	---	---	---	---
19	23.5	22.0	22.6	26.5	24.0	25.3	---	---	---	---	---	---
20	22.2	19.5	20.6	26.7	21.5	24.1	---	---	---	---	---	---
21	20.0	18.5	19.2	25.2	24.0	24.6	---	---	---	---	---	---
22	21.2	17.5	19.1	24.2	20.0	21.6	---	---	---	---	---	---
23	19.7	18.0	18.7	24.0	20.0	21.4	---	---	---	---	---	---
24	21.2	18.0	19.5	21.7	20.0	20.9	---	---	---	---	---	---
25	23.7	20.0	21.7	21.7	20.0	20.9	---	---	---	---	---	---
26	24.7	22.0	23.5	21.7	19.5	20.9	---	---	---	---	---	---
27	27.2	22.5	24.7	21.0	19.5	20.1	---	---	---	---	---	---
28	25.7	20.5	22.7	24.0	19.0	20.7	---	---	---	---	---	---
29	21.7	19.0	20.1	24.2	20.0	21.2	---	---	---	---	---	---
30	21.5	20.0	20.8	24.0	20.0	21.1	---	---	---	---	---	---
31	---	---	---	26.7	20.0	23.2	---	---	---	---	---	---
MONTH	27.2	17.5	21.9	29.2	18.0	22.4	---	---	---	---	---	---

JAMES RIVER BASIN

06470800 BEAR CREEK NEAR OAKES, ND

LOCATION.--Lat 46°13'31", long 98°04'17", in NE¹/₄NE¹/₄, sec.28, T.132 N., R.59 W., Dickey County, Hydrologic Unit 10160003, on right bank 80 ft downstream from bridge on ND Highway 13, 6 mi north, and 1 mi east of Oakes.

DRAINAGE AREA.--357 mi², of which about 255 mi² is noncontributing, revised.

WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,291.30 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records good except those for periods of estimated daily discharges, which are fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of July 1, 1975, reached a stage of 15.00 ft present datum, from floodmark, discharge 4,590 ft³/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.18	e.05	.00	.00	.00	e.44	1.4	14	13	1.3	.07
2	.00	.22	e.04	.00	.00	.00	e.43	1.3	13	12	1.0	.07
3	.00	.18	e.04	.00	.00	.00	e.42	1.4	13	10	.92	.07
4	.00	.21	e.04	.00	.00	.00	e.40	2.4	13	8.9	.81	.05
5	.00	.21	e.04	.00	.00	.00	.38	2.6	13	8.7	.77	.05
6	.00	.22	e.04	.00	.00	.00	.40	2.2	13	10	.76	.05
7	.00	.22	e.04	.00	.00	.00	.37	1.8	11	11	.69	.06
8	.00	.24	e.04	.00	.00	.00	.36	1.5	10	11	.73	.15
9	.00	.23	e.04	.00	.00	e.10	.32	1.3	10	10	.71	.24
10	.00	.23	e.04	.00	.00	e.50	.28	1.3	9.9	9.0	.64	.24
11	.00	.23	e.04	.00	.00	e.80	.25	1.4	9.4	8.0	.55	.23
12	.00	.23	e.03	.00	.00	e1.0	.28	1.4	8.6	7.4	.49	.23
13	.00	.23	e.03	.00	.00	e1.2	.35	1.4	7.6	6.8	.46	.21
14	.00	.22	e.03	.00	.00	e1.1	.52	1.6	6.9	6.6	.40	.21
15	.00	.18	e.03	.00	.00	e1.0	.63	12	6.3	5.8	.37	.20
16	.00	.12	e.03	.00	.00	e.90	.66	88	5.9	4.8	.39	.20
17	.10	.11	e.02	.00	.00	e.80	.61	60	5.8	3.7	.39	.19
18	.08	.11	e.02	.00	.00	e.70	.59	32	5.3	3.0	.35	.14
19	.10	.11	e.01	.00	.00	.68	.53	21	4.4	2.6	.33	.10
20	.13	.11	e.00	.00	.00	.73	.50	16	52	2.4	.32	.09
21	.14	.12	e.00	.00	.00	.91	.47	12	88	2.1	.31	.09
22	.13	.10	.00	.00	.00	.91	.46	11	54	1.9	.27	.11
23	.15	.10	.00	.00	.00	.88	.44	35	34	1.7	e.25	.07
24	.15	.10	.00	.00	.00	.81	.36	69	29	1.6	e.22	.08
25	.15	.09	.00	.00	.00	.73	.36	48	31	1.3	e.20	.08
26	.18	.08	.00	.00	.00	.70	.34	35	31	1.2	.18	.05
27	.22	e.07	.00	.00	.00	.62	.73	30	27	1.5	.16	.05
28	.17	e.07	.00	.00	.00	.56	1.2	24	20	4.4	.14	.05
29	.18	e.06	.00	.00	---	e.52	1.2	19	16	4.1	.13	.05
30	.18	e.06	.00	.00	---	e.46	1.4	16	14	2.6	.11	.05
31	.17	---	.00	.00	---	e.45	---	15	---	1.7	.09	---
TOTAL	2.23	4.64	0.65	0.00	0.00	17.06	15.68	566.0	576.1	178.8	14.44	3.53
MEAN	.072	.15	.021	.000	.000	.55	.52	18.3	19.2	5.77	.47	.12
MAX	.22	.24	.05	.00	.00	1.2	1.4	88	88	13	1.3	.24
MIN	.00	.06	.00	.00	.00	.00	.25	1.3	4.4	1.2	.09	.05
AC-FT	4.4	9.2	1.3	.00	.00	.34	31	1120	1140	355	29	7.0

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1991, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)	MEAN	MAX	(WY)	MIN	(WY)
1977	.092	.97	1979	.000	1977	.083	.49	1987	.000	1977	.036	.26	1987	.000	1977	.001	.021	1979	.000	1977	.047	.40	1988	.000	1977
1978																									
1979																									
1980																									
1981																									
1982																									
1983																									
1984																									
1985																									
1986																									
1987																									
1988																									
1989																									
1990																									
1991																									

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1977 - 1991

ANNUAL TOTAL	274.35	1379.13	7.90
ANNUAL MEAN	.75	3.78	.042
HIGHEST ANNUAL MEAN			32.2
LOWEST ANNUAL MEAN			1979
HIGHEST DAILY MEAN	17	88	1090
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
INSTANTANEOUS PEAK FLOW		113	1170
INSTANTANEOUS PEAK STAGE		7.78	11.47
ANNUAL RUNOFF (AC-FT)	544	2740	5720
10 PERCENT EXCEEDS	1.3	11	7.7
50 PERCENT EXCEEDS	.12	.22	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

WATER-QUALITY RECORDS

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

JAMES RIVER BASIN

06470830 JAMES RIVER AT OAKES, ND

LOCATION.--Lat 46°08'14", long 98°08'09", in NW $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$, sec.30, T.131 N., R.59 W., Dickey County Hydrologic Unit 10160003, on left bank 10 ft downstream from bridge 1.0 mi west of Oakes.

DRAINAGE AREA.--5,320 mi², of which about 3,300 mi² is probably noncontributing.

GAGE-HEIGHT RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 1,200.00 ft above National Vertical Datum of 1929. Flow regulated by Jamestown Reservoir (station 06469000).

EXTREMES FOR PERIOD OF RECORD.--Maximum daily gage height, 95.20 ft, Dec. 20, 1984; minimum, 88.11 ft, Sept. 4, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum recorded gage height, 90.78 ft, June 25; minimum recorded, 88.23 ft, Oct. 17.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	88.86	89.16	89.21	---	---	---	---	89.71	89.89	90.25	89.56	89.30
2	88.96	88.81	89.22	---	---	---	---	89.61	89.87	90.23	89.55	89.48
3	88.81	88.87	89.25	---	---	---	---	89.57	89.86	90.14	89.41	89.04
4	88.91	88.96	89.27	---	---	---	---	89.82	89.90	90.15	89.52	89.15
5	88.87	89.02	89.30	---	---	---	90.01	89.71	89.92	90.16	89.51	89.01
6	88.55	89.01	89.32	---	---	---	89.94	89.63	90.03	90.10	89.47	89.14
7	88.75	89.01	89.35	---	---	---	89.66	89.73	90.09	89.98	89.41	89.26
8	88.84	89.08	89.37	---	---	---	89.50	89.83	90.07	90.02	89.39	89.23
9	88.96	89.02	89.39	---	---	---	89.54	90.07	90.06	89.96	89.46	89.12
10	89.10	89.00	89.41	---	---	---	89.70	90.20	89.96	89.91	89.45	89.11
11	88.91	89.01	89.43	---	---	---	89.47	89.95	90.00	89.92	89.41	89.18
12	88.92	89.01	89.47	---	---	---	89.23	90.00	90.05	89.84	89.38	89.22
13	88.97	89.05	89.48	---	---	---	89.46	90.04	90.17	89.80	89.36	89.22
14	88.85	89.14	89.50	---	---	---	89.66	89.95	89.93	89.93	89.41	89.23
15	88.93	88.96	89.52	---	---	---	89.78	90.03	89.86	90.05	89.31	89.31
16	88.83	89.08	89.52	---	---	---	89.73	90.03	90.00	89.82	89.25	89.24
17	88.43	89.17	89.53	---	---	---	89.74	90.04	90.00	89.76	89.28	89.26
18	88.47	89.12	89.54	---	---	---	89.53	90.14	89.84	89.78	89.28	89.02
19	88.85	89.15	---	---	---	---	89.41	90.27	89.79	89.69	89.40	89.22
20	88.71	89.27	---	---	---	---	89.62	90.39	90.38	89.66	89.39	89.41
21	88.91	89.25	---	---	---	---	89.71	90.41	90.64	89.63	89.22	89.66
22	89.06	89.33	---	---	---	---	89.51	90.43	90.69	89.60	89.32	89.19
23	88.85	89.17	---	---	---	---	89.44	90.21	90.65	89.61	89.19	89.23
24	88.86	89.12	---	---	---	---	89.86	90.18	90.64	89.52	89.45	89.29
25	89.03	89.05	---	---	---	---	89.86	90.18	90.60	89.54	89.34	89.12
26	89.06	89.17	---	---	---	---	89.75	90.13	90.39	89.54	89.43	89.16
27	88.78	89.18	---	---	---	---	90.03	89.99	90.30	89.54	89.37	89.21
28	89.05	89.19	---	---	---	---	90.22	89.96	90.16	89.52	89.57	89.29
29	88.95	89.20	---	---	---	---	89.66	89.97	90.12	89.59	89.26	89.21
30	88.96	89.20	---	---	---	---	89.51	89.99	90.18	89.66	89.18	89.19
31	89.05	---	---	---	---	---	---	89.98	---	89.59	89.19	---
MEAN	88.87	89.09	---	---	---	---	---	90.00	90.13	89.82	89.38	89.22
MAX	89.10	89.33	---	---	---	---	---	90.43	90.69	90.25	89.57	89.66
MIN	88.43	88.81	---	---	---	---	---	89.57	89.79	89.52	89.18	89.01

JAMES RIVER BASIN

293

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983 to current year.

PERIOD OF DAILY RECORDS.--

SPECIFIC CONDUCTANCE: Water years 1982 to current year.

WATER TEMPERATURE: Water years 1982 to current year.

INSTRUMENTATION.--Water quality monitor since October 1982.

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 5,830 microsiemens, Jan. 30, 1991; minimum 180, microsiemens, Mar. 23 and 24, 1991.

WATER TEMPERATURE: Maximum, 31.7°C, Aug. 15, 1988; minimum, 0.0°C on many days during the winter months.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 5,830 microsiemens, Jan. 30; minimum, 180 microsiemens, Mar. 23 and 24.

WATER TEMPERATURE: Maximum, 30.3°C, July 17; minimum, 0.0°C, on many days during winter months.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE	PH (STAND- ARD UNITS)	TEMPER- ATURE AIR	TEMPER- ATURE WATER	TUR- BID- ITY	OXYGEN, DIS- SOLVED	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION)	OXYGEN DEMAND, BIO- CHEM- ICAL, 5 DAY	HARD- NESS TOTAL	CALCIUM DIS- SOLVED	MAGNE- SIUM, DIS- SOLVED	
		(US/CM) (00095)	(00400)	(DEG C) (00020)	(DEG C) (00010)	(NTU) (00076)	(MG/L) (00300)	(MG/L) (00301)	(MG/L) (00310)	(MG/L AS CACO3) (00900)	(MG/L AS CA) (00915)	(MG/L AS MG) (00925)	
JAN 09...	0900	4000	7.6	--	0.0	15	17.5	117	--	1300	250	160	
FEB 19...	1600	1870	7.6	0.0	0.0	3.2	17.2	116	--	500	110	54	
APR 10...	0900	770	8.3	0.0	7.0	25	12.4	100	8.7	220	49	24	
MAY 29...	0800	900	7.6	17.0	20.5	41	5.0	55	3.1	250	55	27	
JUL 09...	1500	930	7.6	27.0	23.5	34	7.6	88	--	310	66	35	
AUG 26...	1500	1060	8.3	38.0	26.5	38	--	--	6.3	360	83	37	
DATE		SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	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)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	
JAN 09...	530	47	6	34	1210	850	310	0.30	2830	2860	3.85	46	
FEB 19...	200	46	4	14	466	380	130	0.50	1200	1170	1.63	<1	
APR 10...	76	41	2	9.5	211	160	45	0.20	402	491	0.55	78	
MAY 29...	93	86	21	13	221	170	53	0.30	595	1210	0.81	101	
JUL 09...	93	36	2	46	291	160	46	0.30	609	622	0.83	73	
AUG 26...	110	39	3	12	357	180	68	0.40	752	706	1.02	98	
DATE		NITRO- GEN, NITRITE TOTAL (MG/L AS N) (00615)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	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,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO TOTAL (MG/L AS P) (70507)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)
JAN 09...	--	<0.010	--	<0.100	--	0.260	--	1.8	--	0.580	--	0.557	
FEB 19...	--	<0.010	--	<0.050	--	0.060	--	0.50	--	0.020	--	0.030	
APR 10...	0.030	<0.010	<0.050	<0.050	0.020	<0.010	0.90	0.50	0.220	0.030	0.055	<0.010	
MAY 29...	0.040	0.020	<0.050	<0.050	0.060	0.030	1.7	0.60	0.340	0.130	0.141	0.100	
JUL 09...	--	<0.010	--	<0.050	--	<0.010	--	0.90	--	0.090	--	0.100	
AUG 26...	0.010	<0.010	<0.050	<0.050	0.010	0.040	1.3	0.80	0.410	0.180	0.155	0.110	

JAMES RIVER BASIN

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	ARSENIC TOTAL (UG/L AS AS) (01002)	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)	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)
JAN 09...	--	7	1300	--	<10	4	--	20	<1	--	200	<0.1
FEB 19...	--	1	680	--	<10	2	--	12	<1	--	120	<0.1
APR 10...	2	1	270	<1	<10	1	1800	15	1	510	200	<0.1
MAY 29...	5	3	290	<1	<10	1	3100	14	<1	1300	730	<0.1
JUL 09...	--	4	270	--	<10	2	--	8	<1	--	310	<0.1
AUG 26...	6	8	440	<1	<10	<1	1700	5	<1	810	640	0.1

DATE	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)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	CYANIDE TOTAL (MG/L AS CN) (00720)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)	ACETA- NALIDES SCREEN WAT, WH (UG/L) (34757)	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS ATRAZIN (UG/L) (70953)	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)
JAN 09...	--	<2	30	--	--	<0.01	--	--	--	--	--	--
FEB 19...	--	<1	9	--	--	<0.01	--	--	--	--	--	--
APR 10...	<1	<1	10	9.9	<0.010	<0.01	--	--	9.70	0.500	1150	1160
MAY 29...	<1	<1	5	16	<0.010	<0.01	0.2	0.6	--	--	--	--
JUL 09...	--	<1	3	--	--	<0.01	<0.1	0.1	--	--	--	--
AUG 26...	<1	<1	5	21	<0.010	<0.01	--	--	43.0	<0.100	1170	1200

DATE	SEDI- MENT SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
JAN 09...	312	8
FEB 19...	90	9
APR 10...	64	94
MAY 29...	99	--
JUL 09...	150	60
AUG 26...	89	84

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	---	---	---	---	---	---	1710	1700	1710	---	---	---
2	---	---	---	---	---	---	1750	1700	1720	---	---	---
3	---	---	---	---	---	---	1770	1740	1760	---	---	---
4	---	---	---	---	---	---	1770	1750	1760	---	---	---
5	---	---	---	---	---	---	1760	1720	1740	---	---	---
6	---	---	---	---	---	---	1720	1690	1700	---	---	---
7	---	---	---	---	---	---	1790	1690	1730	---	---	---
8	---	---	---	---	---	---	1830	1800	1820	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	4210	4080	4140
11	---	---	---	---	---	---	---	---	---	4330	4210	4270
12	---	---	---	---	---	---	---	---	---	4450	4330	4400
13	---	---	---	---	---	---	---	---	---	4590	4470	4520
14	---	---	---	---	---	---	---	---	---	4670	4590	4620
15	---	---	---	---	---	---	---	---	---	4680	4670	4680
16	---	---	---	---	---	---	---	---	---	4670	4610	4650
17	---	---	---	---	---	---	---	---	---	4600	4500	4550
18	---	---	---	---	---	---	---	---	---	4490	4370	4430
19	---	---	---	---	---	---	---	---	---	4350	4230	4290
20	---	---	---	---	---	---	---	---	---	4220	4160	4180
21	---	---	---	1440	1410	1420	---	---	---	4280	4200	4230
22	---	---	---	1410	1400	1400	---	---	---	4350	4280	4310
23	---	---	---	1400	1360	1380	---	---	---	4410	4340	4370
24	---	---	---	1370	1350	1360	---	---	---	4530	4410	4460
25	---	---	---	1410	1340	1370	---	---	---	4740	4530	4620
26	---	---	---	1440	1400	1420	---	---	---	4970	4740	4850
27	---	---	---	1500	1440	1460	---	---	---	5210	4980	5080
28	---	---	---	1600	1500	1550	---	---	---	5380	5210	5290
29	---	---	---	1660	1600	1630	---	---	---	5720	5390	5540
30	---	---	---	1710	1660	1690	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	5590	5250	5400
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	5220	5010	5120	1700	1680	1690	540	330	410	930	910	920
2	5000	4790	4890	1690	1670	1680	550	520	540	950	920	940
3	4790	4550	4680	1680	1670	1680	540	510	520	960	950	950
4	4550	4310	4440	1680	990	1430	520	480	510	960	940	950
5	4290	4010	4160	960	770	840	670	480	530	950	930	940
6	4000	3760	3890	770	670	720	640	550	570	940	920	930
7	3760	3500	3630	680	560	630	660	580	620	930	920	920
8	3490	3230	3370	560	400	470	720	660	680	1090	930	960
9	3220	3000	3120	400	370	380	770	720	730	1090	1040	1070
10	2990	2770	2900	380	360	370	800	760	780	1070	1040	1050
11	2760	2450	2600	380	360	370	780	760	770	1090	1060	1070
12	2450	2260	2360	380	370	380	780	760	770	1080	1060	1070
13	2260	2110	2180	370	340	360	800	780	790	1080	1060	1070
14	2110	2000	2060	340	290	320	800	780	790	1060	1040	1050
15	2000	1950	1980	300	270	280	820	800	810	1030	1000	1020
16	1950	1910	1930	280	240	260	850	820	830	1000	980	990
17	1910	1880	1890	250	230	240	870	840	850	1010	980	990
18	1890	1870	1880	230	210	220	870	860	860	1000	980	990
19	1880	1870	1870	220	210	220	870	850	860	1000	970	980
20	1870	1860	1870	210	200	200	890	870	880	1040	990	1000
21	1870	1850	1860	210	190	200	890	860	870	1130	1040	1090
22	1850	1810	1830	210	200	210	900	880	890	1150	1120	1130
23	1810	1770	1790	220	180	200	900	870	890	1110	1030	1070
24	1770	1750	1760	200	180	190	930	900	910	1030	990	1010
25	1750	1740	1740	230	200	210	940	920	930	990	950	980
26	1740	1710	1730	250	220	230	950	940	940	980	950	960
27	1720	1700	1710	260	240	250	960	940	950	950	930	940
28	1700	1690	1700	260	250	260	970	940	950	930	910	920
29	---	---	---	270	250	260	970	930	950	920	900	910
30	---	---	---	280	260	270	930	910	920	910	890	900
31	---	---	---	330	270	290	---	---	---	920	880	900
MONTH	5220	1690	2680	1700	180	490	970	330	780	1150	880	990

JAMES RIVER BASIN

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	930	910	920	1030	1010	1020	940	930	930	1080	1050	1060
2	960	920	930	1020	970	1010	950	920	930	1070	1040	1060
3	970	940	960	980	970	970	940	910	920	1050	1030	1040
4	970	950	960	970	950	970	930	910	920	1050	1020	1040
5	980	950	960	970	940	960	920	890	900	1180	1040	1110
6	990	970	980	950	940	950	890	880	880	1260	1150	1200
7	1000	980	990	940	920	930	880	860	870	1270	1230	1250
8	990	970	980	940	920	930	870	850	860	1250	1220	1240
9	1010	980	990	930	910	920	880	850	860	1230	1200	1220
10	1020	990	1000	930	910	920	890	850	870	1210	1190	1200
11	1030	1000	1010	910	900	910	890	860	870	1220	1190	1200
12	1070	1010	1040	910	860	880	880	850	860	1240	1220	1230
13	1070	1040	1050	870	850	860	880	850	860	1250	1230	1240
14	1090	1050	1060	1120	860	980	880	860	870	1260	1230	1250
15	1080	1070	1080	1110	1080	1090	900	860	880	1250	1240	1240
16	1090	1060	1070	1120	1080	1090	890	870	880	1250	1240	1250
17	1100	1060	1080	1110	1080	1100	890	870	880	1250	1240	1250
18	1100	1070	1080	1080	1040	1060	880	850	860	1270	1250	1260
19	1090	1070	1080	1060	1020	1040	880	850	860	1290	1270	1280
20	1090	1070	1080	1060	1030	1040	890	860	870	1290	1270	1280
21	1090	1080	1080	1040	1030	1030	900	860	870	1280	1240	1260
22	1090	1080	1080	1030	1000	1020	940	890	910	1280	1250	1260
23	1100	1080	1090	1010	980	990	990	930	960	1290	1270	1290
24	1100	1090	1100	990	950	970	1020	980	1000	1310	1290	1300
25	1110	1090	1100	970	940	950	1040	1000	1010	1310	1300	1310
26	1110	1090	1100	960	940	950	1080	1020	1060	1320	1300	1310
27	1100	1070	1090	950	940	940	1100	1060	1080	1330	1310	1320
28	1070	1030	1050	960	930	940	1110	1080	1090	1350	1310	1330
29	1040	1020	1030	960	940	950	1100	1070	1080	1350	1330	1340
30	1040	1020	1030	960	940	950	1090	1060	1070	1340	1330	1340
31	---	---	---	950	920	940	1080	1050	1060	---	---	---
MONTH	1110	910	1030	1120	850	980	1110	850	930	1350	1020	1230

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	15.6	8.6	11.9	12.3	9.0	10.2	2.3	1.6	2.1	---	---	---
2	16.8	10.3	13.6	8.8	3.9	6.0	1.8	.7	1.2	---	---	---
3	13.8	9.2	11.8	3.8	.8	2.5	1.2	.9	1.1	---	---	---
4	11.5	6.4	9.2	3.2	.1	1.5	1.1	.4	.8	---	---	---
5	16.8	8.5	12.1	2.5	.6	1.6	1.9	.2	.9	---	---	---
6	11.9	5.9	7.9	2.3	.0	1.2	2.0	.4	1.2	---	---	---
7	9.2	2.7	6.1	3.9	1.0	2.3	2.6	1.2	1.7	---	---	---
8	11.5	4.7	7.9	2.7	.8	1.8	1.8	.5	1.2	---	---	---
9	10.3	4.5	7.7	3.2	.9	2.0	---	---	---	---	---	---
10	9.7	4.9	7.4	3.5	1.3	2.4	---	---	---	.2	.0	.1
11	8.2	6.0	7.2	2.9	1.0	1.7	---	---	---	.3	.1	.2
12	9.5	3.5	6.5	2.9	.8	1.8	---	---	---	.3	.1	.2
13	10.8	5.6	8.2	3.4	1.8	2.7	---	---	---	.2	.1	.2
14	9.5	5.3	7.4	3.8	1.2	2.3	---	---	---	.4	.2	.3
15	8.4	3.9	6.2	3.3	1.3	2.4	---	---	---	.5	.3	.4
16	8.3	4.5	6.5	3.3	.0	1.6	---	---	---	.5	.4	.5
17	6.9	.0	2.9	2.9	.4	1.6	---	---	---	.6	.4	.5
18	5.3	.0	2.4	2.6	.7	1.8	---	---	---	.5	.4	.5
19	4.4	1.5	2.8	3.5	1.7	2.5	---	---	---	.6	.5	.6
20	5.8	3.1	4.4	6.0	2.8	4.2	---	---	---	.7	.6	.7
21	6.4	.2	3.2	6.3	2.7	5.3	---	---	---	.7	.6	.7
22	6.1	3.2	4.4	2.4	.4	1.4	---	---	---	.6	.5	.6
23	6.4	2.9	4.6	.9	.0	.3	---	---	---	.7	.6	.6
24	7.2	3.0	4.7	1.2	.0	.7	---	---	---	.6	.3	.5
25	7.9	2.0	4.8	.6	.0	.2	---	---	---	.4	.0	.2
26	10.1	4.4	6.8	1.5	.0	.7	---	---	---	.0	.0	.0
27	8.4	4.7	6.5	2.2	1.4	1.8	---	---	---	.1	.0	.0
28	7.9	2.2	4.9	2.6	1.7	2.2	---	---	---	.1	.0	.1
29	9.1	4.0	6.5	2.4	1.9	2.2	---	---	---	.1	.0	.0
30	8.6	4.3	6.5	2.3	1.8	2.2	---	---	---	.0	.0	.0
31	10.9	5.5	8.2	---	---	---	---	---	---	.0	.0	.0
MONTH	16.8	.0	6.8	12.3	.0	2.4	---	---	---	---	---	---

JAMES RIVER BASIN

297

06470830 JAMES RIVER AT OAKES, ND--CONTINUED

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	.0	.0	.0	.0	.0	.0	1.4	.0	.5	6.2	4.8	5.4
2	.0	.0	.0	.0	.0	.0	2.5	.0	1.1	5.6	3.3	4.5
3	.1	.0	.0	.0	.0	.0	6.4	.5	3.4	4.8	3.1	3.8
4	.0	.0	.0	.0	.0	.0	9.7	4.6	7.1	8.4	3.5	5.6
5	.1	.0	.0	.0	.0	.0	12.5	7.4	9.7	7.3	5.7	6.6
6	.1	.0	.0	.0	.0	.0	14.6	10.3	12.4	6.8	4.3	5.6
7	.2	.0	.1	.0	.0	.0	12.5	10.3	11.5	12.9	5.7	8.8
8	.3	.1	.2	.0	.0	.0	11.2	8.3	9.7	14.1	9.6	11.9
9	.4	.2	.3	.0	.0	.0	10.8	6.2	8.6	18.6	12.1	15.2
10	.4	.0	.2	.0	.0	.0	11.5	7.1	9.1	19.9	16.2	18.1
11	.0	.0	.0	.0	.0	.0	9.5	5.3	7.3	21.4	17.9	19.8
12	.0	.0	.0	.0	.0	.0	5.2	2.5	3.6	23.3	19.5	21.4
13	.0	.0	.0	.0	.0	.0	2.4	1.7	2.0	21.4	18.4	20.0
14	.0	.0	.0	.0	.0	.0	5.7	1.5	3.3	22.5	18.0	20.3
15	.0	.0	.0	.0	.0	.0	6.3	3.5	5.1	20.2	18.3	18.8
16	.0	.0	.0	.0	.0	.0	9.5	4.3	6.7	19.6	17.4	18.5
17	.0	.0	.0	.0	.0	.0	11.5	6.7	9.0	19.2	16.1	17.7
18	.0	.0	.0	.0	.0	.0	12.2	8.9	10.3	18.2	14.6	16.5
19	.0	.0	.0	.1	.0	.0	11.3	5.3	8.3	17.4	14.7	16.0
20	.0	.0	.0	.0	.0	.0	13.6	6.9	9.9	20.0	15.5	17.6
21	.0	.0	.0	.0	.0	.0	12.8	8.9	11.1	22.0	17.7	19.8
22	.0	.0	.0	.0	.0	.0	11.1	7.6	9.6	23.2	20.5	21.8
23	.0	.0	.0	.0	.0	.0	12.8	5.5	8.7	21.9	20.3	21.1
24	.0	.0	.0	.2	.0	.1	13.9	8.4	11.2	22.4	19.4	20.9
25	.0	.0	.0	.4	.0	.1	16.3	10.8	13.4	22.9	19.8	21.4
26	.0	.0	.0	.5	.0	.1	15.1	13.1	14.2	24.3	20.8	22.4
27	.0	.0	.0	.5	.0	.1	13.8	11.2	12.7	23.7	20.3	22.0
28	.0	.0	.0	.1	.0	.0	12.1	9.2	10.8	23.6	20.1	21.8
29	---	---	---	.4	.0	.1	10.9	7.8	9.2	24.4	20.4	22.2
30	---	---	---	.5	.0	.1	7.8	5.7	6.9	25.0	21.0	23.0
31	---	---	---	1.0	.0	.3	---	---	---	25.9	21.0	23.6
MONTH	.4	.0	.0	1.0	.0	.0	16.3	.0	8.2	25.9	3.1	16.5

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	24.1	21.7	22.7	24.2	21.3	22.7	24.7	21.5	22.9	24.5	19.7	22.0
2	25.2	20.4	22.5	22.0	19.8	20.8	25.8	19.7	22.3	24.0	20.3	22.2
3	25.6	21.2	23.5	20.0	18.2	19.2	23.7	20.1	21.5	21.4	17.5	19.7
4	23.7	19.4	20.8	23.2	18.7	20.6	23.5	18.6	20.8	22.7	16.0	19.3
5	19.9	17.5	18.7	24.8	21.0	22.8	22.5	20.0	21.3	21.9	15.5	18.9
6	21.5	18.6	20.1	25.2	21.6	23.2	21.1	20.0	20.5	22.6	16.5	19.5
7	23.4	19.8	21.5	23.4	21.7	22.6	20.0	19.0	19.4	23.4	19.7	21.4
8	22.3	20.5	21.1	24.3	20.1	22.0	24.7	18.7	21.0	24.4	20.6	22.2
9	25.0	20.1	22.3	25.7	21.4	23.3	25.5	20.1	22.8	22.7	19.3	21.2
10	25.8	21.2	23.6	26.1	22.4	24.2	24.9	20.8	22.9	19.1	17.1	17.8
11	26.2	22.0	24.1	26.7	22.8	24.4	25.5	20.7	23.1	17.8	16.4	17.2
12	27.1	23.0	25.1	24.1	21.0	22.3	26.1	21.3	23.7	20.6	16.6	18.5
13	26.7	23.8	25.4	24.4	18.8	21.6	27.3	21.6	24.3	22.0	18.2	20.1
14	26.0	23.4	24.7	25.6	20.9	23.2	26.4	22.3	24.5	24.4	19.6	21.6
15	24.7	21.8	23.4	26.6	22.2	24.4	28.1	22.8	25.3	21.4	17.1	19.8
16	24.2	20.1	22.2	28.9	24.4	26.6	25.4	22.1	23.6	18.2	14.9	16.5
17	25.1	19.9	22.6	30.3	25.9	27.8	25.2	19.7	22.4	15.7	7.6	13.4
18	25.3	21.0	23.2	27.9	25.3	26.5	24.6	19.9	22.2	7.2	5.5	6.4
19	23.8	21.9	23.0	27.8	22.9	25.2	23.8	19.1	21.5	11.6	4.8	8.4
20	22.5	18.4	19.7	26.9	23.7	25.3	26.0	19.9	22.8	13.1	7.4	10.5
21	19.1	18.2	18.6	25.6	23.1	24.6	26.7	21.0	24.0	14.6	9.5	11.9
22	20.5	16.9	18.5	24.7	21.9	23.3	26.7	22.2	24.5	11.8	8.4	10.1
23	19.6	18.5	18.9	24.8	19.8	22.3	26.9	21.1	24.1	9.7	7.5	8.8
24	21.2	18.0	19.5	23.6	20.0	22.0	24.9	21.9	23.7	13.3	8.0	10.9
25	24.2	20.3	22.0	24.6	18.5	21.3	29.1	22.2	25.1	13.3	8.3	10.9
26	25.3	22.9	24.2	22.9	19.5	21.5	27.9	23.4	25.8	11.7	7.7	10.3
27	26.9	23.0	24.9	21.3	19.9	20.6	28.1	23.5	25.7	14.6	10.1	12.4
28	25.7	21.5	23.5	24.5	18.6	21.1	26.2	22.7	24.6	14.7	10.0	12.6
29	23.1	19.9	21.3	25.2	20.4	22.5	27.4	22.8	25.1	14.3	11.0	12.8
30	23.6	21.4	22.4	25.0	20.9	23.0	27.0	22.3	24.6	14.1	10.4	12.4
31	---	---	---	26.3	21.0	23.7	25.3	19.4	22.5	---	---	---
MONTH	27.1	16.9	22.1	30.3	18.2	23.1	29.1	18.6	23.2	24.5	4.8	15.7

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND

LOCATION.--Lat 45°56'52", long 98°10'29", in SE¹/₄, NE¹/₄, NE¹/₄, sec.34, T.129 N., R.60 W., Dickey County, Hydrologic Unit 10160003, on left bank, 10 ft upstream from dam, 4.5 mi southwest of Ludden and .8 mi upstream from North Dakota-South Dakota state line.

DRAINAGE AREA.--5,480 mi², of which about 3,300 mi² are noncontributing.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1981 to current year.

GAGE.--Water-stage recorder and concrete dam control. Datum of gage is 1,280.00 ft above National Geodetic Vertical Datum of 1929.

REMARKS.--Records fair except those for periods of estimated daily discharges, which are poor. Flow regulated by upstream reservoirs, Jamestown Reservoir (station 06469000), Pipestem Lake, capacity 147,000 acre-ft, and Lake LaMoure.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	e.15	e1.0	e11	50	52	e50	120	14	.00
2	.00	.00	.00	e.15	e6.0	e11	40	58	e45	162	12	.00
3	.00	.00	.00	e.15	e8.0	11	12	69	e60	188	30	.00
4	.00	.00	.00	e.13	e10	9.7	64	58	e45	159	2.1	.00
5	.29	.00	.00	e.11	e12	10	80	113	e30	140	.09	.00
6	.03	.00	.00	e.10	e14	8.2	93	114	e28	132	.01	.00
7	.00	.00	.00	e.10	e16	8.1	153	41	30	160	.38	.00
8	.00	.00	.00	e.10	e18	11	114	17	47	77	2.3	.00
9	.00	.00	.04	e.08	e20	12	49	1.7	99	92	.11	.00
10	.00	.00	.15	e.06	e18	12	4.2	.02	107	70	.00	.00
11	.00	.00	.43	e.04	e16	13	14	6.6	56	73	.00	.00
12	.00	.00	1.0	e.02	e14	16	50	16	26	106	.00	.00
13	.00	.00	e1.0	e.02	e12	17	16	15	12	70	.00	.00
14	.00	.00	e.80	e.01	e12	17	17	e30	57	20	.00	.04
15	.00	.46	e.50	e.01	e10	17	17	e33	91	1.1	.00	.00
16	.00	.00	e.50	e.00	e10	17	38	e35	24	31	.71	.00
17	58	.00	e.48	e.00	e10	19	34	e36	19	37	.01	.09
18	.00	.00	e.46	e.00	e11	20	91	e38	58	19	.00	4.0
19	.00	.00	e.43	e.00	e12	27	75	e38	50	19	.00	.00
20	.01	.00	e.40	e.00	e12	38	14	e40	201	20	.00	.00
21	.00	.00	e.37	e.00	e11	48	5.2	e38	316	17	.52	.00
22	.00	.00	e.34	e.00	e11	48	67	e35	299	51	.00	.41
23	.00	.00	e.30	e.00	e11	48	39	e60	265	21	.11	.00
24	.00	5.5	e.27	e.00	e11	46	1.2	e80	210	29	.00	.00
25	.00	.13	e.25	e.00	e11	48	.00	e90	165	6.6	.00	18
26	.00	.00	e.23	e.00	e11	49	.00	e100	236	.85	.00	.00
27	.01	.00	e.21	e.00	e11	67	.15	e100	209	1.5	.00	.00
28	.00	.00	e.19	e.00	e11	62	.00	e98	206	6.9	.00	.00
29	.00	.00	e.17	e.00	---	60	90	e85	170	3.8	.00	.01
30	.00	.00	e.15	e.00	---	52	165	e70	130	1.8	.00	.00
31	.00	---	e.15	e.50	---	49	---	e55	---	5.5	.00	---
TOTAL	58.34	6.09	8.82	1.73	330.0	882.0	1392.75	1622.32	3341	1841.05	62.34	22.55
MEAN	1.88	.20	.28	.056	11.8	28.5	46.4	52.3	111	59.4	2.01	.75
MAX	58	5.5	1.0	.50	20	67	165	114	316	188	30	18
MIN	.00	.00	.00	.00	1.0	8.1	.00	.02	12	.85	.00	.00
AC-FT	116	12	17	3.4	655	1750	2760	3220	6630	3650	124	45

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1991, BY WATER YEAR (WY)

	MEAN	73.5	52.2	22.7	11.7	12.2	258	436	215	145	101	71.9	62.3
MAX	206	178	71.7	45.5	51.6	800	977	579	373	227	207	210	
(WY)	1988	1988	1987	1987	1987	1987	1987	1987	1987	1987	1983	1987	
MIN	1.86	.20	.28	.056	.62	26.0	33.4	9.92	2.12	.015	.000	.011	
(WY)	1989	1991	1991	1991	1989	1990	1990	1990	1988	1988	1988	1990	

SUMMARY STATISTICS

FOR 1990 CALENDAR YEAR

FOR 1991 WATER YEAR

WATER YEARS 1982 - 1991

ANNUAL TOTAL	3067.58	9568.99	
ANNUAL MEAN	8.40	26.2	122
HIGHEST ANNUAL MEAN			312
LOWEST ANNUAL MEAN			10.3
HIGHEST DAILY MEAN	157	Apr 27	2210
LOWEST DAILY MEAN	.00	Jan 14	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Aug 11	.00
INSTANTANEOUS PEAK FLOW			433
INSTANTANEOUS PEAK STAGE			10.36
ANNUAL RUNOFF (AC-FT)	6080	18980	88440
10 PERCENT EXCEEDS	29	82	309
50 PERCENT EXCEEDS	.37	1.1	28
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated.

a About.

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1983 to current year.

PERIOD OF DAILY RECORDS.--

SPECIFIC CONDUCTANCE: October 1982 to current year.

PH: June 1983 to current year.

WATER TEMPERATURE: October 1982 to current year.

DISSOLVED OXYGEN: October 1982 to current year.

INSTRUMENTATION.--Water quality monitor since October 1982.

REMARKS.--Unpublished records for dissolved oxygen and pH are available in files at the District office for water years 1983 through 1987. No flow for many days (see table of daily mean discharges for this station).

EXTREMES FOR PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,250 microsiemens, Jan. 31, 1991; minimum recorded, 217 microsiemens, July 13, 1983.

PH: Maximum recorded, 9.7 units, Oct. 10, 1984; minimum recorded, 6.0 units, Nov. 20, 1984.

WATER TEMPERATURE: Maximum recorded, 31.3°C, July 16, 1991; minimum, 0.0°C, several days during winter months each year.

DISSOLVED OXYGEN: Maximum recorded, greater than 20 mg/L on many days; minimum recorded, 0.0 mg/L, on many days.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,250 microsiemens, Jan. 31; minimum recorded, 620 microsiemens, Apr. 9.

PH: Maximum recorded, 9.4 units, Nov. 24 and Dec. 19; minimum recorded, 7.2 units, Oct. 5, 6, and Apr. 29.

WATER TEMPERATURE: Maximum recorded, 31.3°C, July 16; minimum recorded, 0.0°C, Nov. 25 and Jan. 31.

DISSOLVED OXYGEN: Maximum recorded, greater than 20 mg/L on many days; minimum recorded, 2.4 mg/L, Dec. 10 and May 31.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE-CIFIC CONDUCTANCE (US/CM) (00095)	PH (STANDARD UNITS) (00400)	TEMPERATURE AIR (DEG C) (00020)	TEMPERATURE WATER (DEG C) (00010)	TURBIDITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATURATION) (00301)	OXYGEN DEMAND, BIO-CHEMICAL, 5 DAY (MG/L) (00310)	HARDNESS TOTAL AS CaCO3 (MG/L) (00900)	CALCIUM DIS-SOLVED AS Ca (MG/L) (00915)
JAN 08...	1300	0.10	2770	8.1	-15.0	0.0	10	12.0	80	--	690	110
FEB 20...	0930	12	2400	8.4	3.0	3.0	8.1	12.6	93	--	580	95
APR 10...	1100	0.05	660	8.5	3.0	8.5	12	11.5	96	8.7	170	35
MAY 28...	1600	97	1050	8.1	24.0	22.0	25	8.8	99	6.2	310	63
JUL 10...	0900	72	950	8.0	22.0	23.5	29	7.8	90	--	290	63
DATE		MAGNESIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORPTION RATIO (00932)	POTASSIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKALINITY LAB (MG/L AS CaCO3) (90410)	SULFATE DIS-SOLVED (MG/L AS SO4) (00945)	CHLORIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUORIDE, DIS-SOLVED (MG/L AS F) (00950)	SOLIDS, RESIDUE AT 180 DEG. C DIS-SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)
JAN 08...	100	380	53	6	30	673	620	220	0.40	1840	1870	2.50
FEB 20...	84	300	52	5	22	488	510	180	0.30	1520	1490	2.07
APR 10...	20	71	46	2	8.2	169	120	45	0.20	409	401	0.56
MAY 28...	38	110	42	3	14	267	170	53	0.20	681	609	0.93
JUL 10...	33	85	37	2	17	260	150	45	0.20	581	550	0.79
DATE		SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	RESIDUE TOTAL AT 105 DEG. C, SUS-PENDED (MG/L) (00530)	NITROGEN, NITRITE TOTAL (MG/L AS N) (00615)	NITROGEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITROGEN, NO2+NO3 TOTAL (MG/L AS N) (00630)	NITROGEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	NITROGEN, AMMONIA TOTAL (MG/L AS N) (00610)	NITROGEN, AMMONIA DIS-SOLVED (MG/L AS N) (00608)	NITROGEN, AMMONIA + ORGANIC DIS-SOLVED (MG/L AS N) (00625)	PHOSPHORUS TOTAL (MG/L AS P) (00665)	PHOSPHORUS DIS-SOLVED (MG/L AS P) (00666)
JAN 08...	0.50	17	--	<0.010	--	0.066	--	0.560	--	3.2	--	0.990
FEB 20...	48.0	2	--	<0.010	--	<0.050	--	0.050	--	2.3	--	1.10
APR 10...	0.05	21	<0.010	<0.010	<0.050	<0.050	0.010	<0.010	1.0	0.40	0.170	0.040
MAY 28...	178	60	0.030	<0.010	<0.050	<0.050	0.020	0.020	2.0	0.60	0.140	0.040
JUL 10...	113	66	--	<0.010	--	<0.050	--	0.020	--	0.80	--	0.030

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	PHOS- PHORUS ORTHO	PHOS- PHORUS ORTHO, DIS-	ARSENIC TOTAL (UG/L AS AS) (01002)	ARSENIC DIS-	BORON, DIS-	CADMIUM TOTAL RECOV-	CADMIUM DIS-	COPPER, DIS-	IRON, TOTAL RECOV-	IRON, DIS-	LEAD, DIS-	MANGA- NESE, TOTAL RECOV-
	SOLVED	SOLVED		SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED
	(MG/L AS P) (70507)	(MG/L AS P) (00671)		(UG/L AS AS) (01000)	(UG/L AS B) (01020)	(UG/L AS CD) (01027)	(UG/L AS CD) (01025)	(UG/L AS CU) (01040)	(UG/L AS FE) (01045)	(UG/L AS FE) (01046)	(UG/L AS PB) (01049)	(UG/L AS MN) (01055)
JAN 08...	--	0.975	--	7	960	--	<10	2	--	40	<1	--
FEB 20...	--	0.790	--	5	750	--	<10	2	--	<10	<1	--
APR 10...	0.050	0.020	1	1	220	<1	<10	1	520	7	<1	240
MAY 28...	0.106	0.030	4	3	340	<1	<10	1	1400	6	<1	540
JUL 10...	--	0.040	--	5	260	--	<10	2	--	6	<1	--
DATE	MANGA- NESE, DIS-	MERCURY DIS-	SELE- NIUM, TOTAL	SELE- NIUM, DIS-	ZINC, DIS-	CARBON, ORGANIC TOTAL	CYANIDE TOTAL	CYANIDE DIS-	ACETA- NALIDES SCREEN	DICAMBA (MED- IBEN) (BAN-	PICLO- RAM (TOR- DON)	SILVEX, TOTAL (UG/L) (39760)
	SOLVED	SOLVED	SELE- NIUM, TOTAL	SOLVED	SOLVED	SOLVED	SOLVED	SOLVED	WAT, WH REC	VEL D)	(AMDON)	
	(UG/L AS MN) (01056)	(UG/L AS HG) (71890)	(UG/L AS SE) (01147)	(UG/L AS SE) (01145)	(UG/L AS ZN) (01090)	(MG/L AS C) (00680)	(MG/L AS CN) (00720)	(MG/L AS CN) (00723)	(UG/L) (82052)	TOTAL (UG/L) (39720)	TOTAL (UG/L) (39760)	
JAN 08...	50	<0.1	--	<2	<10	--	--	<0.01	--	--	--	--
FEB 20...	30	<0.1	--	<1	<10	--	--	<0.01	--	--	--	--
APR 10...	6	<0.1	<1	<1	<3	6.4	<0.010	<0.01	--	--	--	--
MAY 28...	26	<0.1	<1	<1	3	12	<0.010	<0.01	<0.1	<0.01	<0.01	<0.01
JUL 10...	4	<0.1	--	<1	<3	--	--	<0.01	<0.1	<0.01	<0.01	<0.01
DATE	TRIAZIN SCREEN (ELISA) WAT, WH REC, AS	2,4-D, TOTAL	2, 4-DP TOTAL	2,4,5-T TOTAL	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM	PLANK- TON BIOMASS ASH WT	PLANK- TON BIOMASS DRY WT	SEDI- MENT, SUS- PENDE	SEDI- MENT, DIS- CHARGE, SUS- PENDE	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	
	ATRAZIN (UG/L) (34757)	(UG/L) (39730)	(UG/L) (82183)	(UG/L) (39740)	(UG/L) (70953)	(UG/L) (70954)	(MG/L) (81353)	(MG/L) (81354)	(MG/L) (80154)	(T/DAY) (80155)		
	(34757)	(39730)	(82183)	(39740)	(70953)	(70954)	(81353)	(81354)	(80154)	(80155)	(70331)	
JAN 08...	--	--	--	--	--	--	--	--	92	0.02	24	
FEB 20...	--	--	--	--	--	--	--	--	15	0.47	43	
APR 10...	--	--	--	--	10.0	0.500	1140	1160	36	0.00	71	
MAY 28...	0.2	0.12	<0.01	<0.01	--	--	--	--	60	16	--	
JUL 10...	0.3	<0.01	<0.01	<0.01	--	--	--	--	79	15	81	

301

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

SPECIFIC CONDUCTANCE, MICROSIEMENS/CM AT 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

PH (STANDARD UNITS), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

PH (STANDARD UNITS), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991[illegible]

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

JAMES RIVER BASIN

305

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	7.9	3.3	5.5	---	---	---	---	---	---	---	---	---
6	8.5	3.5	6.3	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	8.6	3.9	6.7	---	---	---
10	---	---	---	---	---	---	8.7	2.4	4.9	---	---	---
11	---	---	---	---	---	---	7.8	2.7	5.7	---	---	---
12	---	---	---	---	---	---	11.0	5.1	8.5	---	---	---
13	---	---	---	---	---	---	11.2	9.0	9.9	---	---	---
14	---	---	---	---	---	---	10.0	7.2	8.7	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	9.9	6.9	8.8	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	8.9	7.4	8.1	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	16.5	11.4	14.8	---	---	---	---	---	---
25	---	---	---	13.8	8.3	11.1	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	8.7	6.7	7.6	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	11.4	9.6	10.7	>20.0	18.6	19.9	12.1	10.8	11.5
2	---	---	---	13.2	11.1	12.0	19.0	14.4	17.5	13.0	11.3	12.2
3	---	---	---	15.7	12.9	13.9	14.4	9.2	12.2	12.2	11.6	12.0
4	---	---	---	15.6	13.4	14.6	11.0	8.3	10.3	12.2	11.3	11.8
5	---	---	---	16.5	14.0	15.4	11.4	6.5	9.5	12.1	11.5	11.9
6	---	---	---	18.7	15.6	17.1	11.7	10.0	11.0	12.3	11.3	11.8
7	---	---	---	>20.0	18.5	19.6	11.0	10.2	10.6	12.2	11.1	11.6
8	---	---	---	---	---	---	11.3	10.0	10.6	10.9	7.5	9.4
9	---	---	---	---	---	---	11.9	7.9	10.4	9.1	6.1	7.7
10	---	---	---	>20.0	>20.0	>20.0	13.1	7.0	10.5	9.0	5.5	7.1
11	---	---	---	>20.0	>20.0	>20.0	12.5	6.3	10.0	7.5	2.5	4.9
12	---	---	---	>20.0	>20.0	>20.0	14.2	12.4	13.3	8.0	3.6	5.6
13	---	---	---	>20.0	>20.0	>20.0	14.2	13.4	13.8	8.7	3.4	5.1
14	---	---	---	>20.0	>20.0	>20.0	15.5	13.5	14.5	7.9	5.0	6.3
15	---	---	---	20.0	18.9	19.4	15.0	13.9	14.4	6.9	5.6	6.2
16	---	---	---	19.5	17.3	18.4	14.4	13.1	13.8	8.2	5.8	7.0
17	---	---	---	18.9	17.3	18.2	14.6	12.9	13.6	9.0	6.5	7.7
18	---	---	---	>20.0	17.9	19.3	13.6	12.0	12.8	9.0	7.0	8.0
19	---	---	---	>20.0	17.7	19.8	13.3	11.7	12.4	8.1	6.6	7.5
20	---	---	---	>20.0	>20.0	>20.0	13.5	11.8	12.7	8.1	5.8	7.1
21	12.5	9.1	11.1	>20.0	19.2	19.8	13.2	11.1	12.0	---	---	---
22	9.9	8.0	8.5	19.8	18.4	19.2	12.1	10.5	11.4	6.7	4.2	5.4
23	9.3	7.5	8.4	18.9	13.5	16.1	12.9	11.3	12.0	7.1	3.2	5.3
24	10.0	8.6	9.2	>20.0	18.7	19.4	11.8	9.5	10.8	9.0	4.9	6.8
25	10.5	9.5	10.0	>20.0	18.3	19.5	---	---	---	7.6	5.1	6.3
26	11.0	10.2	10.6	19.8	16.1	18.3	---	---	---	7.1	4.3	5.4
27	10.9	9.3	10.2	18.8	15.3	16.3	9.7	4.1	7.2	6.7	3.4	4.9
28	11.0	9.7	10.2	19.6	17.3	18.5	---	---	---	6.8	3.1	4.7
29	---	---	---	>20.0	17.5	18.7	11.1	6.6	9.5	5.6	3.2	4.3
30	---	---	---	19.3	16.0	18.1	11.7	10.8	11.2	4.1	2.4	3.3
31	---	---	---	>20.0	15.8	18.5	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

> Actual value is known to be greater than the value shown.

JAMES RIVER BASIN

06470875 JAMES RIVER AT DAKOTA LAKE DAM NEAR LUDDEN, ND--CONTINUED

OXYGEN DISSOLVED (MG/L), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

[illegible]

JAMES RIVER BASIN

307

06470878 JAMES RIVER AT ND-SD STATE LINE

LOCATION.--Lat 45°56'10", long 98°10'26", in SE¹/₄, SE¹/₄, 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.

DRAINAGE AREA.--5,480 mi², approximately, revised, of which about 3,300 mi² is probably noncontributing.

GAGE HEIGHT 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, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum, 89.76 ft, June 22; minimum observed, 87.03 ft, Sept. 24.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	87.58	87.64	---	---	---	---	---	88.72	88.98	89.21	88.16	87.56
2	87.69	87.52	---	---	---	---	---	88.69	88.93	89.18	88.11	87.58
3	87.58	87.47	---	---	---	---	---	88.70	88.88	89.19	88.10	87.56
4	87.54	87.45	---	---	---	---	---	88.89	89.02	89.18	88.07	87.52
5	87.53	87.45	---	---	---	---	---	88.84	88.96	89.13	88.11	87.50
6	87.49	87.44	---	---	---	---	---	88.81	88.91	89.07	88.10	87.49
7	87.46	87.43	---	---	---	---	---	88.85	88.88	89.01	88.04	87.48
8	87.45	87.43	---	---	---	---	88.14	88.91	88.83	88.98	87.95	87.48
9	87.47	87.42	---	---	---	---	88.17	89.11	88.82	88.87	87.92	87.49
10	87.65	87.41	---	---	---	---	88.35	89.26	88.82	88.79	87.93	87.47
11	87.64	87.40	---	---	---	---	88.26	88.94	88.77	88.73	87.90	87.46
12	87.53	87.39	---	---	---	---	88.10	88.91	88.74	88.70	87.87	87.45
13	87.59	87.39	---	---	---	---	88.27	88.91	88.77	88.68	87.84	87.44
14	87.52	87.43	---	---	---	---	88.39	88.84	88.77	88.64	87.82	87.43
15	87.50	87.44	---	---	---	---	88.46	88.96	88.72	88.69	87.79	87.45
16	87.50	87.42	---	---	---	---	88.43	89.02	88.73	88.53	87.75	87.44
17	87.48	87.41	---	---	---	---	88.44	89.04	88.75	88.43	87.71	87.43
18	87.45	87.42	---	---	---	---	88.37	89.02	88.68	88.42	87.68	87.42
19	87.45	87.41	---	---	---	---	88.32	89.03	88.65	88.33	87.66	---
20	87.45	87.48	---	---	---	---	88.44	89.06	89.00	88.35	87.70	---
21	87.44	87.55	---	---	---	---	88.52	89.03	89.56	88.31	87.66	---
22	87.52	87.49	---	---	---	---	88.39	88.99	89.74	88.42	87.62	---
23	87.51	87.48	---	---	---	---	88.36	89.15	89.72	88.41	87.64	---
24	87.48	87.46	---	---	---	---	88.66	89.16	89.64	88.37	87.67	---
25	87.50	87.43	---	---	---	---	88.74	89.11	89.52	88.34	87.68	---
26	87.57	87.42	---	---	---	---	88.71	89.05	89.42	88.36	87.65	---
27	87.51	---	---	---	---	---	88.81	89.04	89.42	88.35	87.64	---
28	87.51	---	---	---	---	---	88.95	89.01	89.36	88.30	87.66	---
29	87.58	---	---	---	---	---	88.57	88.98	89.32	88.29	87.67	---
30	87.49	---	---	---	---	---	88.63	88.96	89.24	88.31	87.61	---
31	87.49	---	---	---	---	---	---	88.98	---	88.24	87.58	---
MEAN	87.52	---	---	---	---	---	---	88.97	89.05	88.64	87.82	---
MAX	87.69	---	---	---	---	---	---	89.26	89.74	89.21	88.16	---
MIN	87.44	---	---	---	---	---	---	88.69	88.65	88.24	87.58	---

LOCATION.--Lat 45°53'34", long 98°10'13", in SW¹/₄, SE¹/₄, SE¹/₄ sec. 16, T.128 N., R.61 W., Brown County, South Dakota, Hydrologic Unit 10160003, on left bank 30 ft upstream from bridge on county road 1.0 mi northwest of Hecla, South Dakota, and 3.0 mi downstream from the North Dakota - South Dakota border.

GAGE HEIGHT RECORDS

REMARKS.--Records good.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 87.74, Oct. 2; minimum, 86.88 ft, Oct. 17.

[illegible]

JAMES RIVER BASIN

309

06470980 JAMES RIVER NEAR HECLA, SD--CONTINUED

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1985 to current year.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	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)	OXYGEN, DIS- SOLVED (MG/L) (00300)	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)
JAN 08...	1500	3500	8.0	-15.0	0.0	12	>20.0	860	130	130	490
DATE	SODIUM PERCENT (00932)	SODIUM RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINIT 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)	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)	
JAN 08...	54	7	41	688	890	290	0.30	2360	2390	3.21	
DATE	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDE (MG/L) (00530)	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, AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS 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)	
JAN 08...	40	<0.010	<0.100	0.090	3.3	0.080	0.022	1	1200	<10	
DATE	COPPER, DIS- SOLVED (UG/L AS CU) (01040)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LEAD, DIS- SOLVED (UG/L AS PB) (01049)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CYANIDE DIS- SOLVED (MG/L AS CN) (00723)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	
JAN 08...	3	50	<1	60	<0.1	<2	10	<0.01	144	15	

06471200 MAPLE RIVER AT NORTH DAKOTA-SOUTH DAKOTA STATE LINE

LOCATION.--Lat 45°56'20", long 98°27'08", in SW¹/₄SE¹/₄, 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 mi², of which about 332 mi² is probably noncontributing.

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

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

GAGE.--Water-stage recorder and crest-stage gages. 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. Water temperature and specific conductance measured during the year are published by the South Dakota District office in report SD-91-1 in this report series. The table shown below is in the format used in past years and optional for the 1991 water year. Beginning with the 1992 water year, the new format will be mandatory for all daily discharge records published in this report series.

AVERAGE DISCHARGE.--35 years, 19.2 ft³/s, 13,910 acre-ft/yr; median of yearly mean discharges, 11 ft³/s, 8,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,930 ft³/s, Apr. 11, 1969; maximum gage height, 16.05 ft, Apr. 11, 1969, backwater from ice; no flow for long periods in each year.

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

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 18	0500	59	4.66	June 26	1500	126	5.29
May 24	1100	*174	*5.65	July 21	1700	56	4.62
June 22	1800	84	4.93				

No flow for many months.

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	19	52	1.4	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	16	42	1.3	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	15	34	1.1	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	16	28	.78	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	14	26	.65	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	12	32	.61	.00
7	.00	.00	.00	.00	.00	.00	.00	.00	10	47	.58	.00
8	.00	.00	.00	.00	.00	.00	.00	.00	9.1	45	.53	.00
9	.00	.00	.00	.00	.00	.00	.00	.00	8.9	38	.42	.00
10	.00	.00	.00	.00	.00	.00	.00	.00	7.2	30	.35	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	5.7	27	.28	.00
12	.00	.00	.00	.00	.00	.00	.00	.00	4.2	24	.22	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	3.2	23	.16	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	4.3	21	.10	.00
15	.00	.00	.00	.00	.00	.00	.00	17	3.9	19	.08	.00
16	.00	.00	.00	.00	.00	.00	.00	14	2.8	17	.07	.00
17	.00	.00	.00	.00	.00	.00	.00	19	2.2	15	.04	.00
18	.00	.00	.00	.00	.00	.00	.00	55	2.1	13	.02	.00
19	.00	.00	.00	.00	.00	.00	.00	35	1.9	12	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	25	31	11	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	21	43	20	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	23	77	15	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	108	75	6.3	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	167	54	4.5	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	123	68	3.6	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	77	121	3.2	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	53	121	2.8	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	39	108	2.6	.00	.00
29	.00	.00	.00	.00	---	.00	.00	32	85	2.1	.00	.00
30	.00	.00	.00	.00	---	.00	.00	25	68	1.8	.00	.00
31	.00	---	.00	.00	---	.00	---	21	---	1.5	.00	---
TOTAL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	854.00	1008.5	619.4	8.69	0.00
MEAN	.000	.000	.000	.000	.000	.000	.000	27.5	33.6	20.0	.28	.000
MAX	.00	.00	.00	.00	.00	.00	.00	167	121	52	1.4	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	1.9	1.5	.00	.00
AC-FT	.00	.00	.00	.00	.00	.00	.00	1690	2000	1230	17	.00

CAL YR 1990	TOTAL	0.00	MEAN	.000	MAX	.00	MIN	.00	AC-FT	.00
WTR YR 1991	TOTAL	2490.59	MEAN	6.82	MAX	167	MIN	.00	AC-FT	4940

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 U.S. 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. In addition, discharge measurements are made at other site not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at crest-stage partial-record stations are presented in the following table. Discharge measurements made at low-flow partial-record sites and at miscellaneous sites and for special studies are given in separate tables.

Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage gage is a device that 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 it 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.

Annual maximum discharge at crest-stage partial-record stations

Station name and number	Location	Period of record	Water year 1991 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
RED RIVER OF THE NORTH BASIN								
Red River at Grand Forks, ND 05082500	Lat 47°56'34", long 97°03'10", in SW ¹ / ₄ NE ¹ / ₄ sec.33, T.152 N., R.50 W., Grand Forks County, Hydrologic Unit 09020301, on left bank 2.3 mi downstream from Red Lake River (previous site of Red River at Grand Forks). Drainage area is 30,100 mi ² .	1882-1983, 1987-91	07-08-91	---	4,870	4-10-1897	50.2	85,000
Red River of the North at Oslo, MN 05083500	Lat 48°11'40", long 97°08'30", in SW ¹ / ₄ SW ¹ / ₄ sec.36, T.155 N., R.51 W., Walsh County, Hydrologic Unit 09020306, on bridge crossing the Red River 0.5 mi west of Oslo, MN. Drainage area is 31,200 mi ² .	1936-37 [#] , 1941-43 [#] , 1945-60 [#] , 1985-91	07-10-91	12.04	5,200	05-10-50	31.83	63,000
Red River of the North at Pembina, ND 05102490	Lat 48°58'17", long 97°14'16", in NE ¹ / ₄ sec.4, T.163 N., R.51 W., Pembina County, Hydrologic Unit 09020311, on bridge crossing the Red River 0.2 mi north of Pembina. Drainage area is 40,200 mi ² .	1985-91	07-12-91	757.59	5,690	04-23-89	785.30	38,400
Bonnes Coulee at Velva, ND 05119410	Lat 48°03'30", long 100°57'00", in NE ¹ / ₄ SW ¹ / ₄ sec. 21, T.153 N., R.80 W., McHenry County, at culvert on U.S. Highway 52, 0.5 mi west of Velva. Drainage area is 53.0 mi ² .	1962, 1965, 1971-73, 1976-77, 1987-91	04-15-91	.48	*6.0	07-03-90	3.65	600
MISSOURI RIVER BASIN								
West Branch Otter Creek near Beulah, ND 06340200	Lat 47°08'05", long 101°39'35", in NW ¹ / ₄ NW ¹ / ₄ SW ¹ / ₄ sec.12, T.142 N., R.87 W., Oliver County Hydrologic Unit 10130201, on right bank 10 mi northeast of Beulah. Drainage area is 26.5 mi ² .	1965-83 [#] , 1984-91	03-19-91	2.96	.08	06-24-66	17.20	23,700

Operated as a continuous-record gaging station.

a Estimated.

DISCHARGE MEASUREMENTS AT PARTIAL RECORD AND MISCELLANEOUS SITES

Annual maximum discharge at crest-stage partial-record stations--Continued

		Water year 1991 maximum				Period of record maximum		
Station name and number	Location	Period of record	Date	Gage height (ft)	Dis- charge (ft ³ /s)	Date	Gage height (ft)	Dis- charge (ft ³ /s)
MISSOURI RIVER BASIN--Continued								
Elm Creek near Golden Valley, ND 06339490	Lat 47°06'25", long 102°03'05", in SE ¹ / ₄ NW ¹ / ₄ sec.23, T.142 N., R.90 W., Mercer County, Hydrologic Unit 10130201, at bridge on county road, 13.5 mi south of Golden Valley. Drainage area is 82.0 mi ² .	1967-81*, 1982-91	09-18-91	3.89	15	05-08-70	23.55	10,000
Heart River near South Heart, ND 06343000	Lat 46°51'56", long 102°56'53", in NE ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ sec.8, T.139 N., R.97 W., Stark County, Hydrologic Unit 10130202, on left bank 1.7 mi downstream from North Creek, 2 mi east of South Heart and 5.5 mi upstream from Edward Arthur Patterson Lake. Drainage area is 311 mi ² .	1965-84*, 1985-91	06-21-91	4.07	15	05-09-70	22.77	8,080

[#] Operated as a continuous-record gaging station.

Miscellaneous discharge measurement sites

Measurements of streamflow at points other than gaging stations are given in the following table.

Discharge measurements made at miscellaneous sites during water year 1991

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
RED RIVER OF THE NORTH BASIN						
Sheyenne River ^a	Red River of the North	Lat 46°37'48", long 97°56'22", in NW ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ sec.2, T.136 N., R.58 W., Ransom County, Hydrologic Unit 09020204, on Hwy. 46 bridge, 3 mi south of Kathryn.	---	1989-90	04-25-91	11.6
					05-21-91	21.6
					06-18-91	42.5
					07-16-91	49.3
					08-13-91	24.7
					09-11-91	37.6
Sheyenne River ^a	Red River of the North	Lat 46°22'02", long 97°33'47", in NW ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ sec.2, T.133 N., R.55 W., Ransom County, Hydrologic Unit 09020204, 150 ft upstream from bridge on county road, 7.4 mi southeast of Lisbon at river mi 148.	---	1963 ^b , 1983-90	10-04-90	54.0
					04-25-91	17.8
					05-21-91	45.5
					06-18-91	48.4
					07-16-91	45.2
					08-13-91	22.1
09-11-91	47.0					
Sheyenne River ^a	Red River of the North	Lat 46°30'54", long 97°29'23", in SE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ sec.8, T.135 N., R.54 W., Ransom County, Hydrologic Unit 09020204, 30 ft upstream from county highway bridge, 5 mi south of Sheldon at river mi 114.	---	1963 ^b , 1983-90	10-04-90	55.0
					04-24-91	26.4
					05-21-91	54.5
					06-18-91	57.3
					07-17-91	33.1
					08-13-91	19.5
09-11-91	56.1					
Sheyenne River ^a	Red River of the North	Lat 46°31'01", long 97°20'33", in NW ¹ / ₄ SW ¹ / ₄ SW ¹ / ₄ sec.10, T.135 N., R.53 W., Ransom County, Hydrologic Unit 09020204, on bridge, 7 mi east and 5 mi south of Sheldon.	---	1983-90	10-04-90	66.7
					04-24-91	44.5
					05-22-91	61.8
					06-19-91	54.1
					07-17-91	38.1
					08-14-91	14.0
09-11-91	83.0					
Turtle River ^a	Red River of the North	Lat 47°56'18", long 97°29'59", in NE ¹ / ₄ NW ¹ / ₄ SE ¹ / ₄ sec.36, T.152 N., R.54 W., Grand Forks County, Hydrologic Unit 09020307, 1 mi north of Arvilla in Turtle River State Park.	---	---	04-24-91	8.18
					05-07-91	22.2
					05-22-91	9.83
					06-19-91	5.61
					08-14-91	3.00
					09-10-91	5.34
Turtle River ^a	Red River of the North	Lat 48°01'27", long 97°21'47", in NE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ sec.31, T.153 N., R.53 W., Grand Forks County, Hydrologic Unit 09020307, 0.5 mi north of Mekinock.	---	---	04-24-91	10.5
					05-08-91	26.9
					05-22-91	11.0
					06-19-91	5.57
					07-11-91	31.5
					08-14-91	2.40
South Branch Turtle River ^a	Turtle River	Lat 47°55'51", long 97°37'24", in NE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ sec.1, T.151 N., R.55 W., Grand Forks County, Hydrologic Unit 09020307, 1.5 mi north of Larimore.	---	---	04-24-91	2.99
					05-07-91	4.62
					05-22-91	2.79
					07-10-91	12.8
					08-14-91	1.97
					09-10-91	2.53
North Branch Turtle River ^a	Turtle River	Lat 47°59'34", long 97°37'27", in NE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ sec.12, T.152 N., R.55 W., Grand Forks County, Hydrologic Unit 09020307, 5.5 mi north of Larimore.	---	---	04-24-91	3.28
					05-07-91	9.70
					05-22-91	3.94
					06-19-91	1.42
					07-10-91	5.58
					08-14-91	1.05
09-10-91	1.35					
Red River nr Joliet, ND ^b 05092400	Red River of the North	Lat 48°47'15", long 97°09'27", in NE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ sec.7, T.161 N., R.50 W., Pembina County, Hydrologic Unit 09020311, at Hwy. 5 bridge, 4 mi east of Interstate 29.	---	---	03-14-91	341
Souris River ^a	Assiniboine River	Lat 48°07'29", long 100°44'57", in SW ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ sec.30, T.154 N., R.78 W., McHenry County, Hydrologic Unit 09010003, 0.5 mi west of Verendrye.	---	---	04-23-91	16.5
					05-07-91	18.1
					05-23-91	17.8
					06-20-91	15.3
					07-11-91	12.3
					08-15-91	11.5
					09-10-91	3.35

a Current year measurements furnished by and previous measurement data available from the North Dakota State Water Commission unless otherwise noted.

b Data collected by the U.S. Geological Survey.

DISCHARGE MEASUREMENTS AT PARTIAL RECORD AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1991--Continued

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
MISSOURI RIVER BASIN						
East Fork Shell Creek near mouth below Parshall, ND ^b 06332524	Missouri River Mainstem	Lat 47°56'02", long 102°15'47", in NE ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ sec.1, T.151 N., R.91 W., Mountrail County, Hydrologic Unit 10110101, 5.5 mi west and 1 mi south of Parshall.	376	1990	10-26-90 11-11-90 03-28-91 04-24-91 05-20-91 06-25-91	0.18 .09 3.65 1.81 1.63 3.47
Deepwater Creek at mouth near Raub, ND ^b 06332770	Missouri River Mainstem	Lat 47°43'15", long 102°06'14", in NE ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ sec.7, T.149 N., R.89 W., McLean County, Hydrologic Unit 10110101, 5 mi west and 0.6 mi south of Raub.	220	1990	03-28-91 04-24-91 05-20-91 06-25-91 07-10-91	4.28 2.01 2.18 1.43 .46
Little Missouri River ^a	Missouri River	Lat 46°35'33", long 103°30'53", in SE ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ sec.17, T.136 N., R.12 W., Slope County, Hydrologic Unit 10110203, 10 mi west and 8 mi north of Amidon.	---	1985-90	11-01-90 05-02-91 05-29-91 06-27-91 07-24-91 08-21-91 09-20-91	6.00 527 224 435 4.84 13.8 19.6
Little Missouri River at Medora, ND ^a 06336000	Missouri River	Lat 46°55'10", long 103°31'40", in NE ¹ / ₄ NW ¹ / ₄ NE ¹ / ₄ sec. 27, T.140 N., R.102 W., Billings County, Hydrologic Unit 10110203, on bridge on county highway in Medora.	6,190	1903-08 [#] , 1921-24 [#] , 1928-34 [#] , 1945-75 [#] , 1976 ^b , 1985-90	03-27-91 05-02-91 05-29-91 06-27-91 07-24-91 08-21-91 09-20-91	50.6 429 221 1,055 14.3 36.9 47.3
Moccasin Creek at mouth near Mandaree, ND ^b 06337470	Little Missouri River	Lat 47°36'00", long 102°30'38", in NE ¹ / ₄ SW ¹ / ₄ NE ¹ / ₄ sec.34, T.147 N., R.93 W., Dunn County, Hydrologic Unit 109110205, 10 mi south and 8 mi east of Mandaree.	53	1990	10-23-90 11-15-90 04-02-91 04-23-91 05-16-91 06-24-91	.02 .02 .12 .15 .41 .02
Squaw Creek above mouth near Mandaree, ND ^b 06337480	Little Missouri River	Lat 47°38'27", long 102°30'40", in NW ¹ / ₄ SW ¹ / ₄ NE ¹ / ₄ sec.15, T.148 N., R.93 W., Dunn County, Hydrologic Unit 10110205, 7 mi south and 8 mi east of Mandaree.	58	1990	11-15-90 04-02-91 04-23-91 05-16-91 06-24-91 07-18-91	0 .81 .06 .01 .07 0
Missouri River ^b	Missouri River Mainstem	Lat 47°29'42", long 101°25'49", in NW ¹ / ₄ SE ¹ / ₄ NW ¹ / ₄ sec.6, T.146 N., R.84 W., McLean County, Hydrologic Unit 10130101, at left bank of Garrison Dam tailrace, 2.5 mi west of Riverdale at river mi 1,390.	181,400	1988-89	04-15-91	31,800
Crooked Creek ^a	Knife River	Lat 47°09'52", long 102°41'37", in NW ¹ / ₄ SW ¹ / ₄ NW ¹ / ₄ sec.35, T.143 N., R.95 W., Dunn County, Hydrologic Unit 10130201, 4 mi south and 4 mi east of Manning.	---	1988-90	03-27-90 05-02-91 06-27-91	1.50 1.51 6.30
Knife River near Stanton, ND ^b	Missouri River	Lat 47°21'29", long 101°23'49", in SW ¹ / ₄ SW ¹ / ₄ SW ¹ / ₄ sec.21, T.145 N., R.84 W., Mercer County, Hydrologic Unit 10130201, 100 ft upstream from county bridge and 2.5 mi north of Stanton.	---	1988-89	04-15-91	47.4
Missouri River above Stanton ^b	Missouri River Mainstem	Lat 47°20'15", long 101°21'20", in SE ¹ / ₄ NE ¹ / ₄ sec.34, T.145 N., R.84 W., Mercer County, Hydrologic Unit 10130101, on left bank, 2 mi north of Stanton at river mi 1,377.	---	---	10-29-90 04-15-91	11,300 31,400
Missouri River at Stanton Power Plant ^b	Missouri River Mainstem	Lat 47°17'25", long 101°18'40", in SE ¹ / ₄ SW ¹ / ₄ sec.15, T.144 N., R.84 W., McLean County, Hydrologic Unit 10130101, on left bank, 3 mi south of Stanton at river mi 1,371.	---	---	10-30-90 04-16-91	11,300 31,500

a Current year measurements furnished by and previous measurement data available from the North Dakota State Water Commission unless otherwise noted.

b Data collected by the U.S. Geological Survey.

Operated as a continuous-record gaging station.

Discharge measurements made at miscellaneous sites during water year 1991--Continued

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
MISSOURI RIVER BASIN--Continued						
Missouri River near Washburn ^b	Missouri River Mainstem	Lat 47°17'30", long 101°08'25", in SE ¹ / ₄ SW ¹ / ₄ , sec.13, T.144 N., R.82 W., McLean County, Hydrologic Unit 10130101, on left bank, 4.5 mi north of Washburn at river mi 1,360.	---	---	10-30-90 04-17-91	11,200 33,900
Missouri River at Washburn, ND ^b 06341000	Missouri River	Lat 47°17'20", long 101°02'15", in SE ¹ / ₄ SW ¹ / ₄ , sec.14, T.144 N., R.82 W., McLean County, Hydrologic Unit 10130101, on alternate Highway 200 bridge at Washburn at river mi 1,355.	184,000	1987-89	04-16-91	32,400
Missouri River near Wilton (north) ^b	Missouri River Mainstem	Lat 47°02'30", long 100°53'15", in NW ¹ / ₄ NE ¹ / ₄ , sec.13, T.141 N., R.81 W., Oliver County, Hydrologic Unit 10130101, on left bank, 9 mi south of Wilton at river mi 1,334.	---	---	10-31-90 04-18-91	11,100 31,800
Missouri River near Wilton (south) ^b	Missouri River Mainstem	Lat 47°01'10", long 100°53'00", in NW ¹ / ₄ SE ¹ / ₄ , sec.24, T.141 N., R.81 W., Oliver County, Hydrologic Unit 10130101, on left bank, 11 mi south of Wilton at river mi 1,333.	---	---	10-31-90 04-18-91	11,900 31,600
Missouri River ^b	Missouri River Mainstem	Lat 46°58'44", long 100°56'58", in NE ¹ / ₄ SW ¹ / ₄ NW ¹ / ₄ , sec.5, T.140 N., R.81 W., Morton County, Hydrologic Unit 10130101.	---	1988-89	04-17-91	32,900
Missouri River at Eagles Park ^b	Missouri River Mainstem	Lat 46°55'25", long 100°53'45", in NE ¹ / ₄ NE ¹ / ₄ , sec.28, T.140 N., R.81 W., Burleigh County, Hydrologic Unit 10130101, on left bank at Eagles Park, 7 mi north of Bismarck at river mi 1,324.	---	---	04-19-91	29,900
Green River ^a	Heart River	Lat 46°58'06", long 102°44'54", in SE ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ , sec.2, T.140 N., R.95 W., Stark County, Hydrologic Unit 10130202, 4 mi north and 2 mi east of Dickinson.	---	1989-90	11-01-90 03-27-91 05-01-91 05-29-91 06-26-91 07-23-91 08-21-91 09-19-91	1.33 4.33 5.33 1.86 10.3 .32 .17 .86
Green River near Gladstone, ND ^a 06345000	Heart River	Lat 46°53'31", long 102°37'01", in SE ¹ / ₄ SW ¹ / ₄ SE ¹ / ₄ , sec.36, T.140 N., R.95 W., Stark County, Hydrologic Unit 10130202, 7 mi east of Dickinson.	356	1945-76 ^b , 1988-90	03-26-91 05-01-91 05-29-91 06-26-91 07-23-91	9.31 7.79 3.27 10.8 .40
Heart River ^a	Missouri River	Lat 46°36'57", long 101°15'11", in NW ¹ / ₄ NW ¹ / ₄ NW ¹ / ₄ , sec.9, T.136 N., R.84 W., Morton County, Hydrologic Unit 10130203, 2 mi west and 11 mi north of Flasher.	---	1990	10-31-90 05-28-91 07-01-91 07-24-91 08-20-91 09-19-91	17.1 27.4 39.5 67.6 42.6 20.5
Heart River ^a	Missouri River	Lat 46°45'20", long 101°11'05", in SW ¹ / ₄ SW ¹ / ₄ NE ¹ / ₄ , sec.20, T.138 N., R.83 W., Morton County, Hydrologic Unit 10130203, 4 mi south and 13 mi west of Mandan.	---	1990	10-31-90 05-28-91 07-01-91 07-24-91 08-20-91 09-19-91	17.9 20.2 41.6 58.5 22.3 20.5
Missouri River ^b	Missouri River Mainstem	Lat 46°42'10", long 100°47'41", in SE ¹ / ₄ NE ¹ / ₄ NE ¹ / ₄ , sec.8, T.137 N., R.80 W., Morton County, Hydrologic Unit 10130102.	---	1988-89	04-18-91	32,700
Long Lake Creek ^a	Apple Creek	Lat 46°33'37", long 100°07'09", in SW ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄ , sec.28, T.136 N., R.75 W., Emmons County, Hydrologic Unit 10130103, 0.5 mi south and 1.25 mi west of Braddock.	---	1989-90	04-19-91 05-09-91 06-03-91 07-08-91 07-26-91 08-22-91 09-18-91	13.0 16.1 3.35 1.57 .54 .15 .33

a Current year measurements furnished by and previous measurement data available from the North Dakota State Water Commission unless otherwise noted.

b Data collected by the U.S. Geological Survey.

DISCHARGE MEASUREMENTS AT PARTIAL RECORD AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1991--Continued

Stream	Tributary to	Location	Drainage area (mi ²)	Measured previously (water years)	Measurements	
					Date	Discharge (ft ³ /s)
MISSOURI RIVER BASIN--Continued						
Long Lake Creek ^a	Apple Creek	Lat 46°35'52", long 100°11'26", in SE ¹ / ₄ ,SW ¹ / ₄ ,NW ¹ / ₄ , sec.13, T.136 N., R.76 W., Emmons County, Hydrologic Unit 10130103, 5 mi west and 1.5 mi north of Braddock.	---	1989-90	04-19-91 05-09-91 06-03-91 07-08-91	14.1 20.8 4.95 2.95
Cannonball River below Bentley, ND ^a 06351000	Missouri River	Lat 46°21'30", long 102°02'30", in SW ¹ / ₄ ,SW ¹ / ₄ , sec.6, T.133 N., R.90 W., Grant County, Hydrologic Unit 10130204, 2 mi northeast of Bentley.	1,140	1951-81 ^{#a} 1988-90	05-01-91 05-28-91 06-26-91 07-23-91 08-20-91 09-19-91	10.1 5.16 266 4.54 1.60 1.62
Cannonball River ^a	Missouri River	Lat 46°07'35", long 101°19'57", in SW ¹ / ₄ ,SW ¹ / ₄ ,NW ¹ / ₄ , sec.33, T.131 N., R.85 W., Grand County, Hydrologic Unit 10130204, 16 mi south of Raleigh.	---	1989-90	05-01-91 05-28-91 06-26-91 07-23-91	17.6 10.0 279 10.8
Cedar Creek near Pretty Rock, ND ^a 06352500	Cannonball River	Lat 46°01'55", long 101°49'55", in SW ¹ / ₄ ,SW ¹ / ₄ ,SW ¹ / ₄ , sec.33, T.130 N., R.89 W., Grant County, Hydrologic Unit 10130205, 7 mi north of Keldron, SD.	1,340	1943-76 ^{#a} 1988-90	03-26-91 05-01-91	11.9 5.90
Cedar Creek ^a	Cannonball River	Lat 46°02'08", long 101°47'29", in SE ¹ / ₄ ,NE ¹ / ₄ ,SE ¹ / ₄ , sec.34, T.130 N., R.89 W., Sioux County, Hydrologic Unit 10130205, 7.25 mi north and 2 mi east of Keldron, SD.	---	---	06-16-91 06-26-91 07-23-91	.31 .26 23.8
Missouri River below Cannonball River ^b	Missouri River Mainstem	Lat 46°24'25", long 100°35'00", in NW ¹ / ₄ ,SW ¹ / ₄ , sec.23, T.134 N., R. 79 W., Sioux County, Hydrologic Unit 10130102, on left bank, 1 mi downstream from Cannonball River at river mi 1,268.	---	---	11-01-90 04-20-91	11,400 30,900
Unnammed Spring Creek tributary at Linton, ND ^b	Spring Creek	Lat 46°16'15", long 100°14'18", in NE ¹ / ₄ ,SW ¹ / ₄ ,NE ¹ / ₄ , sec.7, T.132 N., R.76 W., Emmons County, Hydrologic Unit 10130104, at U.S. Highway 83 crossing, 200 feet upstream from Spring Creek in Linton.	---	---	06-20-91	23.6
James River ^a	Missouri River	Lat 46°32'38", long 98°28'26", in NE ¹ / ₄ ,NE ¹ / ₄ ,NE ¹ / ₄ , sec.4, T.135 N., R.62 W., LaMoure County, Hydrologic Unit 10160003, on bridge 0.5 mi northwest of Dickey.	---	1988-89	10-03-90 04-25-91 05-21-91 06-18-91 07-16-91 08-13-91 09-11-91	4.05 12.4 12.1 47.8 6.79 3.21 5.37
James River ^a	Missouri River	Lat 46°27'13", long 98°22'06", in SW ¹ / ₄ ,NW ¹ / ₄ ,NW ¹ / ₄ , sec.4, T.134 N., R.61 W., LaMoure County, Hydrologic Unit 10160003, on bridge 1 mi north of Grand Rapids.	---	1988-89	10-03-90 04-25-91 05-21-91 06-18-91 07-16-91 08-13-91 09-11-91	5.99 14.8 16.9 43.9 10.0 6.16 9.48

a Current year measurements furnished by and previous measurement data available from the North Dakota State Water Commission unless otherwise noted.

b Data collected by the U.S. Geological Survey.

Operated as a continuous-record gaging station.

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

317

Water-quality partial-record stations are particular sites where chemical-quality, biological and/or sediment data are collected systematically over a period of years for use in hydrologic analyses. These data are collected usually less than quarterly. Samples collected at sites other than gaging stations and partial-record stations to give better areal coverage in a river basin are referred to as miscellaneous sites.

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS TOTAL (MG/L AS CaCO3) (00900)
05059501 RED RIVER BELOW FARGO, N. DAK. (LAT 46 56 02N LONG 096 47 28W)											
MAR 12...	1000	--	562	7.7	--	0.0	14.7	99	K9	590	--
05069001 RED RIVER ABOVE RED LAKE RIVER, N. DAK. (LAT 47 55 20N LONG 097 01 14W)											
MAR 13...	1330	--	824	6.8	--	0.5	7.2	48	K100	K15000	--
05082501 RED RIVER BELOW GRAND FORKS, N. DAK. (LAT 48 01 04N LONG 097 04 12W)											
MAR 13...	1500	--	757	7.2	--	0.0	12.9	86	K160	3200	--
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)											
MAR 13...	1730	364	828	7.8	8.5	0.0	9.6	64	--	--	350
APR 05...	1630	3460	542	8.2	25.0	2.5	--	--	--	--	210
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)											
MAR 14...	1050	341	965	7.7	3.0	0.0	11.4	78	--	--	370
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)											
OCT 26...	1240	0.18	3100	9.2	20.0	11.0	8.5	--	--	--	--
NOV 11...	1140	0.09	3780	8.8	4.5	3.5	9.8	--	--	--	--
MAR 28...	1300	3.7	2210	8.6	5.0	1.0	8.9	--	--	--	--
APR 24...	1230	1.8	3500	8.7	23.5	13.5	10.8	107	--	--	420
MAY 20...	1200	1.6	3020	8.6	26.0	25.0	8.7	--	--	--	--
JUN 25...	1121	3.5	2300	9.0	25.0	21.0	7.9	--	--	--	--
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)											
OCT 23...	1203	0.02	2230	8.9	15.0	11.0	9.5	--	--	--	--
NOV 15...	1240	0.02	3170	8.3	8.5	5.0	9.3	--	--	--	--
APR 02...	1227	0.12	1400	7.9	25.5	12.5	10.1	--	--	--	--
APR 23...	1330	0.15	1110	8.4	23.0	14.0	11.0	--	--	--	150
MAY 16...	1211	0.41	1500	8.6	24.0	20.0	8.5	--	--	--	--
JUN 24...	1119	0.02	1210	9.1	32.0	20.0	8.0	--	--	--	--
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)											
NOV 15...	1157	0.00	2910	8.2	8.0	5.0	9.8	--	--	--	--
APR 02...	1405	0.01	2950	8.6	22.0	15.5	11.5	--	--	--	--
APR 23...	1230	0.06	3960	8.2	21.0	13.5	13.3	131	--	--	360
MAY 16...	1320	0.01	3220	8.9	26.0	25.5	8.7	--	--	--	--
JUN 24...	1230	0.07	4500	9.0	31.0	26.0	7.4	--	--	--	--
JUL 18...	1215	0.00	5	8.7	25.5	25.5	7.8	--	--	--	--
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)											
MAR 20...	1525	1.9	155	8.3	15.0	4.0	--	--	--	--	240

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

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)	BICAR- BONATE, FET-LAB (MG/L AS HCO3) (95440)	CAR- BONATE, FET-LAB (MG/L AS CO3) (95445)	ALKA- LINITY LAB (MG/L AS CACO3) (90410)	ALKA- LINITY WAT DIS TOT IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE WATER DIS IT FIELD (MG/L AS HCO3) (00453)
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)											
MAR 13...	76	38	44	21	1	7.4	--	--	--	314	383
APR 05...	45	23	25	20	0.8	6.3	180	0	150	--	--
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)											
MAR 14...	79	41	65	27	1	8.4	--	--	--	268	327
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)											
APR 24...	46	74	740	79	16	11	--	--	775	--	--
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)											
APR 23...	30	18	190	73	7	6.0	--	--	317	--	--
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)											
APR 23...	26	72	1300	88	30	11	--	--	1080	--	--
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)											
MAR 20...	50	27	250	69	7	3.8	390	0	320	--	--
DATE	CAR- BONATE WATER DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, DIS- NITRATE DIS- SOLVED (MG/L AS N) (00618)	
05059501 RED RIVER BELOW FARGO, N. DAK. (LAT 46 56 02N LONG 096 47 28W)											
MAR 12...	--	--	--	--	--	--	--	--	--	0.550	
05069001 RED RIVER ABOVE RED LAKE RIVER, N. DAK. (LAT 47 55 20N LONG 097 01 14W)											
MAR 13...	--	--	--	--	--	--	--	--	--	0.710	
05082501 RED RIVER BELOW GRAND FORKS, N. DAK. (LAT 48 01 04N LONG 097 04 12W)											
MAR 13	--	--	--	--	--	--	--	--	--	0.590	
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)											
MAR 13...	0	90	39	0.20	17	519	504	0.71	510	0.630	
APR 05...	--	81	26	0.10	13	334	311	0.45	3120	--	
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)											
MAR 14...	0	99	74	0.30	16	603	548	0.82	--	--	
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)											
APR 24...	--	1300	41	0.80	7.2	--	2680	3.65	13.1	--	
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)											
APR 23...	--	310	2.7	0.50	6.9	--	754	1.03	0.31	--	
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)											
APR 23...	--	2300	10	0.90	8.4	--	4380	5.95	0.67	--	
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)											
MAR 20...	--	420	41	0.40	4.3	1020	991	1.39	5.15	--	

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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,AM- MONIA + ORGANIC DIS- SOLVED (MG/L AS N) (00623)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L AS BE) (01010)	BORON, DIS- SOLVED (UG/L AS B) (01020)
05059501 RED RIVER BELOW FARGO, N. DAK. (LAT 46 56 02N LONG 096 47 28W)										
MAR 12...	0.020	0.570	0.610	1.8	0.190	0.190	--	--	--	--
05069001 RED RIVER ABOVE RED LAKE RIVER, N. DAK. (LAT 47 55 20N LONG 097 01 14W)										
MAR 13...	0.020	0.730	0.360	1.1	0.130	0.130	--	--	--	--
05082501 RED RIVER BELOW GRAND FORKS, N. DAK. (LAT 48 01 04N LONG 097 04 12W)										
MAR 13...	0.020	0.610	0.300	1.4	0.100	0.090	--	--	--	--
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)										
MAR 13...	0.020	0.650	0.280	1.3	0.090	0.090	--	83	<0.5	--
APR 05...	--	--	--	--	--	--	2	--	--	60
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)										
MAR 14...	<0.010	0.790	0.200	1.1	0.100	0.100	--	86	<0.5	--
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)										
APR 24...	--	<0.050	--	--	--	--	--	--	--	--
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)										
APR 23...	--	<0.050	--	--	--	--	--	--	--	--
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)										
APR 23...	--	<0.050	--	--	--	--	--	--	--	--
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)										
MAR 20...	--	--	--	--	--	--	1	--	--	280
DATE	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)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)										
MAR 13...	<1.0	<5	<3	<10	13	10	34	49	--	<10
APR 05...	--	--	--	--	20	<1	20	10	<0.1	2
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)										
MAR 14...	<1.0	<5	<3	<10	11	<10	43	37	--	<10
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)										
APR 24...	--	--	--	--	30	--	--	30	--	--
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)										
APR 23...	--	--	--	--	55	--	--	59	--	--
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)										
APR 23...	--	--	--	--	50	--	--	30	--	--
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)										
MAR 20...	--	--	--	--	20	1	30	210	<0.1	3

ANALYSES OF SAMPLES COLLECTED AT WATER-QUALITY PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	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)	SILVEX, TOTAL (UG/L) (39760)	2,4-D, TOTAL (UG/L) (39730)	2, 4-DP TOTAL (UG/L) (82183)	2,4,5-T TOTAL (UG/L) (39740)
05083500 RED RIVER OF THE NORTH AT OSLO, MN (LAT 48 11 35N LONG 097 08 25W)										
MAR 13...	<10	--	1.0	300	<6	15	--	--	--	--
APR 05...	--	<1	--	240	--	--	--	--	--	--
05092400 RED RIVER NEAR JOLIETTE, N. DAK. (LAT 48 47 15N LONG 097 09 27W)										
MAR 14...	<10	--	<1.0	340	<6	7	--	--	--	--
06332524 EAST FORK SHELL CREEK NEAR MOUTH BELOW PARSHALL, N. DAK. (LAT 47 56 02N LONG 102 15 47W)										
APR 24...	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01
06337470 MOCCASIN CREEK AT MOUTH NEAR MANDAREE, N. DAK. (LAT 47 36 00N LONG 102 30 38W)										
APR 23...	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01
06337480 SQUAW CREEK ABOVE MOUTH NEAR MANDAREE, N. DAK. (LAT 47 38 27N LONG 102 30 40W)										
APR 23...	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01
06343000 HEART RIVER NEAR SOUTH HEART, N. DAK. (LAT 46 51 56N LONG 102 56 53W)										
MAR 20...	--	<1	--	600	--	--	--	--	--	--

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	OXYGEN, DIS- SOLVED (MG/L) (00300)
06338490 MISSOURI RIVER AT GARRISON DAM, N. DAK. (LAT 47 30 08N LONG 101 25 50W)					
AUG					
07...	0850	665	7.8	13.5	9.2
08...	1045	660	--	13.5	9.3
09...	1204	660	--	14.5	8.9
12...	1330	660	8.3	14.0	9.4
13...	1220	660	8.3	14.5	9.0
14...	1020	660	8.3	14.0	9.3
15...	0955	660	8.3	14.5	9.0
06338500 MISSOURI RIVER NEAR RIVERDALE, N. DAK. (LAT 47 26 28N LONG 101 25 04W)					
AUG					
07...	0955	660	7.4	13.5	10.1
08...	1150	660	8.0	15.0	9.5
09...	1234	650	--	15.5	9.5
12...	1340	660	8.3	15.5	9.6
13...	1250	660	8.3	15.0	9.6
14...	1120	660	8.3	14.5	9.2
15...	1130	650	8.2	14.5	9.2
06339010 MISSOURI RIVER ABOVE STANTON N. DAK. (LAT 47 21 45N LONG 101 21 25W)					
AUG					
07...	1215	660	7.8	15.0	9.9
08...	1010	650	8.1	15.5	9.9
09...	1240	650	8.4	15.5	9.9
12...	1130	650	8.3	15.0	10.0
13...	1220	660	8.3	15.5	9.7
14...	1210	650	8.3	15.5	10.0
15...	1230	640	8.3	16.0	9.6
06340700 MISSOURI RIVER NEAR STANTON, N. DAK. (LAT 47 17 14N LONG 101 20 25W)					
AUG					
06...	1500	680	8.4	16.0	10.0
07...	1240	700	7.4	15.5	9.7
08...	0930	670	8.1	14.5	9.3
09...	1330	670	8.4	16.5	9.9
12...	1105	670	8.3	15.0	9.7
13...	1020	680	8.3	15.0	9.5
14...	0930	670	8.2	15.0	9.7
15...	1340	670	8.2	17.0	9.6
06342000 MISSOURI RIVER NEAR WILTON, N. DAK. (LAT 47 07 49N LONG 100 56 44W)					
AUG					
06...	1140	655	8.3	16.5	10.1
07...	1350	660	7.6	17.0	10.2
08...	1440	660	8.4	18.0	10.6
09...	1405	660	--	18.0	10.5
12...	0940	660	8.3	16.0	9.8
13...	0930	660	8.3	16.0	9.9
14...	0920	666	8.2	16.0	9.6
15...	1520	660	8.3	18.5	10.2

STATION RECORDS, GROUND WATER

GROUND-WATER LEVELS

BENSON COUNTY

480228098482501. Local number, 153-063-30CBC.

LOCATION.--Lat 48°02'28", long 098°48'25", Hydrologic Unit 09020201.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 200 ft, cased to 137 ft, plastic pipe, No. 18 slot screen set 137 to 143 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,445 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 13.32 ft below land-surface datum, June 15, 1987; lowest measured, 22.30 ft below land-surface datum, Mar. 3, 1971.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 14	15.69	MAR 6	15.02	SEPT 17	18.37

BENSON COUNTY

480958099154801. Local number, 154-067-15BBB.

LOCATION.--Lat 48°09'58", long 099°15'48", Hydrologic Unit 09020201.

Owner: North Dakota State Water Commission.

AQUIFER.--Spiritwood.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 180 ft, cased to 147 ft, plastic pipe, No. 18 slot screen set 147 to 153 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,475 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1970 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 30.19 ft below land-surface datum, May 26, 1983; lowest measured, 34.97 ft below land-surface datum, Sept. 10, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 13	34.42	MAR 7	33.61	JUNE 4	34.57	SEPT 10	34.97

BENSON COUNTY

481041099442701. Local number, 154-071-11AAD1.

LOCATION.--Lat 48°10'41", long 099°44'27", Hydrologic Unit 09020202.

Owner: North Dakota State Water Commission.

AQUIFER.--Fox Hills Sandstone.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 100 ft, cased to 42 ft, plastic pipe, No. 12 slot screen set 42 to 45 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,590 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--August 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 5.41 ft below land-surface datum, July 12, 1982; lowest measured, 9.27 ft below land-surface datum, June 8, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 13	8.39	MAR 6	6.89	JUNE 4	8.00	SEPT 10	7.96

GROUND-WATER LEVELS

323

BOWMAN COUNTY

461534103491701. Local number, 132-105-16BDB.
 LOCATION.--Lat 46°15'34", long 103°49'17", Hydrologic Unit 10110203.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Hell Creek-Fox Hills Sandstone.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 475 ft, cased to 441 ft, steel pipe, No. 12 slot screen set 441 to 459 ft below land-surface datum.
 INSTRUMENTATION.--Measured annually, during late November or early December, using a steel tape.
 DATUM.--Altitude of land-surface datum is 3,010 ft. Measuring point: Top of casing 3.40 ft above land-surface datum.
 PERIOD OF RECORD.--September 1971 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 270.15 ft below land-surface datum, Feb. 25, 1973; lowest measured, 272.66 ft below land-surface datum, Nov. 28, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL
NOV 28	272.66

BURLEIGH COUNTY

464943100305801. Local number, 139-078-27CBB.
 LOCATION.--Lat 46°49'43", long 100°30'58", Hydrologic Unit 10130103.
 Owner: North Dakota State Water Commission.
 AQUIFER.--McKenzie.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 255 ft, cased to 200 ft, plastic pipe, slotted 200 to 220 ft below land-surface datum, gravel packed.
 INSTRUMENTATION.--Measured on a six-week schedule, except during the winter, using a steel tape.
 DATUM.--Altitude of land-surface datum is 1,713. Measuring point: Top of casing 1.90 ft above land-surface datum.
 PERIOD OF RECORD.--August 1962 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 21.73 ft below land-surface datum, June 5, 1987; lowest measured, 32.44 ft below land-surface datum, Aug. 26, 1977.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 27	25.51	DEC 16	25.11	MAY 5	24.48	AUG 31	29.69
NOV 29	25.60	APR 16	24.63	JUNE 17	24.48	SEPT 9	27.65

DIVIDE COUNTY

485649103155701. Local number, 163-097-15BCC.
 LOCATION.--Lat 48°56'49", long 103°15'57", Hydrologic Unit 09010001.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Yellowstone.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 575 ft, cased to 546 ft, steel pipe, No. 12 slot screen set 546 to 558 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 1,915 ft. Measuring point: Top of casing 1.50 ft above land-surface datum.
 PERIOD OF RECORD.--January 1973 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.31 ft below land-surface datum, June 5, 1979; lowest measured, 15.64 ft below land-surface datum, May 7, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 6	15.43	FEB 26	15.51	MAY 7	15.64	AUG 6	15.46

GROUND-WATER LEVELS

DUNN COUNTY

471323102290101. Local number, 143-093-09BCB.

LOCATION.--Lat 47°13'23", long 102°29'01", Hydrologic Unit 10130201.

Owner: North Dakota State Water Commission.

AQUIFER.--Sentinel Butte.

WELL CHARACTERISTICS.--Drilled observation well, diameter 2 in, depth 965 ft, cased to 378 ft, steel pipe, No. 12 slot screen set 378 to 396 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 2,133 ft. Measuring point: Top of casing 2.10 ft above land-surface datum.

PERIOD OF RECORD.--February 1974 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 92.12 ft below land-surface datum, June 7, 1984; lowest measured, 94.27 ft below land-surface datum, April 30, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	93.69	FEB 25	93.76	APR 30	94.27	AUG 13	93.87

EDDY COUNTY

473720098592401. Local number, 148-065-19DAA.

LOCATION.--Lat 47°37'20", long 098°59'24", Hydrologic Unit 10160001.

Owner: North Dakota State Water Commission.

AQUIFER.--New Rockford.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 242 ft, cased to 220 ft, plastic pipe, slotted from 210 to 220 ft below land-surface datum.

INSTRUMENTATION.--Measured on a six-week schedule, except during the winter, using a steel tape.

DATUM.--Altitude of land-surface datum is 1,526 ft. Measuring point: Top of casing 1.90 ft above land-surface datum.

PERIOD OF RECORD.--September 1964 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 43.40 ft below land-surface datum, Sept. 6, 1983; lowest measured, 50.49 ft below land-surface datum, Sept. 6, 1978.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	45.60	MAY 22	45.13	MAY 30	46.05	JULY 8	45.18
FEB 21	45.47						

EMMONS COUNTY

463632100171901. Local number, 136-076-07CBC.

LOCATION.--Lat 46°36'32", long 100°17'19", Hydrologic Unit 10130103.

Owner: North Dakota State Water Commission.

AQUIFER.--Long Lake.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 150 ft, cased to 117 ft, plastic pipe, No. 12 slot screen set at 117 to 123 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,735 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

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

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.87 ft above land-surface datum, Apr. 17, 1987; lowest measured, 8.32 ft below land-surface datum, Sept. 1, 1977.

CORRECTION.--Highest water level measured, +0.87 ft above land-surface datum, Apr. 17, 1987, was previously published as below-land surface datum (see EXTREMES FOR PERIOD OF RECORD).

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	7.70	APR 26	7.57	JUNE 17	7.24

GROUND-WATER LEVELS

325

GRAND FORKS COUNTY

474957097343501. Local number, 150-054-04CCD.
LOCATION.--Lat 47°49'57", long 097°34'35", Hydrologic Unit 09020307.
Owner: North Dakota State Water Commission.
AQUIFER.--Elk Valley.
WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 126 ft, cased to 40 ft, plastic pipe, No. 12 slot screen set 40 to 43 ft below land-surface datum.
INSTRUMENTATION.--Measured quarterly using a steel tape.
DATUM.--Altitude of land-surface datum is 1,127 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.
PERIOD OF RECORD.--September 1965 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.97 ft below land-surface datum, July 23, 1987; lowest measured, 8.44 ft below land-surface datum, Mar. 27, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	7.95	MAR 27	8.44	MAY 29	6.10	SEPT 17	7.52

GRIGGS COUNTY

471612098113101. Local number, 144-059-20CCC.
LOCATION.--Lat 47°16'12", long 098°11'31", Hydrologic Unit 09020203.
Owner: North Dakota State Water Commission.
AQUIFER.--Spiritwood.
WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 240 ft, cased to 158 ft, plastic pipe, No. 25 slot screen set 158 to 161 ft below land-surface datum.
INSTRUMENTATION.--Measured quarterly using a steel tape.
COOPERATION.--Record provided by the North Dakota State Water Commission since 1975.
DATUM.--Altitude of land-surface datum is 1,430 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
PERIOD OF RECORD.--September 1971 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 45.84 ft below land-surface datum, Apr. 5, 1977; lowest measured, 90.80 ft below land-surface datum, Aug. 11, 1988.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	59.84	APR 4	51.70	JUNE 12	50.90

GRIGGS COUNTY

473425098232901. Local number, 147-061-01CCC.
LOCATION.--Lat 47°34'25", long 098°23'29", Hydrologic Unit 09020203.
Owner: North Dakota State Water Commission.
AQUIFER.--Spiritwood.
WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 340 ft, cased to 237 ft, plastic pipe, No. 25 slot screen set 237 to 240 ft below land-surface datum.
INSTRUMENTATION.--Measured monthly, except during the winter, using a steel tape.
COOPERATION.--Record provided by the North Dakota State Water Commission since 1977.
DATUM.--Altitude of land-surface datum is 1,525 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
PERIOD OF RECORD.--September 1971 to current year.
EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 26.17 ft below land-surface datum, Apr. 29, 1987; lowest measured, 96.10 ft below land-surface datum, Aug. 12, 1975.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	31.48	APR 5	29.38	JUNE 13	28.73

GROUND-WATER LEVELS

GRIGGS COUNTY

473600098065901. Local number, 148-059-36AAB.
 LOCATION.--Lat 47°36'00", long 098°06'59", Hydrologic Unit 09020203.
 Owner: North Dakota State Water Commission.
 AQUIFER.--McVillie.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 180 ft, cased to 137 ft, plastic pipe, No. 12 slot screen set 137 to 143 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 COOPERATION.--Record provided by the North Dakota State Water Commission since 1984.
 DATUM.--Altitude of land-surface datum is 1,320 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
 PERIOD OF RECORD.--October 1971 to December 1982, April 1985 to present.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.77 ft above land-surface datum, Sept. 11, 1986; lowest measured, 12.09 ft below land-surface datum, Nov. 7, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	12.09	APR 5	11.35	JUNE 13	11.59

HETTINGER COUNTY

463153102521001. Local number, 135-097-04DCA.
 LOCATION.--Lat 46°31'53", long 102°52'10", Hydrologic Unit 10130204.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Fox Hills Sandstone.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 1,790 ft, cased to 1,320 ft, steel pipe, open hole.
 INSTRUMENTATION.--Measured quarterly using a steel tape. Water-level recorder prior to May 1974.
 DATUM.--Altitude of land-surface datum is 2,567 ft. Measuring point: Top of casing 0.70 ft above land-surface datum.
 PERIOD OF RECORD.--September 1968 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 142.02 ft below land-surface datum, Dec. 19, 1968; lowest measured, 145.91 ft below land-surface datum, Sept. 19, 1968, (first measurement on well may be as much as 1.5 ft low due to slow recovery of well).

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	144.47	MAR 28	144.50	JUNE 20	144.41	SEPT 12	144.60

KIDDER COUNTY

470638099324301. Local number, 142-070-16DDD.
 LOCATION.--Lat 47°06'38", long 099°32'43", Hydrologic Unit 10130103.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Long Lake.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 84 ft, cased to 70 ft, plastic pipe, No. 18 slot screen set 70 to 73 ft below land-surface datum.
 INSTRUMENTATION.--Measured monthly, except during the winter, using a steel tape.
 COOPERATION.--Record provided by the North Dakota State Water Commission since 1979.
 DATUM.--Altitude of land-surface datum is 1,810 ft. Measuring point: Top of casing 1.90 ft above land-surface datum.
 PERIOD OF RECORD.--November 1965 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 19.94 ft below land-surface datum, Dec. 4, 1976; lowest measured, 26.03 ft below land-surface datum, Aug. 27, 1982.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	21.98	APR 25	21.69	JUNE 22	23.51	AUG 13	23.72
MAR 30	21.75	MAY 21	21.63	JULY 19	24.46	SEPT 13	22.87

GROUND-WATER LEVELS

327

MC LEAN COUNTY

473752101055301. Local number, 148-082-23BBB.
 LOCATION.--Lat 47°37'52", long 101°05'53", Hydrologic Unit 10130101.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Lake Nettie.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 300 ft, cased to 198 ft, plastic pipe, No. 24 slot screen set 198 to 204 ft below land-surface datum.
 INSTRUMENTATION.--Measured monthly, except during the winter, using a steel tape.
 COOPERATION.--Record provided by the North Dakota State Water Commission since December 1984.
 DATUM.--Altitude of land-surface datum is 1,880 ft. Measuring point: Top of casing 2.30 ft above land-surface datum.
 PERIOD OF RECORD.--December 1969 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 36.21 ft below land-surface datum, July 31, 1987, and June 27, 1984; lowest measured, 42.30 ft below land-surface datum, Dec. 2, 1970.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	40.59	MAY 22	40.62	JULY 23	40.75	AUG 28	41.07
APR 2	41.09	MAY 30	40.67	AUG 12	40.89	SEPT 23	41.10
MAY 1	40.56	JUNE 24	40.64				

OLIVER COUNTY

470642101162701. Local number, 142-084-24BBA.
 LOCATION.--Lat 47°06'42", long 101°16'27", Hydrologic Unit 10130101.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Fox Hills Sandstone.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 1,295 ft, cased to 966 ft, steel pipe, open ended.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 2,006 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
 PERIOD OF RECORD.--January 1968 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 197.04 ft below land-surface datum, Dec. 8, 1972; lowest measured, 200.02 ft below land-surface datum, May 7, 1987.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 27	199.62	MAR 25	199.68	JUNE 12	199.73	SEPT 3	199.65

PEMBINA COUNTY

485239097501702. Local number, 162-056-01CCC2.
 LOCATION.--Lat 48°52'39", long 097°50'17", Hydrologic Unit 09020313.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Icelandic.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 40 ft, cased to 37 ft, plastic pipe, No. 12 slot screen set 37 to 40 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 988 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.
 PERIOD OF RECORD.--October 1969 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.65 ft below land-surface datum, May 21, 1970; lowest measured, 9.47 ft below land-surface datum, Oct. 14, 1988, and Aug. 22, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	9.14	MAR 28	8.64	JUNE 19	8.24	SEPT 20	9.07

PIERCE COUNTY

475323100092101. Local number, 151-074-20AAA.

LOCATION.--Lat 47°53'23", long 100°09'21", Hydrologic Unit 09020202.

Owner: North Dakota State Water Commission.

AQUIFER.--New Rockford.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 320 ft, cased to 256 ft, plastic pipe, No. 18 slot screen set 256 to 259 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,605 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.

PERIOD OF RECORD.--November 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 28.08 ft below land-surface datum, Nov. 29, 1976; lowest measured, 35.64 ft below land-surface datum, November 29, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	35.64	APR 2	35.37	JUNE 6	35.42

RICHLAND COUNTY

462633097163402. Local number, 134-052-06CCD2.

LOCATION.--Lat 46°26'33", long 097°16'34", Hydrologic Unit 09020204.

Owner: North Dakota State Water Commission.

AQUIFER.--Sheyenne Delta.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 40 ft, cased to 30 ft, plastic pipe, slotted 30 to 40 ft below land-surface datum.

INSTRUMENTATION.--Water level recorder October 1965 to current year. Prior to February 1972 only 5-day low and EOM water levels are available.

DATUM.--Altitude of land-surface datum is 1,067 ft. Measuring point: Top of casing 0.65 ft above land-surface datum.

REMARKS.--Key well reported in monthly Water Resources Review.

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

EXTREMES FOR PERIOD OF RECORD.--Highest recorded water level, 0.78 ft below land-surface datum, May 13, 1972; lowest recorded, 9.12 ft below land-surface datum, Mar. 8-11, 1989.

DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET), WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991
MAXIMUM VALUES (DAILY-LOW WATER-LEVEL)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
5	8.76	8.65	8.76	8.88	8.97	8.92	8.01	6.49	7.20	6.68	7.78	8.39
10	8.75	8.67	8.77	8.90	8.87	8.91	7.92	6.50	7.34	6.94	7.91	7.98
15	8.75	8.70	8.77	8.92	8.83	8.69	7.81	6.64	7.41	7.07	8.05	7.86
20	8.68	8.69	8.79	8.93	8.84	8.39	7.73	6.80	7.39	7.35	8.10	7.88
25	8.65	8.71	8.81	8.94	8.87	8.18	7.72	6.95	6.90	7.52	8.19	7.97
EOM	8.64	8.73	8.83	8.98	8.88	8.07	7.62	7.12	6.87	7.68	8.33	8.04
MAX	8.76	8.73	8.83	8.98	8.98	8.93	8.07	7.29	7.47	7.68	8.33	8.41

WATER YEAR 1991

HIGHEST WATER LEVEL 6.40 MAY 6

LOWEST WATER LEVEL 8.98 JAN 31-FEB 4

STARK COUNTY

465755102410701. Local number, 140-095-08AAA.

LOCATION.--Lat 46°57'55", long 102°41'07", Hydrologic Unit 10130204.

Owner: North Dakota State Water Commission.

AQUIFER.--Sentinel Butte.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 160 ft, cased to 80 ft, plastic pipe, open ended.

INSTRUMENTATION.--Measured monthly using a steel tape.

DATUM.--Altitude of land-surface datum is 2,419 ft. Measuring point: Top of casing 1.70 ft above land-surface datum.

REMARKS.--Key well reported in monthly Water Resources Review.

PERIOD OF RECORD.--December 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.61 ft below land-surface datum, June 19, 1970; lowest measured, 21.63 ft below land-surface datum, Sept. 30, 1991.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 22	20.99	JAN 28	21.19	APR 26	21.13	JULY 29	21.19
NOV 21	21.00	FEB 25	21.16	MAY 28	20.86	AUG 29	21.51
DEC 26	21.10	MAR 25	21.14	JUNE 28	21.32	SEPT 30	21.63

GROUND-WATER LEVELS

329

STEELE COUNTY

471601097371001. Local number, 144-055-26BBB.
 LOCATION.--Lat 47°16'01", long 097°37'10", Hydrologic Unit 09020109.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Galesburg.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 300 ft, cased to 53 ft, plastic pipe, slotted 53 to 68 ft below land-surface datum.
 INSTRUMENTATION.--Measured monthly, except during the winter, using a steel tape.
 COOPERATION.--Record provided by the North Dakota State Water Commission since 1982.
 DATUM.--Altitude of land-surface datum is 1,160 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
 PERIOD OF RECORD.--June 1970 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 17.43 ft below land-surface datum, June 27, 1970; lowest measured, 25.32 ft below land-surface datum, Aug. 5, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
OCT 5	23.27	APR 20	22.60	JUNE 16	21.46	AUG 17	24.46
NOV 7	22.63	MAY 18	22.25	JULY 19	22.80	SEPT 22	23.53

STUTSMAN COUNTY

463846098274101. Local number, 137-062-26DDD.
 LOCATION.--Lat 46°38'46", long 098°27'41", Hydrologic Unit 10160003.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Spiritwood.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 240 ft, cased to 157 ft, plastic pipe, No. 12 slot screen set 157 to 163 ft below land-surface datum.
 INSTRUMENTATION.--Measured monthly, except during the winter, using a steel tape.
 COOPERATION.--Record provided by the North Dakota State Water Commission since 1982.
 DATUM.--Altitude of land-surface datum is 1,455 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.
 PERIOD OF RECORD.--September 1970 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 15.20 ft below land-surface datum, Sept. 6, 1979; lowest measured, 20.67 ft below land-surface datum, May 28, 1973.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
APR 3	18.12	MAY 10	18.17	JUNE 26	18.14	AUG 27	17.60
MAY 2	18.26	MAY 31	18.17	JULY 22	17.86		

TRAILL COUNTY

473228097051501. Local number, 147-051-22BBB.
 LOCATION.--Lat 47°32'28", long 097°05'15", Hydrologic Unit 09020301.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Hillsboro.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 103 ft, cased to 97 ft, plastic pipe, No. 18 slot screen set 97 to 100 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 925 ft. Measuring point: Top of casing 2.40 ft above land-surface datum.
 PERIOD OF RECORD.--August 1965 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +1.90 ft above land-surface datum, July 4, 1979; lowest measured, 7.27 ft below land-surface datum, Aug. 17, 1965.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 7	3.33	MAR 20	2.84	JULY 9	2.97	SEPT 16	3.89

WALSH COUNTY

481657097473601. Local number, 156-056-36CCC1.

LOCATION.--Lat 48°16'57", long 097°47'36", Hydrologic Unit 09020308.

Owner: North Dakota State Water Commission.

AQUIFER.--Fordville.

WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 280 ft, cased to 27 ft, plastic pipe, No. 18 slot screen set 27 to 30 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,145 ft. Measuring point: Top of casing 1.85 ft above land-surface datum.

PERIOD OF RECORD.--May 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 4.98 ft below land-surface datum, June 3, 1987;

lowest measured, 6.98 ft below land-surface datum, Mar. 11, 1985.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 15	6.44	MAR 27	6.24	JUNE 6	6.55	SEPT 17	6.65

WALSH COUNTY

482408097443201. Local number, 157-055-21DBC.

LOCATION.--Lat 48°24'08", long 097°44'32", Hydrologic Unit 09020301.

Owner: North Dakota State Water Commission.

AQUIFER.--Dakota Formation.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 496 ft, cased to 491 ft, steel pipe, screen set 491 to 496 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 975 ft. Measuring point: Top of casing at land-surface datum.

PERIOD OF RECORD.--May 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 88.84 ft below land-surface datum, Mar. 9, 1982;

lowest measured, 92.75 ft below land-surface datum, Sept. 17, 1974.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	91.54	MAR 27	91.22	JUNE 6	91.18	SEPT 17	91.57

WALSH COUNTY

482449098095801. Local number, 157-058-18DDD.

LOCATION.--Lat 48°24'49", long 098°09'58", Hydrologic Unit 09020308.

Owner: North Dakota State Water Commission.

AQUIFER.--Pierre Shale.

WELL CHARACTERISTICS.--Drilled observation well, diameter 4 in, depth 140 ft, cased to 80 ft, plastic pipe, slotted screen set 80 to 100 ft below land-surface datum.

INSTRUMENTATION.--Measured quarterly using a steel tape.

DATUM.--Altitude of land-surface datum is 1,580 ft. Measuring point: Top of casing 1.00 ft above land-surface datum.

PERIOD OF RECORD.--June 1968 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, +0.89 ft above land-surface datum, Dec. 5, 1972;

lowest measured, 9.89 ft below land-surface datum, Nov. 21, 1989.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 16	9.62	MAR 27	8.17	JUNE 10	7.79	SEPT 17	2.83

WARD COUNTY

480912101090301. Local number, 154-082-24ABA.
 LOCATION.--Lat 48°09'12", long 101°09'03", Hydrologic Unit 09010001.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Lower Souris.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 115 ft, cased to 10 ft, plastic pipe, slotted screen set 10 to 40 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 1,850 ft. Measuring point: Top of casing 1.70 ft above land-surface datum.
 PERIOD OF RECORD.--January 1964 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 10.84 ft below land-surface datum, June 17, 1965; lowest measured, 16.94 ft below land-surface datum, Sept. 18, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 19	16.71	DEC 9	16.77

WELLS COUNTY

474419099371201. Local number, 149-070-09DAA1.
 LOCATION.--Lat 47°44'19", long 099°37'12", Hydrologic Unit 10160001.
 Owner: North Dakota State Water Commission.
 AQUIFER.--New Rockford.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 283 ft, cased to 177 ft, plastic pipe, slotted 177 to 197 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 1,610 ft. Measuring point: Top of casing 1.80 ft above land-surface datum.
 PERIOD OF RECORD.--May 1966 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 64.02 ft below land-surface datum, Dec. 10, 1986; lowest measured, 66.65 ft below land-surface datum, Mar. 15, 1967.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 29	64.48	APR 2	64.39	JUNE 6	64.74

WILLIAMS COUNTY

483048103373101. Local number, 158-100-17ADA.
 LOCATION.--Lat 48°30'48", long 103°37'31", Hydrologic Unit 10110102.
 Owner: North Dakota State Water Commission.
 AQUIFER.--Little Muddy.
 WELL CHARACTERISTICS.--Drilled observation well, diameter 1.25 in, depth 52 ft, cased to 35 ft, plastic pipe, slotted 35 to 43 ft below land-surface datum.
 INSTRUMENTATION.--Measured quarterly using a steel tape.
 DATUM.--Altitude of land-surface datum is 1,987 ft. Measuring point: Top of casing 2.00 ft above land-surface datum.
 PERIOD OF RECORD.--August 1966 to current year.
 EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 18.02 ft below land-surface datum, June 5, 1979; lowest measured, 24.96 ft below land-surface datum, Aug. 8, 1990.

WATER LEVEL, IN FEET BELOW LAND SURFACE DATUM, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL	DATE	WATER LEVEL
NOV 6	21.61	FEB 26	21.24	MAY 7	20.99	AUG 20	24.42

QUALITY OF GROUND WATER

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	LOCAL IDENT- IFIER	GEO- LOGIC UNIT	DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)
BENSON COUNTY										
480005098542001	152-064-07BCA		112BGFV	08-28-91	0800	--	120.00	565	--	7.3
BOWMAN COUNTY										
460705103005301	130-099-01BBB		125TRVL	07-23-91	1130	27.62	60.00	2540	--	9.0
460645103021801	130-099-03ADD		125TRVL	07-23-91	1550	4.32	64.00	6990	--	8.2
460705103025601	130-099-03BAA		125TRVL	07-24-91	0940	21.77	70.00	6500	--	8.4
460645103033302	130-099-04ADD2		125TRVL	08-22-91	1430	18.04	50.00	7500	--	6.8
460705103041101	130-099-04BAA		125TRVL	08-23-91*	1115	14.05	47.00	4210	--	7.3
461355103055701	131-099-19DDD		125TRVL	07-22-91*	1510	25.09	74.00	--	2580	8.6
460902103043601	131-099-21CCB1		125TRVL	08-16-91	1135	59.85	80.00	--	1510	7.5
461355103043303	131-099-21CCC3		125TRVL	08-19-91	1650	76.05	152.00	1710	--	9.1
460856103024401	131-099-22DCC1		125HRMN	08-22-91	1145	46.85	76.00	3980	--	7.4
460856103020701	131-099-23CCC1		125TRVL	08-21-91	1540	75.92	170.00	1380	--	9.4
460856103020702	131-099-23CCC2		125TRVL	08-21-91	1145	74.15	100.00	2800	--	8.5
460804103010101	131-099-26DDC1		125HRMN	08-05-91	1710	44.02	76.00	--	1380	8.6
460843103032001	131-099-27BBC1		120TRTR	08-08-91	1425	54.87	86.00	4890	--	7.9
460843103032003	131-099-27BBC3		125TRVL	08-08-91	1700	58.97	160.00	1680	--	9.2
460823103030301	131-099-27CAB		125TGRVL	07-24-91	1540	19.55	38.00	4350	--	7.0
460816103032701	131-099-27CBC1		125TRVL	08-20-91	1235	52.25	80.00	--	2660	7.8
460816103032702	131-099-27CBC2		125HRMN	08-20-91	1520	52.43	60.00	--	2670	7.6
460830103044504	131-099-29ADD4		125HRMN	08-15-91*	1635	61.51	80.00	2090	--	8.2
460849103053201	131-099-29BAB		125TRVL	07-25-91	1615	19.61	33.00	5250	--	7.8
460834103055501	131-099-29BCC		125TGRVL	08-07-91	1145	11.81	53.00	1810	--	9.4
460823103053201	131-099-29CAB		125TRVL	07-25-91	1345	9.77	30.00	5800	--	7.1
460804103052301	131-099-29CDD		125HRMN	08-06-91	1525	13.01	32.00	11300	--	6.8
460810103051301	131-099-29DCB		125TRVL	08-06-91	1130	13.32	22.00	5600	--	7.0
460751103044501	131-099-32AAD		125TRVL	07-25-91	0950	14.32	23.00	--	7440	6.8
460718103045501	131-099-32DDB		125TRVL	08-22-91	1705	12.82	65.00	2900	--	7.8
460747103032902	131-099-33ADA2		120TRTR	08-07-91	1635	7.60	38.00	--	2690	9.0
460747103032903	131-099-33ADA3		125TRVL	08-07-91	1855	7.77	76.00	2890	--	--
460757103021601	131-099-34AAA		125TGRVL	07-24-91	1315	21.86	41.00	--	6560	--
460744103014801	131-099-35BDB1		125TRVL	08-09-91	1125	37.52	78.00	1390	--	8.9
BURLEIGH COUNTY										
464741100450001	138-080-02CCC		112BMCK	09-09-91*	1145	19.65	142.00	2050	--	7.4
464457100462801	138-080-28AAA1		112BMCK	09-04-91	1500	--	100.00	1430	--	8.2
464457100462802	138-080-28AAA2		112BMCK	09-04-91	1400	--	28.00	870	--	7.9
464457100462803	138-080-28AAA3			09-04-91	1445	--	18.00	850	--	8.4
464943100305801	139-078-27CBB		112GCDF	09-09-91*	1350	27.65	220.00	1850	--	8.2
465707100051301	140-075-12CDD		112SBLC	09-30-91	1530	--	167.00	1790	--	7.9
465521100043501	140-075-24DDD		112SBLC	09-30-91	1432	--	132.00	1780	--	7.9
465856100551801	140-081-05AAA		112WGCL	09-30-91	1000	--	90.00	2020	--	7.5
CAVALIER COUNTY										
484534098254401	161-060-21BBB		211PIRR	09-19-91	1200	11.20	40.00	630	--	7.1
485600098561001	163-064-21AAD		211PIRR	09-19-91	0930	8.20	39.00	5960	--	8.0
EDDY COUNTY										
473627098351301	148-062-29DAA		112BRDO	05-30-91	1122	23.80	105.00	430	--	7.8
473720098592401	148-065-19DAA		112BRDO	05-30-91	1300	46.05	220.00	1320	--	7.9
473934099032301	148-066-03DDC		112BRDO	05-30-91	1430	12.60	218.00	2200	--	7.8
474347099162901	149-067-17BBB			08-26-91	1150	--	260.00	315	--	7.6

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

333

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	PH LAB (STAND- ARD UNITS) (00403)	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)	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)
BENSON COUNTY												
480005098542001		08-28-91	--	--	9.5	--	--	2100	540	180	800	45
BOWMAN COUNTY												
460705103005301		07-23-91	--	23.0	9.0	1.8	17	66	11	9.4	560	94
460645103021801		07-23-91	--	29.0	8.0	2.6	25	230	24	41	1700	94
460705103025601		07-24-91	--	23.5	8.5	2.1	20	190	30	29	1500	94
460645103033302		08-22-91	--	37.0	8.0	0.9	9	2200	230	400	1400	58
460705103041101		08-23-91 ^a	--	22.0	8.5	0.6	6	830	150	110	870	69
461355103055701		07-22-91 ^a	--	26.0	9.0	2.5	--	85	16	11	580	--
460902103043601		08-16-91	--	22.0	8.5	--	--	750	170	80	48	12
461355103043303		08-19-91	--	35.0	9.0	1.4	14	42	6.0	6.5	440	96
460856103024401		08-22-91	--	36.0	9.0	1.1	11	1500	280	200	480	40
460856103020701		08-21-91	--	34.0	9.0	0.8	8	25	5.7	2.7	350	--
460856103020702		08-21-91	--	31.0	8.5	--	--	62	12	7.7	590	95
460804103010101		08-05-91	--	27.0	9.0	--	--	16	3.6	1.8	310	97
460843103032001		08-08-91	--	28.0	8.5	1.4	13	460	77	66	1000	81
460843103032003		08-08-91	--	28.0	8.5	10.8	102	29	8.5	1.9	390	96
460823103030301		07-24-91	--	26.0	8.5	1.9	18	2100	380	290	390	28
460816103032701		08-20-91	--	34.0	10.0	--	--	320	56	44	530	78
460816103032702		08-20-91	--	37.0	10.0	--	--	340	60	45	520	77
460830103044504		08-15-91 ^a	--	22.0	9.0	--	--	170	30	22	430	84
460849103053201		07-25-91	--	27.0	8.5	4.0	39	2500	460	340	560	32
460834103055501		08-07-91	--	22.0	8.0	2.3	22	18	4.9	1.4	400	98
460823103053201		07-25-91	--	28.0	11.0	1.7	17	1200	240	150	1100	66
460804103052301		08-06-91	--	30.0	8.5	--	--	2300	290	390	2300	68
460810103051301		08-06-91	--	25.0	9.5	1.4	14	1800	300	250	890	52
460751103044501		07-25-91	--	24.0	9.0	--	--	3300	480	520	970	39
460718103045501		08-22-91	--	30.0	11.0	--	--	600	100	85	480	63
460747103032902		08-07-91	--	28.0	9.5	--	--	110	22	14	610	92
460747103032903		08-07-91	8.6	28.0	9.5	0.8	8	32	7.1	3.4	670	--
460757103021601		07-24-91	10.7	24.5	8.5	3.6	--	180	44	16	1500	94
460744103014801		08-09-91	--	28.5	9.5	0.5	5	25	6.3	2.2	320	96
BURLEIGH COUNTY												
464741100450001		09-09-91 ^a	--	--	9.0	--	--	240	58	24	420	78
464457100462801		09-04-91	--	--	9.5	--	--	350	89	30	230	58
464457100462802		09-04-91	--	--	10.5	--	--	330	87	28	67	30
464457100462803		09-04-91	--	--	9.5	--	--	420	120	28	52	21
464943100305801		09-09-91 ^a	--	--	9.0	--	--	210	51	20	390	79
465707100051301		09-30-91	--	--	9.0	--	--	460	110	46	270	55
465521100043501		09-30-91	--	--	9.0	--	--	220	56	19	360	77
465856100551801		09-30-91	--	--	9.0	--	--	460	110	44	310	59
CAVALIER COUNTY												
484534098254401		09-19-91	--	--	9.5	--	--	190	41	22	62	41
485600098561001		09-19-91	--	--	6.5	--	--	1600	370	170	960	56
EDDY COUNTY												
473627098351301		05-30-91	--	--	8.5	--	--	170	50	12	23	22
473720098592401		05-30-91	--	--	--	--	--	110	33	7.5	260	82
473934099032301		05-30-91	--	--	7.0	--	--	190	53	14	450	83
474347099162901		08-26-91	--	--	12.5	--	--	240	65	18	690	85

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LITY LAB (MG/L AS CACO3) (90410)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)
BENSON COUNTY												
480005098542001		08-28-91	8	28	370	2800	500	0.10	21	5410	5110	7.36
BOWMAN COUNTY												
460705103005301		07-23-91	30	5.5	553	700	12	1.8	7.7	1630	1640	2.22
460645103021801		07-23-91	49	13	470	3800	6.0	1.5	9.7	5570	5870	7.58
460705103025601		07-24-91	47	12	390	3300	6.7	1.1	11	5110	5120	6.95
460645103033302		08-22-91	13	14	237	4000	18	0.70	9.5	7600	6230	10.3
460705103041101		08-23-91 ^a	13	18	360	2300	10	0.10	13	3780	3700	5.14
461355103055701		07-22-91 ^a	27	--	514	910	9.5	0.90	--	1730	--	--
460902103043601		08-16-91	0.8	10	316	540	14	0.30	11	1120	1070	1.52
461355103043303		08-19-91	30	2.2	655	230	10	12	11	1220	1090	1.66
460856103024401		08-22-91	5	16	490	2000	33	0.50	5.9	3690	3320	5.02
460856103020701		08-21-91	30	--	672	78	14	17	--	1090	--	--
460856103020702		08-21-91	33	5.7	476	880	7.2	2.0	7.1	1810	1790	2.46
460804103010101		08-05-91	33	3.5	447	290	11	2.4	7.8	884	895	1.20
460843103032001		08-08-91	20	32	682	2000	15	1.3	18	3750	3610	5.10
460843103032003		08-08-91	31	2.0	748	160	18	4.4	14	1340	1030	1.82
460823103030301		07-24-91	4	11	714	2400	13	0.30	13	4190	3920	5.70
460816103032701		08-20-91	13	9.6	470	1100	9.8	0.70	7.9	1890	2000	2.57
460816103032702		08-20-91	12	9.0	473	990	9.3	0.70	7.8	1910	1930	2.60
460830103044504		08-15-91 ^a	15	12	518	580	8.4	0.50	8.8	1380	1400	1.88
460849103053201		07-25-91	5	13	253	3600	19	0.40	9.8	5520	5160	7.51
460834103055501		08-07-91	41	3.0	623	330	11	1.3	9.7	1120	1130	1.52
460823103053201		07-25-91	14	21	1180	2400	16	0.50	19	4750	4660	6.46
460804103052301		08-06-91	21	14	723	7000	19	0.70	9.2	10500	10400	14.3
460810103051301		08-06-91	9	35	670	3200	6.6	0.40	35	5020	5130	6.83
460751103044501		07-25-91	7	17	1110	4500	22	0.50	21	7940	7160	10.8
460718103045501		08-22-91	9	13	418	1300	1.9	0.30	10	2190	2230	2.98
460747103032902		08-07-91	25	6.3	575	920	12	1.4	7.4	1840	1940	2.50
460747103032903		08-07-91	52	--	541	920	12	2.1	--	1960	--	--
460757103021601		07-24-91	49	35	115	3300	29	0.80	2.3	5050	5000	6.87
460744103014801		08-09-91	28	2.5	591	170	15	4.5	12	1080	917	1.47
BURLEIGH COUNTY												
464741100450001		09-09-91 ^a	12	9.1	640	470	50	0.80	24	1410	1440	1.92
464457100462801		09-04-91	5	9.8	590	220	38	0.40	26	984	996	1.34
464457100462802		09-04-91	2	6.2	330	160	8.2	0.50	15	586	574	0.80
464457100462803		09-04-91	1	5.6	460	60	6.9	0.40	12	410	564	0.56
464943100305801		09-09-91 ^a	12	12	620	390	60	0.60	24	1300	1320	1.77
465707100051301		09-30-91	5	14	510	570	9.7	0.30	27	1260	1350	1.71
465521100043501		09-30-91	11	9.3	510	530	9.0	0.20	28	1300	1320	1.77
465856100551801		09-30-91	6	17	870	200	84	0.50	21	1210	1310	1.65
CAVALIER COUNTY												
484534098254401		09-19-91	2	3.5	250	60	14	0.20	26	397	377	0.54
485600098561001		09-19-91	10	29	290	3400	49	0.20	26	5270	5180	7.17
EDDY COUNTY												
473627098351301		05-30-91	0.8	4.5	216	7.8	1.8	0.20	28	262	1420	0.36
473720098592401		05-30-91	11	6.5	470	160	56	0.40	25	829	834	1.13
473934099032301		05-30-91	14	9.4	670	410	92	0.20	24	1530	1460	2.08
474347099162901		08-26-91	20	18	1100	23	430	0.20	26	1800	1910	2.45

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

335

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	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)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ARSENIC DIS- SOLVED (UG/L AS AS) (01000)	BORON, DIS- SOLVED (UG/L AS B) (01020)	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)
BENSON COUNTY												
480005098542001	08-28-91	--	--	--	--	--	--	620	--	23000	--	--
BOWMAN COUNTY												
460705103005301	07-23-91	0.070	<0.050	0.430	0.080	--	--	<10	270	--	--	--
460645103021801	07-23-91	0.200	0.320	0.470	0.020	--	--	10	30	--	--	--
460705103025601	07-24-91	0.050	0.051	0.430	0.030	--	--	<10	30	--	--	--
460645103033302	08-22-91	<0.010	<0.050	1.20	<0.010	--	--	20	10000	--	--	--
460705103041101	08-23-91 ^a	--	--	--	--	<1	3400	--	870	<1	260	--
461355103055701	07-22-91 ^a	0.070	<0.050	0.300	0.110	--	--	--	1500	--	--	--
460902103043601	08-16-91	<0.010	<0.050	0.100	<0.010	--	--	<10	9	--	--	--
461355103043303	08-19-91	0.060	<0.050	0.500	0.550	--	--	10	600	--	--	--
460856103024401	08-22-91	--	--	--	--	<1	510	--	50	<1	100	--
460856103020701	08-21-91	0.060	<0.050	0.100	0.090	--	--	--	600	--	--	--
460856103020702	08-21-91	0.020	<0.050	0.320	0.130	--	--	<10	60	--	--	--
460804103010101	08-05-91	0.030	<0.050	0.180	0.100	--	--	<10	78	--	--	--
460843103032001	08-08-91	<0.010	<0.050	0.670	0.030	--	--	<10	80	--	--	--
460843103032003	08-08-91	0.090	<0.050	0.140	0.440	--	--	50	1300	--	--	--
460823103030301	07-24-91	<0.010	<0.050	0.900	<0.010	--	--	20	40	--	--	--
460816103032701	08-20-91	<0.010	<0.050	0.350	0.040	--	--	<10	20	--	--	--
460816103032702	08-20-91	<0.010	<0.050	0.310	0.040	--	--	<10	60	--	--	--
460830103044504	08-15-91 ^a	<0.010	<0.050	0.520	0.020	--	--	<10	10	--	--	--
460849103053201	07-25-91	<0.010	0.300	0.050	<0.010	--	--	20	<10	--	--	--
460834103055501	08-07-91	0.040	<0.050	0.330	0.250	--	--	<10	70	--	--	--
460823103053201	07-25-91	<0.010	<0.050	1.00	<0.010	--	--	20	230	--	--	--
460804103052301	08-06-91	0.010	<0.050	0.940	<0.010	--	--	30	170	--	--	--
460810103051301	08-06-91	<0.010	<0.050	0.200	<0.010	--	--	10	110	--	--	--
460751103044501	07-25-91	0.020	0.230	0.710	<0.010	--	--	30	80	--	--	--
460718103045501	08-22-91	<0.010	<0.050	1.10	0.020	--	--	<10	70	--	--	--
460747103032902	08-07-91	<0.010	<0.050	0.140	0.100	--	--	<10	10	--	--	--
460747103032903	08-07-91	0.060	<0.050	0.440	0.230	--	--	--	110	--	--	--
460757103021601	07-24-91	0.020	0.059	0.140	<0.010	--	--	10	<10	--	--	--
460744103014801	08-09-91	0.060	<0.050	0.100	0.100	--	--	<10	350	--	--	--
BURLEIGH COUNTY												
464741100450001	09-09-91 ^a	--	--	--	--	--	1500	--	40	--	--	--
464457100462801	09-04-91	--	--	--	--	--	370	--	370	--	--	--
464457100462802	09-04-91	--	--	--	--	--	80	--	3900	--	--	--
464457100462803	09-04-91	--	--	--	--	--	90	--	250	--	--	--
464943100305801	09-09-91 ^a	--	--	--	--	--	1600	--	20	--	--	--
465707100051301	09-30-91	--	--	--	--	--	1100	--	40	--	--	--
465521100043501	09-30-91	--	--	--	--	--	1300	--	60	--	--	--
465856100551801	09-30-91	--	--	--	--	--	720	--	50	--	--	--
CAVALIER COUNTY												
484534098254401	09-19-91	--	--	--	--	--	100	--	10	--	--	--
485600098561001	09-19-91	--	--	--	--	--	550	--	30	--	--	--
EDDY COUNTY												
473627098351301	05-30-91	--	--	--	--	--	80	--	40	--	--	--
473720098592401	05-30-91	--	--	--	--	--	360	--	60	--	--	--
473934099032301	05-30-91	--	--	--	--	--	770	--	320	--	--	--
474347099162901	08-26-91	--	--	--	--	--	510	--	90	--	--	--

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MERCURY DIS- SOLVED (UG/L AS HG) (71890)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	ZINC, DIS- SOLVED (UG/L AS ZN) (01090)	CARBON, ORGANIC TOTAL (MG/L AS C) (00680)	C-13 / C-12 STABLE ISOTOPE RATIO PER MIL (82081)	O-18 / O-16 STABLE ISOTOPE RATIO PER MIL (82085)	S-34 / S-32 STABLE ISOTOPE RATIO PER MIL (82086)
BENSON COUNTY												
480005098542001	08-28-91	1700	--	--	--	--	--	--	--	--	--	--
BOWMAN COUNTY												
460705103005301	07-23-91	50	--	--	--	--	--	40	43	-13.20	--	-10.20
460645103021801	07-23-91	150	--	--	--	--	--	40	9.4	-11.40	--	-14.50
460705103025601	07-24-91	60	--	--	--	--	--	<10	15	-13.10	--	-15.20
460645103033302	08-22-91	3300	--	--	--	--	--	120	5.7	-13.90	--	-17.90
460705103041101	08-23-91 ^a	590	<0.1	<1	1	4100	--	--	--	--	--	--
460902103043601	08-16-91	200	--	--	--	--	--	8	2.5	-10.20	--	-12.30
461355103043303	08-19-91	21	--	--	--	--	--	38	110	-10.50	--	--
460856103024401	08-22-91	340	<0.1	22	1	4100	--	--	--	--	--	--
460856103020702	08-21-91	20	--	--	--	--	--	<10	12	-10.40	--	-3.60
460804103010101	08-05-91	19	--	--	--	--	--	10	13	-10.00	--	--
460843103032001	08-08-91	190	--	--	--	--	--	<10	9.0	-14.40	--	-10.10
460843103032003	08-08-91	93	--	--	--	--	--	210	140	-7.60	--	--
460823103030301	07-24-91	3500	--	--	--	--	--	20	8.2	-15.00	--	-15.40
460816103032701	08-20-91	50	--	--	--	--	--	<10	11	-10.80	--	-12.00
460816103032702	08-20-91	60	--	--	--	--	--	<10	12	-11.00	--	-11.90
460830103044504	08-15-91 ^a	50	--	--	--	--	--	<10	7.1	-10.60	--	-9.70
460849103053201	07-25-91	40	--	--	--	--	--	<10	6.6	-10.10	--	-16.60
460834103055501	08-07-91	10	--	--	--	--	--	6	14	-9.60	--	--
460823103053201	07-25-91	510	--	--	--	--	--	<10	55	-16.00	-15.65	-13.20
460804103052301	08-06-91	420	--	--	--	--	--	<10	150	-13.30	--	-12.90
460810103051301	08-06-91	340	--	--	--	--	--	<10	34	-15.20	--	-13.90
460751103044501	07-25-91	3700	--	--	--	--	--	10	81	-13.30	-14.80	-19.40
460718103045501	08-22-91	230	--	--	--	--	--	<10	17	-13.50	--	-15.00
460747103032902	08-07-91	30	--	--	--	--	--	<10	5.3	-12.40	--	-9.10
460757103021601	07-24-91	<10	--	--	--	--	--	<10	9.2	--	--	-18.80
460744103014801	08-09-91	65	--	--	--	--	--	7	140	-9.20	--	--
BURLEIGH COUNTY												
464741100450001	09-09-91 ^a	190	--	--	--	--	--	--	--	--	--	--
464457100462801	09-04-91	70	--	--	--	--	--	--	--	--	--	--
464457100462802	09-04-91	720	--	--	--	--	--	--	--	--	--	--
464457100462803	09-04-91	290	--	--	--	--	--	--	--	--	--	--
464943100305801	09-09-91 ^a	290	--	--	--	--	--	--	--	--	--	--
465707100051301	09-30-91	1200	--	--	--	--	--	--	--	--	--	--
465521100043501	09-30-91	630	--	--	--	--	--	--	--	--	--	--
465856100551801	09-30-91	290	--	--	--	--	--	--	--	--	--	--
CAVALIER COUNTY												
484534098254401	09-19-91	20	--	--	--	--	--	--	--	--	--	--
485600098561001	09-19-91	1400	--	--	--	--	--	--	--	--	--	--
EDDY COUNTY												
473627098351301	05-30-91	530	--	--	--	--	--	--	--	--	--	--
473720098592401	05-30-91	530	--	--	--	--	--	--	--	--	--	--
473934099032301	05-30-91	660	--	--	--	--	--	--	--	--	--	--
474347099162901	08-26-91	410	--	--	--	--	--	--	--	--	--	--

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

337

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	LOCAL IDENT- I- FIER	GEO- LOGIC UNIT	DATE	TIME	DEPTH BELOW LAND SURFACE (WATER LEVEL) (FEET) (72019)	DEPTH OF WELL, TOTAL (FEET) (72008)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)
EMMONS COUNTY								
463632100171901	136-076-07CBC		112BDVL	09-11-91	1430	--	123.00	1120
463607100211501	136-077-16AAD		112BDVL	09-11-91	1400	--	203.00	1250
FOSTER COUNTY								
472216099085001	145-067-13DCC			05-29-91	1400	--	50.00	1110
472543098373301	146-062-30CCC		112BRDO	05-29-91	--	13.30	150.00	1450
473419098330601	147-062-10ABB		112BRDO	05-29-91	1712	9.95	50.00	1400
473124098452501	147-064-25ADD		112BRDO	05-29-91	1557	3.40	65.00	1050
473031099073202	147-066-31ACC2		112CRNG	05-29-91	--	22.32	84.00	850
GRIGGS COUNTY								
471612098113101	144-059-20CCC		112BGFV	07-08-91	1130	--	161.00	1360
473425098232901	147-061-01CCC		112BGFV	06-28-91	1220	31.82	240.00	1440
473600098065901	148-059-36AAB		112BGFV	06-28-91	1045	11.47	143.00	814
MCHENRY COUNTY								
482120100333601	156-077-10BBB		112DNBH	09-18-91 ^a	1416	--	159.00	2790
481948100305901	156-077-13CCB1		112DNBH	09-18-91	1506	--	126.00	2460
481948100305902	156-077-13CCB2		112DNBH	09-18-91	1520	--	56.00	490
481848100333601	156-077-22CCC		211FXHL	09-18-91	1558	--	81.00	1000
482449100225902	157-075-20BBB2		112SORV	09-18-91 ^a	1200	--	40.00	510
NELSON COUNTY								
475445098231301	151-060-07BDD		112BGFV	07-02-91	1100	--	143.00	1470
475650098255101	152-061-35BAA		112BGFV	07-02-91	1230	6.89	163.00	2280
PIERCE COUNTY								
481125100100801	154-074-03BCC		112KLGR	08-26-91	0900	--	163.00	494
RAMSEY COUNTY								
481929098392601	156-062-20BBB		211PIRR	09-18-91	1045	14.60	58.00	1420
TRAILL COUNTY								
473228097051501	147-051-22BBB			09-16-91	1330	3.89	100.00	3170
WALSH COUNTY								
482408097443201	157-055-21DBC		217DKOT	09-17-91	1005	91.30	496.00	980
482449098095801	157-058-18DDD		211PIRR	09-18-91	0830	3.70	100.00	1260
WELLS COUNTY								
472724099323101	146-070-13CCC1		112PPCK	08-28-91	1100	--	30.00	1280

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	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)
EMMONS COUNTY								
463632100171901		09-11-91	8.7	--	9.0	170	34	21
463607100211501		09-11-91	8.2	--	--	260	58	27
FOSTER COUNTY								
472216099085001		05-29-91	7.5	--	8.5	370	96	31
472543098373301		05-29-91	7.8	--	8.5	270	74	20
473419098330601		05-29-91	7.7	--	11.0	160	42	14
473124098452501		05-29-91	7.4	--	9.5	370	87	38
473031099073202		05-29-91	7.3	--	9.0	370	97	30
GRIGGS COUNTY								
471612098113101		07-08-91	7.6	--	8.0	260	69	21
473425098232901		06-28-91	7.5	--	7.0	160	38	16
473600098065901		06-28-91	7.8	--	13.0	230	59	20
MCHENRY COUNTY								
482120100333601		09-18-91 ^a	8.5	--	9.0	48	15	2.5
481948100305901		09-18-91	8.0	--	9.0	63	17	5.0
481948100305902		09-18-91	8.6	--	--	240	70	15
481848100333601		09-18-91	8.9	--	7.0	10	3.0	0.50
482449100225902		09-18-91 ^a	7.2	0.0	9.0	240	63	20
NELSON COUNTY								
475445098231301		07-02-91	7.2	--	11.0	160	47	11
475650098255101		07-02-91	7.5	--	9.0	350	95	27
PIERCE COUNTY								
481125100100801		08-26-91	8.0	--	11.5	170	41	17
RAMSEY COUNTY								
481929098392601		09-18-91	7.8	--	9.0	180	44	16
TRAILL COUNTY								
473228097051501		09-16-91	7.8	--	9.5	320	75	33
WALSH COUNTY								
482408097443201		09-17-91	8.1	--	8.0	310	65	35
482449098095801		09-18-91	7.9	--	8.0	100	27	8.0
WELLS COUNTY								
472724099323101		08-28-91	8.0	--	11.5	410	98	40

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER

339

WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	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 CAO3) (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)
EMMONS COUNTY										
463632100171901		09-11-91	220	72	7	8.9	480	180	3.5	0.40
463607100211501		09-11-91	210	63	6	12	530	200	5.5	0.40
FOSTER COUNTY										
472216099085001		05-29-91	110	38	2	14	490	110	18	0.10
472543098373301		05-29-91	250	66	7	11	670	0.80	120	0.30
473419098330601		05-29-91	260	77	9	7.7	390	270	70	0.40
473124098452501		05-29-91	92	34	2	7.2	350	220	5.0	0.20
473031099073202		05-29-91	45	21	1	4.8	390	75	4.6	0.10
GRIGGS COUNTY										
471612098113101		07-08-91	200	62	5	7.7	380	250	59	0.20
473425098232901		06-28-91	240	75	8	7.9	320	170	150	0.30
473600098065901		06-28-91	82	43	2	6.3	240	150	19	0.20
MCHENRY COUNTY										
482120100333601		09-18-91 ^a	610	96	38	5.1	630	1.6	510	0.60
481948100305901		09-18-91	490	94	27	4.8	440	2.5	510	0.70
481948100305902		09-18-91	8.0	7	0.2	1.9	240	14	7.5	0.70
481848100333601		09-18-91	240	98	34	1.1	520	3.3	25	0.70
482449100225902		09-18-91 ^a	11	9	0.3	1.6	240	28	1.8	0.10
NELSON COUNTY										
475445098231301		07-02-91	250	76	9	8.4	380	150	130	0.30
475650098255101		07-02-91	380	69	9	13	470	490	140	0.20
PIERCE COUNTY										
481125100100801		08-26-91	39	32	1	5.3	240	12	7.7	0.20
RAMSEY COUNTY										
481929098392601		09-18-91	270	76	9	7.9	470	290	4.9	0.30
TRAILL COUNTY										
473228097051501		09-16-91	550	77	13	26	250	710	400	2.1
WALSH COUNTY										
482408097443201		09-17-91	2000	92	50	38	460	23	2900	0.80
482449098095801		09-18-91	99	67	4	5.0	130	170	28	0.20
WELLS COUNTY										
472724099323101		08-28-91	160	45	3	12	480	220	58	0.20

a Replicate sample also collected for quality-assurance purposes.

QUALITY OF GROUND WATER
WATER-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

STATION	NUMBER	DATE	SILICA, DIS- SOLVED (MG/L AS SIO ₂) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	BORON, DIS- SOLVED (UG/L AS B) (01020)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)
EMMONS COUNTY									
463632100171901		09-11-91	25	765	784	1.04	460	20	420
463607100211501		09-11-91	26	799	857	1.09	420	20	440
FOSTER COUNTY									
472216099085001		05-29-91	28	697	703	0.95	140	3300	720
472543098373301		05-29-91	24	892	902	1.21	140	1200	480
473419098330601		05-29-91	27	930	924	1.26	970	80	930
473124098452501		05-29-91	29	703	692	0.96	430	2800	250
473031099073202		05-29-91	28	528	521	0.72	240	2100	180
GRIGGS COUNTY									
471612098113101		07-08-91	24	819	859	1.11	450	40	880
473425098232901		06-28-91	29	852	846	1.16	350	90	150
473600098065901		06-28-91	24	503	507	0.68	110	60	650
MCHENRY COUNTY									
482120100333601		09-18-91 ^a	20	1570	1550	2.14	1600	60	10
481948100305901		09-18-91	16	1340	1310	1.82	1400	110	30
481948100305902		09-18-91	24	291	288	0.40	70	1100	190
481848100333601		09-18-91	20	621	605	0.84	1700	390	10
482449100225902		09-18-91 ^a	22	281	293	0.38	50	680	210
NELSON COUNTY									
475445098231301		07-02-91	27	868	855	1.18	690	80	380
475650098255101		07-02-91	25	1390	1460	1.89	930	60	720
PIERCE COUNTY									
481125100100801		08-26-91	21	299	294	0.41	110	3800	160
RAMSEY COUNTY									
481929098392601		09-18-91	25	939	944	1.28	930	60	230
TRAILL COUNTY									
473228097051501		09-16-91	23	1990	1970	2.71	1600	190	200
WALSH COUNTY									
482408097443201		09-17-91	4.0	5190	5350	7.06	4100	60	40
482449098095801		09-18-91	17	458	434	0.62	210	60	140
WELLS COUNTY									
472724099323101		08-28-91	25	930	905	1.26	320	1200	210

a Replicate sample also collected for quality-assurance purposes.

CHEMICAL QUALITY OF PRECIPITATION

341

RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND
(National Trends Network precipitation-quality station)

LOCATION.--Lat 48°47'14", long 97°44'23", in SW¹/₄NW¹/₄SW¹/₄ sec. 10, T.161 N., R.55 W., Pembina County, Hydrologic Unit 09020313, at Icelandic State Park 5.6 mi west of Cavalier.

PERIOD OF RECORD.--October 1983 to current year (weekly composite).

INSTRUMENTATION.--The composite sample collector is an Aerochem Metrics¹ model 301 wet/dry precipitation collector mounted on ground surface. Precipitation quantity is determined by a Belfort¹ model 5-780 recording rain gage equipped with an event recorder and an Alter-type wind screen. The recording rain gage is installed 20 ft east of the sample collector with gage mouth and collector bucket elevations of 50.75 in above land surface. A nonrecording National Weather Service rain gage is installed 28 ft south of the composite sample collector as a quality check on weekly composite precipitation volume.

REMARKS.--Data presented are provisional analyses by the Central Analytical Laboratory of the Illinois State Water Survey and have not completed quality-assurance review by the National Atmospheric Deposition Program. Unless noted starting and ending time for composite period is 9:00 a.m. Analyses are determined from water taken from the sample collector.

COOPERATION.--Onsite observers are provided by the North Dakota State Parks and Recreation Department.

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	PRECIP- ITATION TOTAL INCHES/ WEEK (00046)	COL- LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
09/25 to 10/02	b0.0	--	--	--	--	--	--
10/02 to 10/09	0.07	129	24	--	6.1	--	1.865
10/09 to 10/16	0.04	125	17	--	5.6	--	0.710
10/16 to 10/23	<0.01	>300	--	--	--	--	--
10/23 to 10/30	0.15	87	10	--	5.7	--	0.120
10/30 to 11/06	b0.0	--	--	--	--	--	--
11/06 to 11/13	b0.0	--	--	--	--	--	--
11/13 to 11/20	b0.0	--	--	--	--	--	--
11/20 to 11/27	--	--	19	--	4.9	--	0.153
11/27 to 12/04	0.15	20	--	7	--	6.3	0.251
12/04 to 12/11	0.05	80	6	--	5.0	--	0.118
12/11 to 12/18	0.10	70	--	8	--	5.5	0.216
12/24 to 01/02	--	--	--	12	--	4.8	0.270
01/02 to 01/08	0.10	20	--	a7	--	a6.2	a0.311
01/08 to 01/15	b--	--	--	--	--	--	--
01/15 to 01/22	b--	--	--	--	--	--	--
01/22 to 01/29	b--	--	--	--	--	--	--
01/29 to 02/05	b0.0	--	--	--	--	--	--
02/05 to 02/12	b0.0	--	--	--	--	--	--
02/12 to 02/19	0.37	35	6	--	5.5	--	0.187
02/19 to 02/26	0.16	44	7	--	5.4	--	0.156
02/26 to 03/05	b0.15	<6.7	--	18	--	6.6	--
03/05 to 03/12	0.10	80	6	--	5.7	--	0.130
03/12 to 03/19	0.14	64	21	--	4.4	--	0.215
03/19 to 03/26	b0.0	--	--	--	--	--	--
03/26 to 04/02	0.03	33	--	a43	--	a6.3	a1.926
04/02 to 04/09	b<0.01	100	--	a88	--	a6.4	a4.663
04/09 to 04/16	0.89	91	8	--	5.1	--	0.199
04/16 to 04/23	0.33	82	10	--	5.4	--	0.307

1 The use of brand names in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

a To provide for an adequate sample, 50 milliliters of dilution water was added.

b Trace of water collected in field sampler.

CHEMICAL QUALITY OF PRECIPITATION

RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND--CONTINUED
(National Trends Network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	PRECIP- TATION TOTAL INCHES/ WEEK (00046)	COL- LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
04/23 to 04/30	1.35	81	11	--	5.2	--	0.236
04/30 to 05/07	1.29	86	5	--	5.1	--	0.045
05/07 to 05/14	0.30	97	17	--	5.0	--	0.478
05/14 to 05/21	0.17	88	48	--	7.4	--	2.889
05/21 to 05/28	1.23	96	10	--	6.6	--	0.365
05/28 to 06/04	0.06	117	15	--	5.5	--	0.808
06/04 to 06/11	1.62	98	17	--	4.6	--	0.232
06/11 to 06/18	0.52	96	8	--	5.8	--	0.255
06/18 to 06/25	--	--	4	--	5.1	--	0.187
06/25 to 07/02	1.89	98	8	--	5.3	--	0.186
07/02 to 07/09	1.32	92	4	--	5.2	--	0.035
07/09 to 07/16	0.87	99	7	--	--	5.6	0.204
07/16 to 07/23	0.49	94	12	--	6.3	--	0.596
07/23 to 07/30	0.05	80	--	6	--	5.9	0.224
07/30 to 08/06	1.10	104	10	--	6.1	--	0.418
08/06 to c08/13	b0.0	--	--	--	--	--	--
c08/13 to 08/20	0.28	96	19	--	4.6	--	0.397
08/20 to 08/27	0.15	73	16	--	7.0	--	1.364
08/27 to 09/03	0.0	--	--	a2	--	a5.7	a0.031
09/03 to 09/10	0.82	109	5	--	5.6	--	0.092
09/10 to 09/17	0.80	101	5	--	5.7	--	0.103
09/17 to 09/24	1.56	95	5	--	6.3	--	0.315

a To provide for an adequate sample, 50 milliliters of dilution water was added.

b Trace of water collected in field sampler.

c Ending and starting time was 12:00, noon.

CHEMICAL QUALITY OF PRECIPITATION

343

RED RIVER OF THE NORTH BASIN

484714097442301 ICELANDIC STATE PARK, ND--CONTINUED
(National Trends Network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
09/25 to 10/02	--	--	--	--	--	--	--	--
10/02 to 10/09	0.545	0.865	0.758	1.88	0.83	0.420	0.630	<0.007
10/09 to 10/16	0.168	0.572	0.771	2.14	0.82	0.400	0.470	<0.007
10/16 to 10/23	--	--	--	--	--	--	--	--
10/23 to 10/30	0.023	0.053	0.204	0.76	0.21	0.110	0.270	<0.007
10/30 to 11/06	--	--	--	--	--	--	--	--
11/06 to 11/13	--	--	--	--	--	--	--	--
11/13 to 11/20	--	--	--	--	--	--	--	--
11/20 to 11/27	0.017	0.078	0.028	1.99	0.05	0.420	0.630	<0.007
11/27 to 12/04	0.074	0.106	0.038	0.33	0.22	0.150	0.290	<0.007
12/04 to 12/11	0.046	0.210	0.034	0.30	0.27	0.100	0.250	<0.007
12/11 to 12/18	0.041	0.116	0.054	0.64	0.23	0.400	0.320	<0.007
12/24 to 01/02	0.046	0.121	0.008	0.26	0.16	0.580	0.110	0.073
01/02 to 01/08	a0.068	a0.725	a0.068	a0.12	a0.96	a<0.020	a<0.050	a<0.021
01/08 to 01/15	--	--	--	--	--	--	--	--
01/15 to 01/22	--	--	--	--	--	--	--	--
01/22 to 01/29	--	--	--	--	--	--	--	--
01/29 to 02/05	--	--	--	--	--	--	--	--
02/05 to 02/12	--	--	--	--	--	--	--	--
02/12 to 02/19	0.046	0.034	0.005	0.26	0.07	0.160	0.250	<0.007
02/19 to 02/26	0.028	0.093	0.024	0.65	0.11	0.250	0.230	<0.007
02/26 to 03/05	--	--	--	--	--	--	--	--
03/05 to 03/12	0.021	0.209	0.007	0.31	0.08	0.160	0.050	<0.007
03/12 to 03/19	0.029	0.108	0.015	0.68	0.19	0.660	0.130	<0.007
03/19 to 03/26	--	--	--	--	--	--	--	--
03/26 to 04/02	a0.319	a0.383	a0.089	a4.85	a0.32	a1.10	a0.790	a<0.043
04/02 to 04/09	a0.775	a0.896	a0.375	a8.24	a1.09	a3.06	a1.88	a<0.081
04/09 to 04/16	0.034	0.025	0.035	0.83	0.07	0.180	0.190	<0.007
04/16 to 04/23	0.064	0.128	0.084	1.00	0.09	0.120	0.360	<0.007
04/23 to 04/30	0.043	0.021	0.029	1.42	0.03	0.280	0.510	<0.007
04/30 to 05/07	0.005	0.013	0.004	0.47	<0.03	0.070	0.140	<0.007
05/07 to 05/14	0.091	0.078	0.058	1.37	0.11	0.290	0.610	<0.007
05/14 to 05/21	0.641	0.203	0.152	3.12	0.29	1.74	2.48	<0.007
05/21 to 05/28	0.083	0.021	0.040	0.76	0.04	0.280	0.500	<0.007
05/28 to 06/04	0.210	0.123	0.363	0.87	0.45	0.530	0.290	<0.007
06/04 to 06/11	0.040	0.030	0.026	2.55	0.08	0.260	0.440	<0.007
06/11 to 06/18	0.050	0.028	0.024	0.58	0.10	0.310	0.610	<0.007
06/18 to 06/25	0.044	0.015	0.006	0.27	0.07	0.130	0.030	<0.007
06/25 to 07/02	0.021	0.054	0.032	1.01	0.10	0.220	0.320	<0.007
07/02 to 07/09	0.008	0.022	0.726	0.21	0.04	0.060	0.030	<0.007
07/09 to 07/16	0.046	0.011	0.012	0.66	0.04	0.210	0.230	<0.007
07/16 to 07/23	0.123	0.061	0.065	1.03	0.10	0.350	0.140	<0.007
07/23 to 07/30	0.066	0.435	0.013	0.66	0.19	0.060	<0.020	<0.007
07/30 to 08/06	0.124	0.032	0.063	0.73	0.07	0.240	0.540	<0.007
08/06 to b08/13	--	--	--	--	--	--	--	--
b08/13 to 08/20	0.102	0.048	0.037	2.65	0.08	0.470	0.400	<0.007
08/20 to 08/27	0.375	0.043	0.207	1.06	0.12	0.320	0.320	<0.007
08/27 to 09/03	a0.007	a0.084	a0.013	a<0.03	a0.10	a0.020	a<0.020	a<0.007
09/03 to 09/10	0.019	0.019	0.003	0.56	0.04	0.130	0.220	<0.007
09/10 to 09/17	0.031	0.029	0.020	0.35	0.04	0.090	0.160	<0.007
09/17 to 09/24	0.070	0.020	0.030	0.57	<0.03	0.110	0.230	<0.007

a To provide for an adequate sample, 50 milliliters of dilution water was added.

b Ending and starting time for period was 12:00, noon.

CHEMICAL QUALITY OF PRECIPITATION

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND
(National Trends Network precipitation-quality station)

LOCATION.--Lat 47°14'32", long 99°14'02", in SE¹/₄SW¹/₄SW¹/₄, sec.12, T.142 N., R.68 W., Stutsman County, Hydrologic Unit 10160002, at U.S. Fish and Wildlife Service Northern Prairie Wildlife Research Center, Woodworth Experiment Station, 2.8 mi east and 1 mi south of Woodworth.

PERIOD OF RECORD.--November 1983 to current year (weekly composite).

INSTRUMENTATION.--The composite sample collector is an Aerochem Metrics¹ model 301 wet/dry precipitation collector mounted on ground surface. Precipitation quantity is determined by a Belfort¹ model 5-780 recording rain gage equipped with an event recorder and an Alter-type wind screen. The recording rain gage is installed 17 ft east of the sample collector with gage mouth and collector bucket elevations of 50.75 in above land surface.

REMARKS.--The station is located 300 ft west of an event sample-collection station which was operated by the North Dakota State Health Department (station discontinued 1987). Continuously recording meteorological instrumentation for air temperature, wind speed, and wind direction were installed 9.8 ft above land surface at the event station. Data presented are provisional analyses by the Central Analytical Laboratory of the Illinois State Water Survey and have not completed quality-assurance review by the National Atmospheric Deposition Program. Unless noted starting and ending time for composite periods is 9:00 a.m. Analyses are determined from water taken from the sample collector.

COOPERATION.--Onsite observers are provided by the U.S. Fish and Wildlife Service.

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	PRECIP- ITATION TOTAL INCHES/ WEEK (00046)	COL- LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
09/25 to 10/02	0.33	115	11	--	4.9	--	0.101
10/02 to 10/09	b<0.01	100	--	--	--	--	--
10/09 to 10/16	<0.01	>200	--	18	--	6.4	0.566
10/16 to 10/23	0.35	57	8	--	5.8	--	0.121
10/23 to 10/30	b0.0	--	--	--	--	--	--
10/30 to 11/06	0.0	--	--	a2	--	a5.7	a0.023
11/06 to 11/13	0.0	--	--	a3	--	a5.9	a0.042
11/13 to 11/20	0.0	--	--	a2	--	a5.6	a0.024
11/20 to 11/27	b<0.01	100	--	--	--	--	--
11/27 to 12/04	b0.07	<14	--	--	--	--	--
12/04 to 12/11	0.0	--	--	--	--	--	--
12/11 to 12/18	0.0	--	--	--	--	--	--
12/18 to 12/26	--	--	--	a2	--	a5.5	a0.027
12/26 to 01/02	b--	--	--	--	--	--	--
01/02 to 01/08	0.0	--	--	a2	--	a5.7	a0.046
01/08 to 01/15	--	--	--	a2	--	a5.6	a0.037
01/15 to 01/22	0.0	--	--	a2	--	a5.6	a0.047
01/22 to 01/29	b0.03	<33	--	23	--	6.8	--
01/29 to 02/05	0.0	--	--	a3	--	a5.5	a0.014
02/05 to 02/12	0.05	100	3	--	5.6	--	0.208
02/12 to 02/19	b0.06	<17	--	--	--	--	--
02/19 to 02/26	b0.17	<6.0	--	--	--	--	--
02/26 to 03/05	b0.03	<33	--	--	--	--	--
03/05 to 03/12	0.0	--	--	a2	--	a5.8	a0.017
03/12 to 03/19	0.07	129	8	--	4.9	--	0.052
03/19 to 03/26	0.04	50	--	a23	--	a6.4	a0.351
03/26 to 04/02	0.02	100	--	a11	--	a6.5	a0.363
04/02 to 04/09	0.0	--	--	a1	--	a5.8	a<0.009
04/09 to 04/16	0.43	133	9	--	5.1	--	0.245

1 The use of brand names in this report is for identification purposes only and does not imply endorsement by the U.S. Geological Survey.

a To provide for an adequate sample, 50 milliliters of dilution water was added.

b Trace of water collected in field sampler.

CHEMICAL QUALITY OF PRECIPITATION

345

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND--CONTINUED
(National Trends Network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	PRECIP- ITATION TOTAL INCHES/ WEEK (00046)	COL- LECTOR EFFI- CIENCY WET DEPOS. PERCENT (82284)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	SPE- CIFIC CON- DUCT- ANCE LAB (US/CM) (90095)	PH (STAND- ARD UNITS) (00400)	PH LAB (STAND- ARD UNITS) (00403)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)
04/16 to 04/23	0.02	50	--	a32	--	a6.2	a0.882
04/23 to 04/30	1.15	101	9	--	5.7	--	0.327
04/30 to 05/07	0.37	70	5	--	4.8	--	0.131
05/07 to 05/14	b0.03	<33	--	--	--	--	--
05/14 to 05/21	0.96	109	13	--	6.1	--	0.771
05/21 to 05/28	0.53	104	5	--	4.7	--	0.140
05/28 to 06/04	0.12	150	12	--	4.7	--	0.372
06/04 to 06/11	0.33	103	--	22	4.6	--	0.232
06/11 to 06/18	1.62	102	7	--	5.6	--	0.077
06/18 to 06/25	0.45	107	14	--	6.3	--	0.247
06/25 to 07/02	0.83	192	9	--	6.0	--	0.199
07/02 to 07/09	0.10	100	11	--	4.9	--	0.500
07/09 to 07/16	0.24	100	11	--	5.9	--	0.469
07/16 to 07/23	0.56	27	41	--	5.7	--	1.309
07/23 to 07/30	0.24	79	15	--	5.9	--	1.297
07/30 to 08/06	0.04	--	--	a20	--	a6.0	1.344
08/06 to 08/13	0.0	--	--	a1	--	a5.9	a0.021
08/13 to 08/20	0.50	98	12	--	5.9	--	a0.436
08/20 to 08/27	0.31	97	14	--	6.2	--	0.749
08/27 to 09/03	0.0	--	--	a4	--	a5.7	a0.141
09/03 to 09/10	1.30	109	6	--	5.6	--	0.051
09/10 to 09/17	1.00	105	4	--	4.9	--	0.019
09/17 to 09/24	0.07	129	6	--	5.5	--	0.166

a To provide for an adequate sample, 50 milliliters of dilution water was added.

b Trace of water collected in field sampler.

CHEMICAL QUALITY OF PRECIPITATION

JAMES RIVER BASIN

470732099140204 WOODWORTH, ND--CONTINUED
(National Trends Network precipitation-quality station)

PRECIPITATION-QUALITY DATA, WATER YEAR OCTOBER 1990 TO SEPTEMBER 1991

PERIOD OF COLLECTION	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	NITRO- GEN, NITRATE DIS- SOLVED (MG/L AS N) (00618)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	PHOS- PHORUS DIS- SOLVED (MG/L AS P) (00666)
09/25 to 10/02	0.025	0.020	0.017	1.04	0.08	0.100	0.160	<0.007
10/02 to 10/09	--	--	--	--	--	--	--	--
10/09 to 10/16	0.169	0.990	0.099	3.45	0.34	0.260	0.600	0.010
10/16 to 10/23	0.032	0.029	0.030	0.650	0.07	0.140	0.400	0.010
10/23 to 10/30	--	--	--	--	--	--	--	--
10/30 to 11/06	a0.009	a0.082	a0.006	a0.130	a0.07	a0.030	a0.060	a0.023
11/06 to 11/13	a0.013	a0.316	a0.014	a0.040	a0.08	a0.020	a0.070	a<0.007
11/13 to 11/20	a0.005	a0.060	a<0.003	a<0.030	a0.06	a0.030	a0.050	a0.010
11/20 to 11/27	--	--	--	--	--	--	--	--
11/27 to 12/04	--	--	--	--	--	--	--	--
12/04 to 12/11	--	--	--	--	--	--	--	--
12/11 to 12/18	--	--	--	--	--	--	--	--
12/18 to 12/26	a0.007	a0.048	a0.013	a0.050	a0.06	a0.010	a0.070	a<0.007
12/26 to 01/02	--	--	--	--	--	--	--	--
01/02 to 01/08	a0.012	a0.117	a0.018	a0.120	a0.15	a0.060	a0.070	a<0.007
01/08 to 01/15	a0.010	a0.119	a0.017	a0.060	a0.17	a0.040	a0.030	a<0.007
01/15 to 01/22	a0.011	a0.044	a0.023	a0.050	a0.18	a0.010	a<0.020	a0.010
01/22 to 01/29	--	--	--	--	--	--	--	--
01/29 to 02/05	a0.003	a0.144	a0.085	a0.060	a0.18	a0.020	a<0.020	a<0.007
02/05 to 02/12	0.051	0.789	0.498	0.250	0.98	0.090	0.120	<0.007
02/12 to 02/19	--	--	--	--	--	--	--	--
02/19 to 02/26	--	--	--	--	--	--	--	--
02/26 to 03/05	--	--	--	--	--	--	--	--
03/05 to 03/12	a0.004	a0.055	a0.007	a0.050	a0.07	a0.030	a<0.020	a<0.007
03/12 to 03/19	0.012	0.023	<0.003	0.340	0.05	0.210	0.040	<0.007
03/19 to 03/26	a0.068	a0.275	a0.089	a4.15	a0.39	a0.520	a1.11	a<0.024
03/26 to 04/02	a0.088	a0.790	a0.146	a0.580	a0.34	a0.280	a0.050	a<0.023
04/02 to 04/09	a<0.003	a0.048	a<0.003	a<0.030	a0.05	a0.020	a<0.020	a<0.007
04/09 to 04/16	0.043	0.045	0.026	1.08	0.07	0.210	0.210	<0.007
04/16 to 04/23	a0.160	a0.296	a0.070	a6.14	a0.28	a0.840	a1.62	a0.058
04/23 to 04/30	0.063	0.022	0.033	1.03	0.03	0.210	0.550	<0.007
04/30 to 05/07	0.013	0.114	0.025	0.30	0.04	0.100	0.040	<0.007
05/07 to 05/14	--	--	--	--	--	--	--	--
05/14 to 05/21	0.138	0.070	0.030	0.89	0.09	0.450	0.690	<0.007
05/21 to 05/28	0.019	0.024	0.041	0.36	0.05	0.180	0.160	<0.007
05/28 to 06/04	0.088	0.063	0.119	0.93	0.11	0.290	0.360	<0.007
06/04 to 06/11	0.045	0.039	0.038	3.22	0.14	0.630	0.900	0.007
06/11 to 06/18	0.014	0.018	0.031	0.50	0.08	0.180	0.370	<0.007
06/18 to 06/25	0.052	0.066	0.278	1.06	0.21	0.360	0.790	0.070
06/25 to 07/02	0.028	0.050	0.106	0.77	0.11	0.200	0.680	0.043
07/02 to 07/09	0.125	0.078	0.065	1.57	0.14	0.210	0.190	0.007
07/09 to 07/16	0.105	0.085	0.018	0.89	0.14	0.410	0.790	<0.007
07/16 to 07/23	0.273	0.101	0.206	4.06	0.27	1.22	3.88	<0.007
07/23 to 07/30	0.424	0.048	0.132	0.59	0.13	0.350	0.640	<0.007
07/30 to 08/06	0.352	0.077	0.277	2.95	0.23	0.490	0.120	<0.007
08/06 to 08/13	a0.004	a0.112	a0.008	a<0.03	a0.14	a0.020	a<0.020	a<0.007
08/13 to 08/20	a0.114	a0.045	a0.061	a1.14	a0.08	a0.290	a0.540	a<0.007
08/20 to 08/27	0.176	0.043	0.109	1.27	0.06	0.390	0.710	<0.007
08/27 to 09/03	a0.026	a0.123	a0.037	a0.41	a0.13	a0.130	a0.050	a<0.007
09/03 to 09/10	0.006	0.014	0.016	0.36	<0.03	0.110	0.050	<0.007
09/10 to 09/17	<0.003	0.012	0.003	0.16	0.03	0.050	0.030	<0.007
09/17 to 09/24	0.036	0.080	0.047	0.51	0.11	0.110	0.100	<0.007

a To provide for an adequate sample, 50 milliliters of dilution water was added.

INDEX

	Page		Page
Access to WATSTORE-----	32	Crest-stage partial-record stations-----	311-312
Acre-foot (AC-FT, acre-ft), definition of-----	33	Crooked Creek near Manning-----	314
Analyses of samples collected at miscellaneous ground-water quality sites-----	332-340	Cubic foot per second per square mile (CFSM), definition of-----	33
Analyses of samples collected at water-quality partial-record stations and miscellaneous sites-----	317-321	Cubic foot per second, definition of-----	33
Annual 7-day minimum-----	33	Cubic foot per second-day, definition of-----	33
Apple Creek near Menoken-----	251-252	Cut Bank Creek at Upham-----	166
Apple Creek basin, gaging-station records for-----	248-252	Cypress Creek near Sarles-----	121-122
Aquifer, definition of-----	33		
Artesian, definition of-----	33	Deep River near Upham-----	165
		Deepwater Creek near Raub-----	314
Bacteria, definition of-----	33	Definition of terms-----	33-36
Fecal coliform, definition of-----	33	Des Lacs River at Foxholm-----	150-152
Fecal streptococcal, definition of-----	33	Des Lacs River near Kenmare-----	149
Baldhill Creek near Dazey-----	74-75	Devils Lake near Devils Lake-----	71
Bear Creek near Oakes-----	290-291	Discharge, definition of-----	33
Bear Den Creek near Mandaree-----	185-187	instantaneous, definition of-----	33
Bear Den Creek basin, gaging station records for-----	185-187	mean, definition of-----	33
Beaver Creek (tributary to Goose River) near Finley-----	100-102	suspended-sediment, definition of-----	35
Beaver Creek (tributary to Little Missouri River) near Trotters-----	190-191	Discharge measurements at partial record and miscellaneous sites-----	311-316
Beaver Creek (tributary to Missouri River) at Linton-----	265-266	Dissolved, definition of-----	33
Beaver Creek basin, gaging-station records for-----	265-266	Dissolved-solids concentration, definition of-----	34
Bed load, definition of-----	35	Divide County, ground-water levels for-----	323
Bed material, definition of-----	33	Downstream order system-----	15
Benson County, ground-water levels for-----	322	Drainage area, definition of-----	34
Benson County, ground-water quality sites-----	332-336	Drainage basin, definition of-----	34
Big Coulee near Churchs Ferry-----	67	Dry Lake near Penn-----	65
Big Muddy Creek near Almont-----	238-239	Dunn County, ground-water levels for-----	324
Biochemical oxygen demand (BOD), definition of-----	33		
Bonnes Coulee near Velva-----	311	E. A. Patterson Lake near Dickinson-----	225-226
Boundary Creek near Landa-----	167	East Branch Short Creek Reservoir near Columbus-----	137
Bowman County, ground-water levels for-----	323	East Fork Shell Creek near Parshall-----	314, 317-320
Bowman County, ground-water quality sites-----	332-336	Eddy County, ground-water levels for-----	324
Bowman-Haley Lake near Haley-----	267	Eddy County, ground-water quality sites-----	332-336
Brush Creek near Beulah-----	204-205	Edmore Coulee near Edmore-----	59-60
Burleigh County, ground-water levels for-----	323	Edmore Coulee Tributary near Webster-----	61
Burleigh County, ground-water quality sites-----	332-336	Elm Creek near Golden Valley-----	312
Burnt Creek near Bismarck-----	221-222	Emmons County, ground-water levels for-----	324
Burnt Creek basin, gaging-station records for-----	221-222	Emmons County, ground-water quality sites-----	337-340
		Explanation of records-----	14-31
Cannonball River, at Breien-----	262-264		
at Regent-----	254-255	Fecal coliform bacteria, definition of-----	33
Cannonball River basin, gaging-station records for-----	254-264	Fecal streptococcal bacteria, definition of-----	33
Cannonball River basin, miscellaneous sites-----	316	Forest River, at Minto-----	110-111
Cannonball River below Bentley-----	316	near Fordville-----	108-109
Cannonball River near Raleigh-----	316	Foster County, ground-water quality sites-----	337-340
Cavalier County, ground-water quality sites-----	332-336		
Cedar Creek, near Haynes-----	258-259	Gage height (G.H.), definition of-----	34
near Keldron-----	316	Gaging station, definition of-----	34
near Pretty Rock-----	316	Goose River, at Hillsboro-----	103-104
near Raleigh-----	260-261	Grand Forks County, ground-water levels for-----	325
White Butte Fork, near Scranton-----	256-257	Grand River, North Fork, at Haley-----	268-269
Cells/volume, definition of-----	33	Grand River basin, gaging-station records for-----	267-269
Cfs, definition of-----	33	Green River, near New Hradec-----	229-230
Channel A near Penn-----	68-70	near Dickinson-----	315
Chemical oxygen demand (COD), definition of-----	33	near Gladstone-----	315
Chemical quality of streamflow-----	11	Griggs County, ground-water quality sites-----	337-340
Climate-----	5-8	Griggs County, ground-water levels for-----	325-326
Coliform bacteria, fecal, definition of-----	33	Ground-water levels-----	11-14
fecal streptococcal, definition of-----	33	Ground-water level data, by counties: Benson County-----	322
Coliform organisms, definition of-----	33	Bowman County-----	323
Color unit, definition of-----	33	Burleigh County-----	323
Concentration, suspended-sediment, definition of-----	35	Divide County-----	323
Contents, definition of-----	33	Dunn County-----	324
Control, definition of-----	33	Eddy County-----	324
Cooperation-----	1	Emmons County-----	324
Crest-stage gage, definition of-----	33	Grand Forks County-----	325
		Griggs County-----	325-326
		Hettinger County-----	326
		Kidder County-----	326
		McLean County-----	327
		Oliver County-----	327

	Page		Page
Ground-water level data, by counties:		Lakes and Reservoirs:	
Pemba County-----	327	Ashtabula, Lake, at Baldhill Dam-----	76
Pierce County-----	328	Bowman-Haley Lake, near Haley-----	267
Richland County-----	328	Darling, Lake, near Foxholm-----	146
Stark County-----	328	Darling, Lake, near Grano-----	145
Steele County-----	329	Devils Lake, near Devils Lake-----	71
Stutsman County-----	329	Dry Lake near Penn-----	65
Traill County-----	329	E. A. Patterson Lake near Dickinson-----	225-226
Walsh County-----	330	East Branch Short Creek Reservoir near	
Ward County-----	331	Columbus-----	137
Wells County-----	331	Homme Reservoir near Park River-----	112
Williams County-----	331	Jamestown Reservoir near Jamestown-----	276-278
Ground-water level records-----	322-331	Morrison Lake near Webster-----	62
Ground-water quality analyses by counties:		Oahe, Lake, near Pierre, SD-----	270
Benson County-----	332-336	Sakakawea, Lake, near Riverdale-----	195
Bowman County-----	332-336	Tschida, Lake, near Glen Ullin-----	235-237
Burleigh County-----	332-336	Latitude-longitude system-----	15
Cavalier County-----	332-336	Little Coulee near Brinsmade-----	66
Eddy County-----	332-336	Little Missouri River, at Marmarth-----	188-189
Emmons County-----	337-340	at Medora-----	314
Foster County-----	337-340	near Watford City-----	192-194
Griggs County-----	337-340	Little Missouri River basin, gaging-station	
McHenry County-----	337-340	records for-----	188-194
Nelson County-----	337-340	Little Muddy River below Cow Creek near	
Pierce County-----	337-340	Williston-----	183-184
Ramsey County-----	337-340	Little Muddy River basin, gaging-station	
Traill County-----	337-340	records for-----	183-184
Walsh County-----	337-340	Local well numbers-----	15
Wells County-----	337-340	Long Creek, at western crossing of	
Ground-water quality records-----	332-340	international boundary, Sask.-----	134
Hardness, definition of-----	34	near Noonan-----	135-136
Heart River above Lake Tschida near		Long Lake Creek above Long Lake, near Moffit-----	248-249
Glen Ullin-----	233-234	Long Lake Creek below Long Lake, near Moffit-----	250
Heart River, at Dickinson-----	227-228	Long Lake Creek southwest of Braddock-----	315
at Stark Bridge near Judson-----	242-243	Long Lake Creek northwest of Braddock-----	316
near Lark-----	240-241		
near Mandan-----	244-246	Map showing location of, gaging stations-----	2
near Richardton-----	231-232	water-quality stations-----	3
near South Heart-----	312, 317-320	ground-water observation wells-----	4
northwest of Flasher-----	315	Maple River (James River basin) at North	
southwest of Mandan-----	315	Dakota-South Dakota State line-----	310
Heart River basin, gaging-stations		Maple River (tributary to Sheyenne River),	
records for-----	225-246	near Enderlin-----	93-94
discharge measurements at partial records		near Hope-----	91-92
and miscellaneous sites-----	315	Mauvais Coulee, near Cando-----	58
Hettinger County, ground-water		Tributary No. 3 near Cando-----	53-57
levels for-----	326	McHenry County, ground-water quality sites-----	337-340
Hidden Island Coulee near Hansboro-----	119-120	McLean County, ground-water	
Homme Reservoir near Park River-----	112	levels for-----	327
Hydrologic bench-mark network,		Mean discharge, definition of-----	33
definition of-----	14	Micrograms per gram ($\mu\text{G/G}$, mg/g),	
Hydrologic conditions (see summary of		definition of-----	34
hydrologic conditions)-----	5-14	Micrograms per liter ($\mu\text{G/L}$, mg/L),	
Hydrologic unit, definition of-----	34	definition of-----	34
Icelandic State Park, NTN		Milligrams per liter (MG/L , mg/L),	
precipitation quality-----	341-343	definition of-----	34
Instantaneous discharge, definition of-----	33	Miscellaneous sites, discharge	
Introduction-----	1	measurements at-----	313-316
James River, above Arrowwood Lake near Kensal-----	274-275	Missouri River, above Stanton-----	199, 314, 321
at Dakota Lake Dam near Ludden-----	298-306	at Bismarck-----	223-224
at Jamestown-----	281-283	at Eagles Park-----	315
at LaMoure-----	284-289	at Garrison Dam-----	196-198, 321
at North Dakota-South Dakota State line-----	307	at Price-----	218
at Oakes-----	292-297	at Stanton-----	314
near Dickey-----	316	at Washburn-----	213, 315
near Grace City-----	272-273	below Cannonball River-----	316
near Grand Rapids-----	316	below Mandan-----	247
near Hecla, SD-----	308-309	near Culbertson, MT-----	171
near Manfred-----	271	near Hensler-----	212
James River basin, gaging-station		near Riverdale-----	321
records for-----	271-310	near Schmidt-----	253
Jamestown Reservoir near Jamestown-----	276-278	near Stanton-----	211, 321
Kidder County, ground-water records for-----	326	near Washburn-----	315
Knife River, at Hazen-----	208-210	near Williston-----	181
at Manning-----	200-201	near Wilton-----	315, 321
near Golden Valley-----	202-203	Missouri River basin, miscellaneous	
near Stanton-----	314	discharge measurements-----	314-316
Knife River basin, gaging-station		Missouri River, crest-stage partial-records	
records in-----	200-210	stations for-----	311
Lake Ashtabula at Baldhill Dam-----	76	Missouri River main stem, gaging-stations	
Lake Darling near Foxholm-----	146	records for-----	171-173, 178-182, 195-198, 211-213,
Lake Darling near Grano-----	145	218, 223-224, 247, 253	
Lake Oahe near Pierre, SD-----	270	Missouri River stage gage No. 4	
Lake Sakakawea near Riverdale-----	195	near Nohly, MT-----	172
Lake Tschida near Glen Ullin-----	235-237	Missouri River stage gage No. 5	
		at Nohly, MT-----	173
		Missouri River stage gage No. 5A at Buford-----	178
		Missouri River stage gage No. 6 near Buford-----	179
		Missouri River stage gage No. 7	
		near Trenton-----	180

Page	Page
Missouri River stage gage No. 9 at Williston----	182
Missouri-Oahe River basin-----	270
Moccasin Creek near Mandaree-----	314, 317-320
Morrison Lake near Webster-----	62
Mouse River (see Souris River)	
Mowbray Creek near Mowbray, Man.-----	124
National Geodetic Vertical Datum of 1929 (NGVD), definition of-----	34
National stream-quality accounting network (NASQAN), definition of-----	14
National trends network (NTN), definition of-----	14
precipitation-quality data-----	341-346
Nelson County, ground-water quality sites-----	337-340
Normal, definition of-----	34
North Fork Grand River at Haley-----	268-269
North Branch Turtle River near Larimore-----	313
Oliver County, ground-water levels for-----	327
Painted Woods Creek near Wilton-----	216-217
Painted Woods Creek basin, gaging-station records for-----	216-217
Parameter code, definition of-----	34
Park River, at Grafton-----	115-116
South Branch, below Homme Dam-----	113-114
Partial-record station, definition of-----	34
Particle size, definition of-----	34
classification, definition of-----	34
Pembina County, ground-water levels for-----	327
Pembina County, precipitation chemical quality-----	341-343
Pembina River, at Neche-----	126-127
near Windygates, Man.-----	125
Percent composition, definition of-----	34
Pesticides, definition of-----	34
pH, definition of-----	35
Picocurie (PC, pCi), definition of-----	35
Pierce County, ground-water levels for-----	328
Pierce County, ground-water quality sites-----	337-340
Pipestem Creek, near Pingree-----	279-280
Publication of Techniques of Water-Resources Investigations-----	37-39
Radiochemical program, definition of-----	14
Ramsey County, ground-water quality sites-----	337-340
Records of ground-water levels: Availability of data-----	27
Data collection and computation-----	26
Data presentation-----	26-27
Records of ground-water quality: Data collection and computation-----	32
Data presentation-----	32
Records of stage and water discharge: Accuracy of the records-----	19
Data collection and computation-----	15-17
Data presentation-----	17-19
Data table of daily mean values-----	18
Identifying estimated daily discharge-----	19
Other records available-----	19
Station manuscript-----	17
Statistics of monthly mean data-----	18
Summary statistics-----	18
Records of surface-water quality: Arrangement of records-----	23
Classification of records-----	23
Data presentation-----	25
Laboratory measurements-----	25
On-site measurements and sample collection-----	23
Remark codes-----	26
Sediment-----	25
Water temperatures-----	23
Red River of the North, above Red Lake River-----	317, 319
at Drayton-----	117-118
at Emerson, Man.-----	130-133
at Fargo-----	49-50
at Grand Forks-----	105-107, 311
at Halstad, MN-----	97-99
at Hickson-----	43-44
at Oslo, MN-----	311, 317-320
at Pembina-----	311
at Wahpeton-----	40-42
below Fargo-----	317, 319
below Grand Forks-----	317, 319
near Joliette-----	313, 317-320
Red River of the North basin, gaging-station records for-----	40-170
Red River of the North basin, crest-stage partial-records stations for-----	311
miscellaneous discharge measurements-----	313
water-quality partial-records stations and miscellaneous sites-----	317-320
Reservoirs (see lakes and reservoirs)	
Return period, definition of-----	35
Richland County, ground-water levels for-----	328
Runoff in inches (IN, in), definition of-----	35
Rush River, at Amenla-----	95-96
SAR (Sodium-adsorption ratio), definition of-----	35
Sediment, definition of-----	35
bedload, definition of-----	35
suspended sediment, definition of-----	35
suspended-sediment concentration definition of-----	35
suspended-sediment discharge, definition of---	35
suspended-sediment load, definition of-----	35
Sheyenne River, above Harvey-----	51-53
at Lisbon-----	81-82
at Valley City-----	79-80
at West Fargo-----	88-90
below Baldhill Dam-----	77-78
near Cooperstown-----	72-73
near Horace-----	86-87
near Kathryn-----	313
near Kindred-----	83-85
near Lisbon-----	313
near Sheldon-----	313
near Warwick-----	54-55
Sheyenne River basin, miscellaneous discharge measurements-----	313
Short Creek below international boundary near Roche Percee, Sask.-----	138
Snowflake Creek near Snowflake, Man.-----	123
Sodium-adsorption ratio (SAR), definition of---	35
Solute, definition of-----	35
Souris (Mouse) River, above Minot-----	153-154
near Bantry-----	161-162
near Foxholm-----	147-148
near Sherwood-----	139-144
near Verendrye-----	155-157, 313
near Westhope-----	168-170
Souris (Mouse) River basin, gaging stations records for-----	139-170
South Branch Park River below Homme Dam-----	113-114
South Branch Turtle River near Larimore-----	313
Special networks and programs-----	14
Specific conductance, definition of-----	35
Spring Creek (Knife River basin) at Zap-----	206-207
Square Butte Creek below Center-----	219-220
Square Butte Creek basin, gaging-station records for-----	219-220
Squaw Creek above mouth near Mandaree-----	314, 317-320
Stage, definition of-----	35
Stage-discharge relation, definition of-----	35
Stark County, ground-water levels for-----	328
Starkweather Coulee near Webster-----	63-64
Station identification numbers-----	15
Steele County, ground-water levels for-----	329
Stone Creek near Kramer-----	164
Streamflow-----	8
Streamflow, definition of-----	35
Stutsman County, ground-water levels in-----	329
precipitation chemical quality-----	344-346
Summary of hydrologic conditions: Climate-----	5-8
Chemical quality of streamflow-----	11
Ground-water levels-----	11-14
Streamflow-----	8
Surface area, definition of-----	35
Suspended, definition of-----	35
Suspended, recoverable, definition of-----	35
Suspended sediment, definition of-----	35
Suspended-sediment concentration definition of-----	35
Suspended-sediment discharge definition of-----	35
Suspended-sediment load, definition of-----	35
Suspended, total, definition of-----	36
Terms, definition of-----	33-36
Thermograph, definition of-----	36
Time-weighted average, definition of-----	36
Tongue River at Akra-----	128-129
Tons per acre-foot, definition of-----	36

	Page		Page
Tons per day, definition of-----	36	West Branch Otter Creek near Beulah-----	311
Total, definition of-----	36	White Butte Fork Cedar Creek near	
Total discharge-----	36	Scranton-----	256-257
Total, recoverable, definition of-----	36	Wild Rice River, near Abercrombie-----	47-48
Traill County, ground-water levels for-----	329	near Rutland-----	45-46
Traill County, ground-water quality		Williams County,	
sites-----	337-340	ground-water levels for-----	331
Turtle Creek above Washburn-----	214-215	Willow Creek near Willow City-----	163
Turtle Creek basin, gaging stations		Wintering River near Karlsruhe-----	158-160
records for-----	214-215	Woodworth, NTN precipitation quality-----	344-346
Turtle River near Arvilla-----	313	WRD (see WDR)	
Turtle River at Mekinock-----	313	WSP, definition of-----	36
Walsh County, ground-water levels for-----	330	Yellowstone River near Sidney, MT-----	174
Walsh County, ground-water quality sites-----	337-340	Yellowstone River stage gage No. 1 near	
Ward County, ground-water levels for-----	331	Fairview, MT-----	175
Water year, definition of-----	36	Yellowstone River stage gage No. 2 near	
Water-quality partial records-----	317-321	Cartwright-----	176
WDR, definition of-----	36	Yellowstone River stage gage No. 3 near	
Weighted average, definition of-----	36	Buford-----	177
Wells County, ground-water levels for-----	331	Yellowstone River basin, gaging-station	
Wells County, ground-water quality sites-----	337-340	records for-----	174-177

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	By	To obtain SI units
<i>Length</i>		
inches (in)	2.54×10^1	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^0	kilometers (km)
<i>Area</i>		
acres	4.047×10^3	square meters (m ²)
	4.047×10^{-1}	square hectometers (hm ²)
	4.047×10^{-3}	square kilometers (km ²)
square miles (mi ²)	2.590×10^0	square kilometers (km ²)
<i>Volume</i>		
gallons (gal)	3.785×10^0	liters (L)
	3.785×10^0	cubic decimeters (dm ³)
	3.785×10^{-3}	cubic meters (m ³)
million gallons	3.785×10^3	cubic meters (m ³)
	3.785×10^{-3}	cubic hectometers (hm ³)
cubic feet (ft ³)	2.832×10^1	cubic decimeters (dm ³)
	2.832×10^{-2}	cubic meters (m ³)
cfs-days	2.447×10^3	cubic meters (m ³)
	2.447×10^{-3}	cubic hectometers (hm ³)
acre-feet (acre-ft)	1.233×10^3	cubic meters (m ³)
	1.233×10^{-3}	cubic hectometers (hm ³)
	1.233×10^{-6}	cubic kilometers (km ³)
<i>Flow</i>		
cubic feet per second (ft ³ /s)	2.832×10^1	liters per second (L/s)
	2.832×10^1	cubic decimeters per second (dm ³ /s)
	2.832×10^{-2}	cubic meters per second (m ³ /s)
gallons per minute (gal/min)	6.309×10^{-2}	liters per second (L/s)
	6.309×10^{-2}	cubic decimeters per second (dm ³ /s)
	6.309×10^{-5}	cubic meters per second (m ³ /s)
million gallons per day	4.381×10^1	cubic decimeters per second (dm ³ /s)
	4.381×10^{-2}	cubic meters per second (m ³ /s)
<i>Mass</i>		
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

U.S. DEPARTMENT OF THE INTERIOR
U.S. Geological Survey
821 E. Interstate Avenue
Bismarck, ND 58501

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE \$300

SPECIAL 4th CLASS BOOK RATE

