

STREAMFLOW ENTERING AND LEAVING  
LAKE BEMIDJI, BELTRAMI COUNTY, MINNESOTA,  
JULY 1987 THROUGH SEPTEMBER 1989

By Mark R. Have

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U.S. GEOLOGICAL SURVEY

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## CONVERSION FACTORS

<u>Multiply</u>	<u>By</u>	<u>To obtain</u>
acre-foot (acre-ft)	1,233	cubic meter
inch (in.)	25.4	millimeter
foot (ft)	0.3048	meter
cubic foot per second (ft <sup>3</sup> /s)	0.02832	cubic meter per second
degrees Fahrenheit (°F)	$5/9 \times (°F - 32)$	degrees Celsius

**STREAMFLOW ENTERING AND LEAVING LAKE BEMIDJI,  
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**ABSTRACT**

The U.S. Geological Survey, in cooperation with the Minnesota Department of Natural Resources, operated three streamflow-gaging stations from July 1987 through September 1989 to determine the volume of streamflow entering and leaving Lake Bemidji. Suspended- and bottom-sediment data were also collected at the gaging stations. Two gaging stations were located upstream and one was located downstream from the lake.

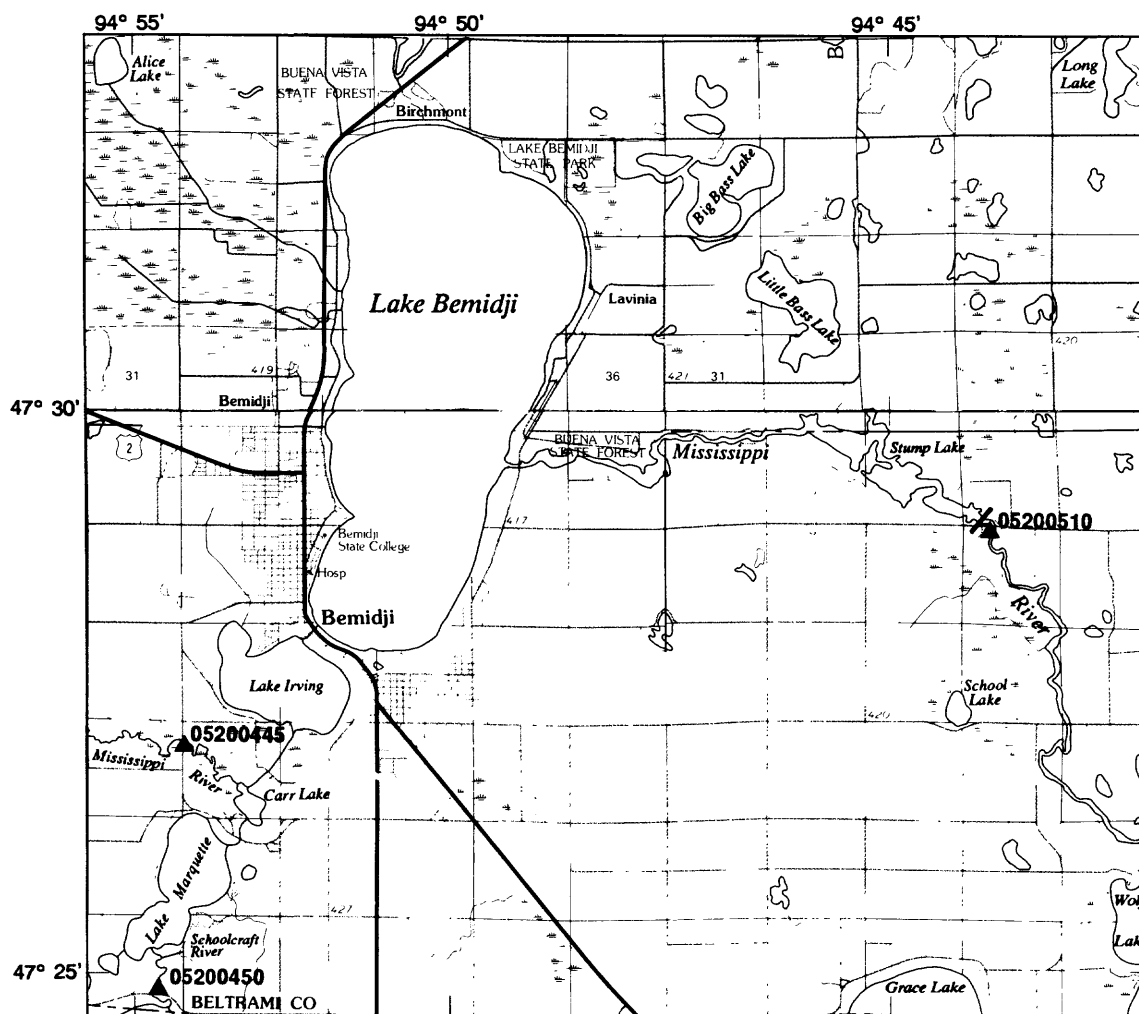
Daily mean discharges were determined except for the November 1987 to March 1988 winter period. During the 1989 water year, the only complete year of data, the mean annual discharge for the two upstream stations was 111 ft<sup>3</sup>/s (cubic feet per second) for Mississippi River at Bemidji and 71 ft<sup>3</sup>/s for Schoolcraft River near Bemidji. The station downstream from Lake Bemidji, Mississippi River near Bemidji, had a mean annual discharge of 228 ft<sup>3</sup>/s during water year 1989.

**INTRODUCTION**

The U.S. Geological Survey, in cooperation with the Minnesota Department of Natural Resources, operated three streamflow-gaging stations from July 1987 through September 1989 to determine the volume of streamflow entering and leaving Lake Bemidji. Suspended- and bottom-sediment data were also collected at the gaging stations. Two gaging stations were located upstream and one was located downstream from the lake.

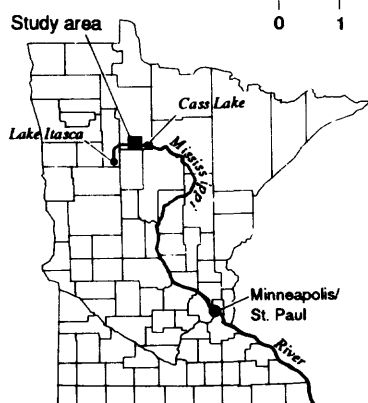
This study complements a water-quality study conducted by Bemidji State University. Their data and the data obtained from this study will be used by the Minnesota Department of Natural Resources and the Beltrami County Soil and Water Conservation District to help them better understand the overall hydrology of this important recreational area.

The Lake Bemidji study area is in Beltrami County in northwestern Minnesota. The study area and the locations of the three streamflow-gaging stations are shown on figure 1. The Mississippi River is the only major inflow to Lake Bemidji, and it is also the outlet. The lake has a surface area of 6,760 acres, an average depth of 29 ft, and a maximum depth of about 80 ft (Oakes and Bidwell, 1968). The outlet to Lake Bemidji is natural, but the hydropower dam on the east end of Stump Lake influences Lake Bemidji's water-surface elevation. The city of Bemidji, located on the south side of Lake Bemidji, is the largest city in the area with a population of 10,949 (U.S. Department of Commerce, 1982).



Base from U.S. Geological Survey  
Black Duck 1:100,000, 1976  
and Cass Lake 1:100,000, 1977.

SCALE



MINNESOTA

# EXPLANATION

05200450 ▲ Gaging station site and number

Figure 1.--Location of the streamflow-gaging stations  
on the Mississippi and the Schoolcraft Rivers.

The study area lies within the Bemidji-Bagley sandplain, which is underlain by an unconfined aquifer consisting of glacial outwash and glacial-lake deposits (Stark and others, 1991). The surface of the sand plain is flat to gently rolling and is mostly forested; less than 10 percent of the sand plain is cultivated.

Lake Bemidji is within the continental climate zone of North America, which is characterized by a large range in temperature throughout the year. First frost generally occurs in late September and last frost generally occurs in late May. Average annual precipitation at the Bemidji weather station is 23 in. Maximum average monthly precipitation is 3.65 in. during June and the minimum average monthly precipitation is 0.45 in. during February (National Oceanic and Atmospheric Administration, 1989). During 1988, 25.5 in. of precipitation was recorded at the Bemidji weather station; however, many other weather stations in north-central Minnesota recorded less than average precipitation. During 1989, 18.1 in. of precipitation was recorded at the Bemidji weather station indicating drier than average conditions in the study area.

The highest annual peak flow on the Mississippi River at Bemidji was 1,690 ft<sup>3</sup>/s on April 23, 1979, during the time it was operated as a high-flow station. A high-flow station is equipped with a crest-stage gage, a device that registers the peak stage occurring between inspections of the gage; only the maximum discharge and gage height for each water year are published for high-flow stations. The lowest annual peak flow occurred September 25, 1977, when the peak flow for the 1977 water year was estimated to be 190 ft<sup>3</sup>/s. A low flow of 28 ft<sup>3</sup>/s was measured September 23, 1976, during the time that the station was operated as a low-flow station; low-flow stations may or may not be gaged. Low flow is sustained, or fair-weather flow, and is composed mostly of ground-water discharge. The 7-day, 10-year low flow for the Mississippi River at Bemidji is 32.4 ft<sup>3</sup>/s. In other words, there is only a 10-percent chance in a given year that the mean discharge for 7 consecutive days will be equal to or less than 32.4 ft<sup>3</sup>/s for the Mississippi River at Bemidji.

The lowest flow measured in the Schoolcraft River near Bemidji during the period it was operated as a low-flow station was 9.75 ft<sup>3</sup>/s on September 30, 1976. The 7-day, 10-year low flow is 10.5 ft<sup>3</sup>/s.

## METHODS

Three continuous-record streamflow-gaging stations were installed in the study area: Mississippi River at Bemidji (05200445), Schoolcraft River near Bemidji (05200450), and Mississippi River near Bemidji (05200510). The stations are described and their drainage areas listed in table 1. The stations, Mississippi River at Bemidji and Schoolcraft River near Bemidji, were operated previously as high-flow and/or low-flow stations.

Table 1.--Description of streamflow-gaging stations

[a, approximate]

Station no.	Station name	Location	Drainage area (mi <sup>2</sup> )	Remarks
05200445	Mississippi River at Bemidji, Minnesota	Lat 47°27'04", long 94°54'23", in NW¼NW¼ sec.20, T.146 N., R.33 W., Beltrami County, Hydrologic Unit 07010101, at bridge on County Highway 11, 1.5 mi southwest of intersection of U.S. Highway 2 and County Highway 7 in Bemidji.	a400	October 1972 to June 1987, operated as a high-flow partial-record station. October 1963 to June 1987, operated as a low-flow station. July 1987 to September 1987, operated as a continuous-record station.
05200450	Schoolcraft River near Bemidji, Minnesota	Lat 47°24'48", long 94°54'46", in SW¼SE¼ sec.31, T.146 N., R.33 W., Beltrami County, Hydrologic Unit 07010101, on left bank 100 ft downstream of bridge on County Highway 2, 0.1 mi downstream from Lake Plantagenet outlet, and 4.6 mi south of Bemidji.	165	August 1947 to June 1987, operated as a low-flow partial-record station. April 1988 to September 1989, operated as a continuous-record station.
05200510	Mississippi River near Bemidji, Minnesota	Lat 47°29'00", long 94°43'40", in SE¼SW¼ sec.3, T.146 N., R.32 W., Beltrami County, Hydrologic Unit 07010101, 3.5 mi east of Bemidji on right bank 100 ft upstream of County Highway 12 and 400 ft downstream from Stump Lake dam.	a610	Some regulation by Stump Lake dam. September 1987 to September 1989, operated as a continuous-record station.

Stilling wells were installed at the three gaging stations, and digital recorders were housed inside small shelters. Outside gages were used as base gages for calibrating the recorders. Elevations of the gages, shelters, and instruments at each of the stations were referenced to an arbitrary datum. Recorders were connected to floats, and the gage-height of the water surface was recorded every half hour.

The gaging stations were visited every five to six weeks during the open-water periods and during the winter of 1988-89; they were not visited during the 1987-88 winter period. The recorders were not operated during the winter periods, although streamflow measurements were made during each visit during the 1988-89 winter period. During the open-water periods, the recorders were serviced and streamflow measurements were made. Sediment samples were collected during some of the visits.

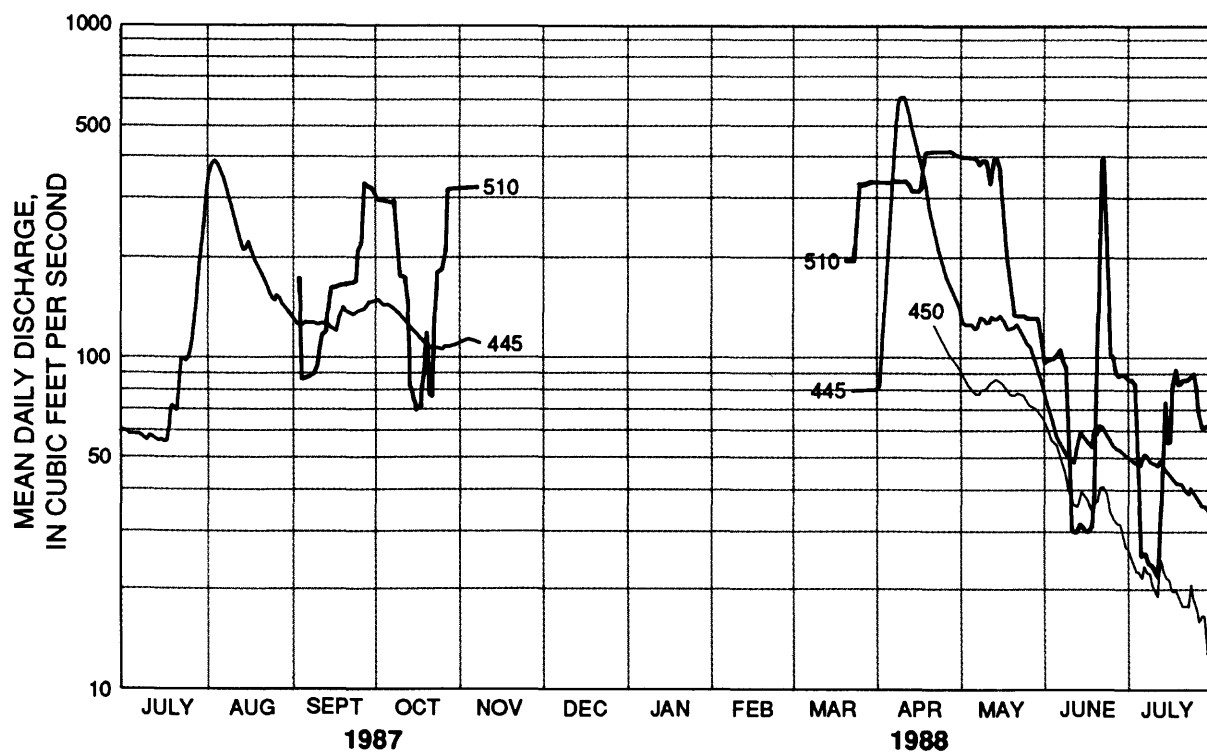


The daily mean streamflows for each gaging station are tabulated in tables 2-4 (in the Supplemental Information Section at the end of the report). Each daily mean streamflow value is computed by using the relation between gage height and streamflow that was developed for each station (tables 5-7, in the Supplemental Information Section). Monthly summaries are given at the bottom of Tables 2-4. Two of the monthly streamflow statistics are runoff in acre-feet and in inches. An acre-foot is the volume of water that would be required to cover an acre to a depth of one foot. Runoff, in inches, indicates the depth of water in the drainage area if all the runoff for a given time period were uniformly distributed.

Streamflow at each station for a given gage height can be obtained from tables 5-7. Gage height, in feet, is given in tenths in the left column and in hundredths across the top. Using table 5, for example, a streamflow of 426.9 ft<sup>3</sup>/s is determined for gage height 11.44 ft.

Daily values were estimated for the 1988-89 winter period for the Mississippi River at Bemidji (05200445) and for the Schoolcraft River near Bemidji (05200450), using the discharge measurements that were made during that time. During that same time, daily values were estimated for the Mississippi River near Bemidji (05200510) using discharge measurements and the daily electrical generation at the power plant directly upstream. The daily values listed in tables 2-4 are considered good except for the estimated values, which are considered fair. Good indicates that about 95 percent of the daily discharges are within 10 percent of the true values and fair indicates that about 95 percent are within 15 percent. Streamflow hydrographs of the daily values for periods when the gaging stations were in operation are shown in figure 2. The streamflow data are summarized in table 8 (in the Supplemental Information Section).

Suspended-sediment and bottom-sediment samples were collected and analyzed by the methods according to Guy (1969) and Guy and Norman (1970). Suspended sediment was analyzed for total concentration and for percentage of sediment by weight that was less than 0.062 millimeters in diameter (less than sand-size). Bottom sediment was analyzed for percentage of sediment by weight of various size fractions. All samples were analyzed in the U.S. Geological Survey Sediment Laboratory in Iowa City, Iowa. Collection of suspended-sediment samples was not necessary during much of the summer when suspended-sediment concentrations were low and suspended-sediment loads to and from the lake were small. Sediment data are presented in tables 9-11 (in the Supplemental Information Section).

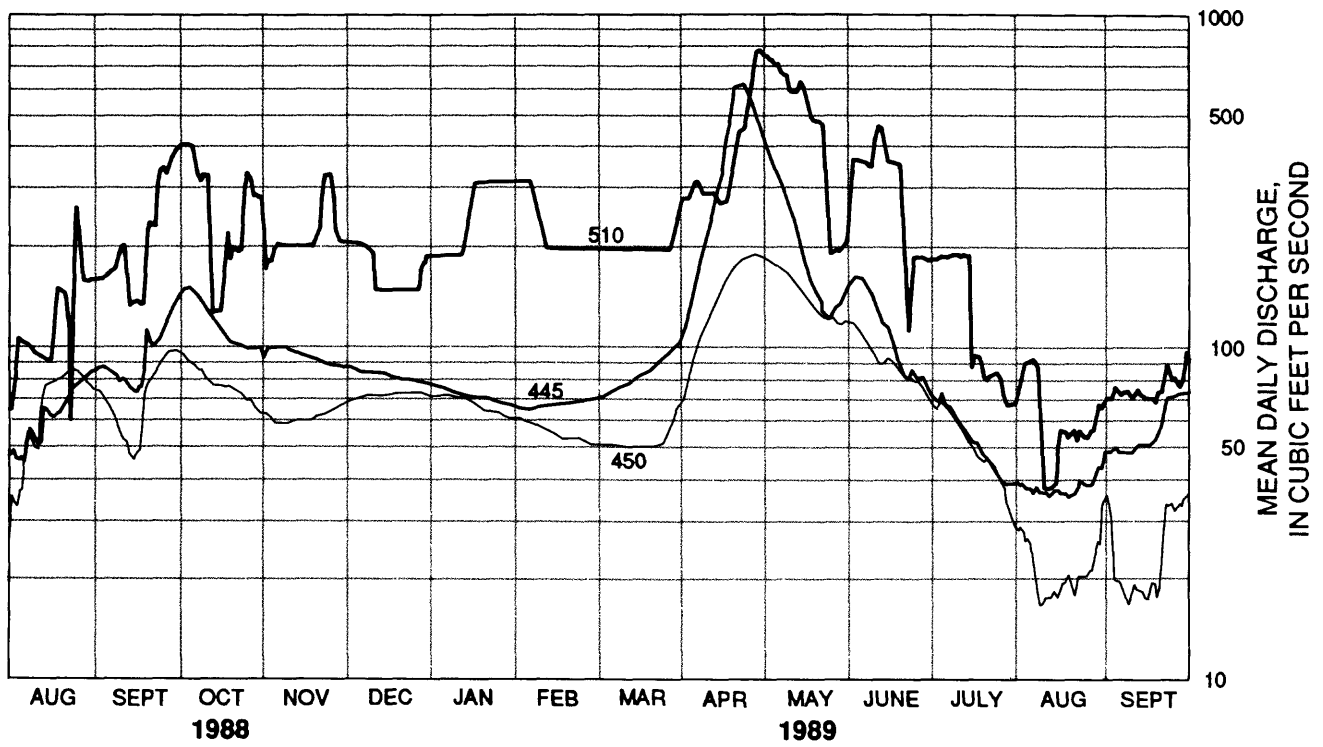


#### EXPLANATION

##### STREAMFLOW STATION LOCATION AND NUMBER

- Schoolcraft River near Bemidji, 05200450
- Mississippi River at Bemidji, 05200445
- Mississippi River near Bemidji, 05200510

**Figure 2.--Streamflow hydrograph for the**



period of July 1987 through September 1989.

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- Stark, J.R., Busch, J.P., and Deters, M.H., 1991, Hydrogeology and water quality of glacial-drift aquifers in the Bemidji-Bagley area, Beltrami, Clearwater, Cass, and Hubbard Counties, Minnesota: U.S. Geological Survey Water-Resources Investigations Report 89-4136, 75 p.
- U.S. Department of Commerce, 1982, Number of inhabitants in Minnesota in Chapter A of 1980 Census of population: Characteristics of the population: PC 80-1-A25, 67 p.

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**SUPPLEMENTAL INFORMATION SECTION**

**TABLES 2-11**

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**Table 2.--Daily mean streamflow for the Mississippi River  
at Bemidji, Minnesota (05200445)**

[Values in cubic feet per second unless otherwise noted; e, estimated; ---, no data; max, maximum; min, minimum; ac-ft, acre-feet; in., inches of runoff]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1986 - September 30, 1987												
1	---	---	---	---	---	---	---	---	---	57	322	128
2	---	---	---	---	---	---	---	---	---	60	356	126
3	---	---	---	---	---	---	---	---	---	59	380	123
4	---	---	---	---	---	---	---	---	---	58	383	123
5	---	---	---	---	---	---	---	---	---	58	374	125
6	---	---	---	---	---	---	---	---	---	58	361	127
7	---	---	---	---	---	---	---	---	---	58	342	125
8	---	---	---	---	---	---	---	---	---	57	320	126
9	---	---	---	---	---	---	---	---	---	56	298	125
10	---	---	---	---	---	---	---	---	---	55	276	124
11	---	---	---	---	---	---	---	---	---	58	255	125
12	---	---	---	---	---	---	---	---	---	57	239	124
13	---	---	---	---	---	---	---	---	---	56	220	125
14	---	---	---	---	---	---	---	---	---	55	205	124
15	---	---	---	---	---	---	---	---	---	56	209	121
16	---	---	---	---	---	---	---	---	---	55	221	119
17	---	---	---	---	---	---	---	---	---	55	203	118
18	---	---	---	---	---	---	---	---	---	61	192	129
19	---	---	---	---	---	---	---	---	---	72	183	140
20	---	---	---	---	---	---	---	---	---	70	176	137
21	---	---	---	---	---	---	---	---	---	68	170	135
22	---	---	---	---	---	---	---	---	---	99	163	134
23	---	---	---	---	---	---	---	---	---	100	156	133
24	---	---	---	---	---	---	---	---	---	97	149	135
25	---	---	---	---	---	---	---	---	---	99	145	136
26	---	---	---	---	---	---	---	---	---	107	152	137
27	---	---	---	---	---	---	---	---	---	123	148	139
28	---	---	---	---	---	---	---	---	---	153	142	142
29	---	---	---	---	---	---	---	---	---	188	138	145
30	---	---	---	---	---	---	---	---	---	227	136	146
31	---	---	---	---	---	---	---	---	---	274	132	---
Total	---	---	---	---	---	---	---	---	---	2706	7146	3896
Mean	---	---	---	---	---	---	---	---	---	87.3	231	130
Max	---	---	---	---	---	---	---	---	---	274	383	146
Min	---	---	---	---	---	---	---	---	---	55	132	118
Ac-ft	---	---	---	---	---	---	---	---	---	5370	14170	7730
In.	---	---	---	---	---	---	---	---	---	0.25	0.66	0.36

**Table 2.--Daily mean streamflow for the Mississippi River  
at Bemidji, Minnesota (05200445)--Continued**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1987 - September 30, 1988												
1	147	110	---	---	---	---	80	136	78	50	37	84
2	147	111	---	---	---	---	82	128	75	50	48	84
3	145	112	---	---	---	---	93	126	70	49	44	85
4	142	113	---	---	---	---	150	126	65	48	44	84
5	143	113	---	---	---	---	192	127	60	48	45	83
6	143	112	---	---	---	---	232	126	56	47	43	82
7	140	111	---	---	---	---	e322	122	54	52	51	81
8	138	110	---	---	---	---	e468	124	52	51	55	80
9	136	109	---	---	---	---	e579	133	51	49	51	76
10	134	---	---	---	---	---	e612	131	50	48	48	78
11	131	---	---	---	---	---	e610	128	49	48	47	77
12	128	---	---	---	---	---	e591	128	48	47	47	75
13	125	---	---	---	---	---	e562	133	54	49	64	73
14	122	---	---	---	---	---	e528	131	60	47	63	72
15	119	---	---	---	---	---	e486	131	58	46	60	71
16	118	---	---	---	---	---	e446	134	57	45	59	74
17	115	---	---	---	---	---	e405	132	55	44	59	74
18	112	---	---	---	---	---	e369	127	54	43	61	84
19	110	---	---	---	---	---	e320	122	62	42	61	110
20	109	---	---	---	---	---	e279	122	58	42	63	101
21	107	---	---	---	---	79	261	123	63	42	66	98
22	106	---	---	---	---	79	238	126	63	40	70	99
23	106	---	---	---	---	80	218	122	60	39	73	101
24	106	---	---	---	---	80	198	118	58	41	74	104
25	105	---	---	---	---	80	184	114	56	39	75	108
26	105	---	---	---	---	80	176	110	54	38	76	115
27	107	---	---	---	---	80	167	109	53	37	78	119
28	107	---	---	---	---	80	159	104	53	36	79	125
29	107	---	---	---	---	80	151	98	52	36	81	133
30	108	---	---	---	---	80	144	92	51	35	82	138
31	109	---	---	---	---	80	---	85	---	35	82	---
Total	3777	---	---	---	---	---	9302	3768	1729	1363	1886	2768
Mean	122	---	---	---	---	---	310	122	57.6	44.0	60.8	92.3
Max	147	---	---	---	---	---	612	136	78	52	82	138
Min	105	---	---	---	---	---	80	85	48	35	37	71
Ac-ft	7490	---	---	---	---	---	18450	7470	3430	2700	3740	5490
In.	0.35	---	---	---	---	---	0.87	0.35	0.16	0.13	0.18	0.26

**Table 2.--Daily mean streamflow for the Mississippi River  
at Bemidji, Minnesota (05200445)--Continued**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1988 - September 30, 1989												
1	143	97	e85	e75	e65	e70	e113	384	163	69	39	50
2	146	97	85	e75	e64	e70	e120	364	165	69	38	49
3	147	97	e84	e74	e64	e71	e130	346	165	74	38	50
4	147	98	e83	e74	e64	e72	e140	329	162	69	38	51
5	145	98	e83	e73	e64	e72	e150	317	159	66	37	49
6	143	98	e82	e73	e64	e73	e165	305	155	67	39	49
7	139	98	e82	e72	e65	e74	e180	288	149	64	38	49
8	136	e98	e82	e72	e65	e75	e190	277	144	61	37	49
9	132	e96	e82	e72	e65	e75	e200	262	137	60	37	49
10	129	e96	e82	e71	e65	e76	e220	247	128	58	37	49
11	124	e95	e82	e71	e65	e77	e240	231	119	56	36	51
12	120	e94	e82	e70	e65	e77	e270	215	117	54	37	52
13	117	e93	e81	e70	e66	e78	e300	201	116	52	38	52
14	114	e93	e81	e70	e66	e79	e320	190	114	50	38	52
15	111	e92	e80	e69	e67	e80	e360	180	106	49	37	52
16	109	e91	e80	e69	67	e81	e420	169	99	47	37	52
17	106	e91	e79	e69	e67	e82	e460	157	93	46	37	53
18	103	e90	e79	e69	e67	e83	e530	151	89	45	36	54
19	101	e90	e79	69	e67	e84	604	145	85	47	37	56
20	100	e89	e78	e69	e67	e85	608	140	81	46	37	58
21	99	e88	e78	e68	e68	e86	610	127	81	44	38	67
22	99	e88	e78	e68	e68	e88	607	126	86	43	41	72
23	99	e87	e78	e68	e68	e90	585	122	84	42	40	73
24	98	e87	e77	e67	e68	e92	562	122	81	41	39	73
25	97	e86	e77	e67	e69	e94	532	130	82	39	39	73
26	96	e86	e77	e67	e69	e95	505	133	82	39	40	74
27	96	e86	e77	e66	e69	e96	478	134	78	39	40	75
28	97	e86	e76	e66	e70	e98	449	137	75	39	43	75
29	97	e85	e76	e66	---	e100	426	146	72	39	45	75
30	97	e85	e76	e66	---	e103	406	153	71	40	44	76
31	90	---	e76	e65	---	105	---	159	---	39	50	---
Total	3577	2755	2477	2160	1858	2581	10880	6387	3338	1593	1207	1759
Mean	115	91.8	79.9	69.7	66.4	83.3	363	206	111	51.4	38.9	58.6
Max	147	98	85	75	70	105	610	384	165	74	50	76
Min	90	85	76	65	64	70	113	122	71	39	36	49
Ac-ft	7090	5460	4910	4280	3690	5120	21580	12670	6620	3160	2390	3490
In.	0.33	0.26	0.23	0.20	0.17	0.24	1.01	0.59	0.31	0.15	0.11	0.16



**Table 3.--Daily mean streamflow for the Schoolcraft River  
near Bemidji, Minnesota (05200450)**

[Values in cubic feet per second unless otherwise noted; e, estimated; ---, no data; max, maximum; min, minimum; ac-ft, acre feet; in., inches of runoff]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1987 - September 30, 1988												
1	---	---	---	---	---	---	---	92	64	27	20	72
2	---	---	---	---	---	---	---	88	62	26	36	71
3	---	---	---	---	---	---	---	85	59	24	33	71
4	---	---	---	---	---	---	---	83	56	23	32	69
5	---	---	---	---	---	---	---	81	55	23	36	66
6	---	---	---	---	---	---	---	80	53	22	36	64
7	---	---	---	---	---	---	---	78	50	24	47	63
8	---	---	---	---	---	---	---	78	46	23	54	60
9	---	---	---	---	---	---	---	81	42	23	53	56
10	---	---	---	---	---	---	---	81	39	21	52	53
11	---	---	---	---	---	---	---	81	37	20	49	51
12	---	---	---	---	---	---	---	84	35	19	50	50
13	---	---	---	---	---	---	---	86	36	25	66	47
14	---	---	---	---	---	---	---	87	40	23	74	45
15	---	---	---	---	---	---	---	86	39	22	75	44
16	---	---	---	---	---	---	---	85	38	22	75	46
17	---	---	---	---	---	---	---	83	36	20	76	47
18	---	---	---	---	---	---	---	81	35	20	77	50
19	---	---	---	---	---	---	---	78	37	20	77	71
20	---	---	---	---	---	---	---	77	37	19	78	75
21	---	---	---	---	---	---	126	77	41	18	79	77
22	---	---	---	---	---	---	123	79	41	18	83	81
23	---	---	---	---	---	---	120	78	40	18	84	82
24	---	---	---	---	---	---	115	77	38	21	83	85
25	---	---	---	---	---	---	111	76	35	19	82	89
26	---	---	---	---	---	---	108	73	33	18	81	92
27	---	---	---	---	---	---	104	72	32	16	79	94
28	---	---	---	---	---	---	100	71	32	17	77	94
29	---	---	---	---	---	---	97	71	30	17	75	95
30	---	---	---	---	---	---	94	69	27	13	74	95
31	---	---	---	---	---	---	---	67	---	15	72	---
Total	---	---	---	---	---	---	---	2465	1245	636	1965	2055
Mean	---	---	---	---	---	---	---	79.5	41.5	20.5	63.4	68.5
Max	---	---	---	---	---	---	---	92	64	27	84	95
Min	---	---	---	---	---	---	---	67	27	13	20	44
Ac-ft	---	---	---	---	---	---	---	4890	2470	1260	3900	4080
In.	---	---	---	---	---	---	---	0.56	0.28	0.14	0.44	0.46

**Table 3.--Daily mean streamflow for the Schoolcraft River near Bemidji, Minnesota (05200450)--Continued**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1988 - September 30, 1989												
1	94	61	e66	e70	e60	e50	68	184	119	65	29	36
2	93	61	67	e70	e60	e50	71	181	117	65	28	37
3	91	60	e67	e70	e59	e50	76	178	116	69	26	32
4	89	59	e68	e70	e58	e50	86	175	111	67	27	20
5	88	57	e68	e70	e58	e50	89	175	109	66	26	20
6	86	57	e68	e70	e58	e50	95	171	105	66	23	20
7	85	57	e68	e70	e57	e50	102	167	102	64	20	19
8	83	57	e69	e69	e57	e50	109	166	99	62	17	18
9	83	e57	e70	e69	e56	e50	113	165	96	61	17	17
10	80	e57	e70	e68	e56	e50	118	161	93	59	18	18
11	77	e58	e70	e68	e55	e49	125	158	89	57	18	20
12	76	e58	e70	e68	e55	e49	130	153	90	56	18	19
13	75	e58	e70	e68	e54	e49	136	150	92	54	19	19
14	74	e58	e70	e67	e54	e49	141	146	94	52	18	19
15	74	e58	e71	e66	e53	e49	145	142	92	52	19	18
16	74	e58	e71	e66	52	e49	152	139	91	51	20	18
17	74	e58	e71	e65	e52	e49	160	135	87	50	20	20
18	73	e58	e71	e64	e52	e49	166	132	85	47	21	20
19	74	e59	e71	63	e52	e49	170	129	83	47	20	18
20	74	e60	e71	e63	e52	e49	174	127	81	46	19	19
21	73	e60	e71	e62	e52	e49	178	123	80	45	18	28
22	72	e60	e71	e62	e52	e49	181	121	82	44	21	35
23	71	e61	e71	e62	e52	e49	183	122	80	42	21	34
24	70	e62	e71	e62	e51	e49	185	121	78	41	21	35
25	68	e62	e71	e62	e51	e50	187	123	79	39	21	33
26	67	e63	e71	e61	e50	e52	188	119	77	38	22	34
27	67	e64	e71	e61	e50	e54	189	117	74	35	22	35
28	65	e64	e71	e60	e50	e56	188	117	72	32	25	34
29	63	e65	e70	e60	---	e60	186	120	70	31	27	36
30	62	e65	e70	e60	---	e65	186	120	67	29	26	37
31	61	---	e70	e60	---	67	---	119	---	28	34	---
Total	2356	1792	2165	2026	1518	1590	4277	4456	2710	1560	681	768
Mean	76.0	59.7	69.8	65.4	54.2	51.3	143	144	90.3	50.3	22.0	25.6
Max	94	65	71	70	60	67	189	184	119	69	34	37
Min	61	57	66	60	50	49	68	117	67	28	17	17
Ac-ft	4670	3550	4290	4020	3010	3150	8480	8840	5380	3090	1350	1520
In.	0.53	0.40	0.49	0.46	0.34	0.36	0.96	1.00	0.61	0.35	0.15	0.17

**Table 4.--Daily mean streamflow for the Mississippi River  
near Bemidji, Minnesota (05200510)**

[Values in cubic feet per second unless otherwise noted; e, estimated; ---, no data; max, maximum; min, minimum; ac-ft, acre-feet; in., inches of runoff]

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1986 - September 30, 1987												
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	168
4	---	---	---	---	---	---	---	---	---	---	---	83
5	---	---	---	---	---	---	---	---	---	---	---	85
6	---	---	---	---	---	---	---	---	---	---	---	85
7	---	---	---	---	---	---	---	---	---	---	---	86
8	---	---	---	---	---	---	---	---	---	---	---	87
9	---	---	---	---	---	---	---	---	---	---	---	88
10	---	---	---	---	---	---	---	---	---	---	---	92
11	---	---	---	---	---	---	---	---	---	---	---	108
12	---	---	---	---	---	---	---	---	---	---	---	116
13	---	---	---	---	---	---	---	---	---	---	---	117
14	---	---	---	---	---	---	---	---	---	---	---	139
15	---	---	---	---	---	---	---	---	---	---	---	161
16	---	---	---	---	---	---	---	---	---	---	---	161
17	---	---	---	---	---	---	---	---	---	---	---	160
18	---	---	---	---	---	---	---	---	---	---	---	162
19	---	---	---	---	---	---	---	---	---	---	---	163
20	---	---	---	---	---	---	---	---	---	---	---	163
21	---	---	---	---	---	---	---	---	---	---	---	165
22	---	---	---	---	---	---	---	---	---	---	---	165
23	---	---	---	---	---	---	---	---	---	---	---	165
24	---	---	---	---	---	---	---	---	---	---	---	168
25	---	---	---	---	---	---	---	---	---	---	---	209
26	---	---	---	---	---	---	---	---	---	---	---	220
27	---	---	---	---	---	---	---	---	---	---	---	333
28	---	---	---	---	---	---	---	---	---	---	---	323
29	---	---	---	---	---	---	---	---	---	---	---	318
30	---	---	---	---	---	---	---	---	---	---	---	317
31	---	---	---	---	---	---	---	---	---	---	---	---
Total	---	---	---	---	---	---	---	---	---	---	---	---
Mean	---	---	---	---	---	---	---	---	---	---	---	---
Max	---	---	---	---	---	---	---	---	---	---	---	---
Min	---	---	---	---	---	---	---	---	---	---	---	---
Ac-ft	---	---	---	---	---	---	---	---	---	---	---	---
In.	---	---	---	---	---	---	---	---	---	---	---	---

**Table 4.--Daily mean streamflow for the Mississippi River near  
Bemidji, Minnesota (05200510)--Continued**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1987 - September 30, 1988												
1	301	317	---	---	---	---	337	405	96	88	62	153
2	289	320	---	---	---	---	337	400	97	86	62	154
3	290	320	---	---	---	---	337	401	100	87	79	153
4	290	321	---	---	---	---	337	398	100	84	104	155
5	290	322	---	---	---	---	337	397	101	53	101	158
6	287	320	---	---	---	---	336	397	103	25	99	162
7	285	321	---	---	---	---	340	397	107	26	99	164
8	290	323	---	---	---	---	340	395	98	26	97	169
9	229	---	---	---	---	---	337	377	95	24	96	183
10	171	---	---	---	---	---	337	393	57	24	94	195
11	173	---	---	---	---	---	337	393	30	23	93	195
12	171	---	---	---	---	---	337	389	30	22	92	153
13	145	---	---	---	---	---	330	328	30	23	90	127
14	80	---	---	---	---	---	317	397	32	47	89	131
15	77	---	---	---	---	---	316	397	31	75	88	133
16	68	---	---	---	---	---	317	373	30	55	87	134
17	70	---	---	---	---	---	323	333	30	56	119	129
18	70	---	---	---	---	---	373	247	31	85	146	130
19	90	---	---	---	---	---	417	191	35	95	143	218
20	118	---	---	---	---	---	418	162	57	84	141	233
21	76	---	---	---	---	195	418	134	258	85	139	226
22	75	---	---	---	---	195	418	134	399	87	115	224
23	130	---	---	---	---	195	418	134	395	87	57	301
24	181	---	---	---	---	195	418	134	221	89	191	333
25	182	---	---	---	---	241	416	134	102	91	256	337
26	182	---	---	---	---	333	413	132	102	84	195	319
27	205	---	---	---	---	333	413	132	92	69	151	337
28	320	---	---	---	---	333	413	132	88	61	151	364
29	318	---	---	---	---	334	407	132	90	62	151	376
30	318	---	---	---	---	337	404	132	90	62	153	384
31	317	---	---	---	---	337	---	117	---	63	153	---
Total	6088	---	---	---	---	---	10998	8617	3127	1928	3693	6430
Mean	196	---	---	---	---	---	367	278	104	62.2	119	214
Max	320	---	---	---	---	---	418	405	399	95	256	384
Min	68	---	---	---	---	---	316	117	30	22	57	127
Ac-ft	12080	---	---	---	---	---	21810	17090	6200	3820	7330	12750
In.	0.37	---	---	---	---	---	0.67	0.53	0.19	0.12	0.23	0.39

**Table 4.--Daily mean streamflow for the Mississippi River near  
Bemidji, Minnesota (05200510)--Continued**

Day	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
October 1, 1988 - September 30, 1989												
1	311	169	e197	e180	e310	e186	276	735	369	185	86	72
2	323	177	e197	e180	e310	e186	275	724	368	188	92	72
3	350	176	e197	e180	e310	e186	275	716	365	189	92	72
4	280	191	e197	e180	e310	e186	292	693	364	189	93	78
5	365	197	e197	e180	e310	e186	312	700	362	188	94	75
6	351	195	e192	e180	e310	e186	311	662	359	191	90	73
7	317	195	e188	e180	e248	e186	302	646	351	192	86	75
8	303	195	e188	e180	e186	e186	284	648	348	191	55	76
9	317	e196	e188	e180	e186	e186	285	592	414	190	38	74
10	317	e197	e188	e180	e186	e186	287	578	469	189	38	71
11	315	e197	e188	e180	e186	e186	287	578	455	192	38	74
12	236	e197	e188	e180	e186	e186	288	580	404	190	39	76
13	122	e197	e188	e245	e186	e186	278	622	359	189	40	73
14	125	e197	e188	e310	e186	e186	266	598	358	86	50	72
15	125	e197	e188	e310	e186	e186	269	585	357	97	58	71
16	124	e197	e162	e310	e186	e186	270	530	354	96	57	71
17	163	e197	e136	e310	e186	e186	272	481	354	94	56	71
18	217	e262	e136	e310	e186	e186	307	469	352	83	54	70
19	176	e328	e136	e310	e186	e186	345	466	300	80	56	76
20	195	e328	e136	e310	e186	e186	385	468	192	83	57	75
21	190	e328	e136	e310	e186	e186	439	460	110	84	53	83
22	188	e262	e136	e310	e186	e186	444	412	141	85	57	92
23	190	e197	e136	e310	e186	e186	447	234	189	86	55	85
24	280	e197	e136	e310	e186	e186	499	189	188	83	54	80
25	328	e197	e136	e310	e186	e186	595	192	187	73	54	83
26	302	e197	e136	e310	e186	e186	651	195	187	69	57	79
27	272	e197	e136	e310	e186	e186	761	194	185	67	57	77
28	278	e197	e158	e310	e186	e186	771	196	183	68	60	82
29	272	e197	e180	e310	---	e186	757	201	186	68	69	99
30	272	e197	e180	e310	---	e232	740	207	185	68	65	93
31	237	---	e180	e310	---	278	---	294	---	73	69	---
Total	7841	6351	5225	7985	6014	5904	11970	14845	8995	3906	1919	2320
Mean	253	212	169	258	215	190	389	479	300	126	61.9	77.3
Max	365	328	197	310	310	278	771	735	469	192	94	99
Min	122	169	136	180	186	186	266	189	110	67	38	70
Ac-ft	15550	12600	10360	15840	11930	11710	23740	29450	17840	7750	3810	4600
In.	0.48	0.39	0.32	0.49	0.37	0.36	0.73	0.81	0.55	0.24	0.12	0.14

**Table 5.--Relation between gage height and streamflow for the  
Mississippi River at Bemidji, Minnesota (05200445)**

[Streamflow values in cubic feet per second; gage-height values in feet]

Gage height	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
7.60	30.00	30.43	30.86	31.29	31.73	32.17	32.61	33.05	33.49	33.94
7.70	34.39	34.84	35.29	35.74	36.20	36.66	37.12	37.58	38.05	38.51
7.80	38.98	39.46	39.93	40.40	40.88	41.36	41.84	42.33	42.81	43.30
7.90	43.79	44.28	44.77	45.27	45.77	46.26	46.77	47.27	47.77	48.28
8.00	48.79	49.30	49.81	50.33	50.85	51.36	51.89	52.41	52.93	53.46
8.10	53.99	54.52	55.05	55.58	56.12	56.66	57.20	57.74	58.28	58.82
8.20	59.37	59.92	60.47	61.02	61.58	62.13	62.69	63.25	63.81	64.37
8.30	64.94	65.50	66.07	66.64	67.22	67.79	68.36	68.94	69.52	70.10
8.40	70.68	71.27	71.85	72.44	73.03	73.62	74.21	74.81	75.41	76.00
8.50	76.60	77.21	77.81	78.41	79.02	79.63	80.24	80.85	81.46	82.08
8.60	82.69	83.31	83.93	84.55	85.18	85.80	86.43	87.06	87.69	88.32
8.70	88.95	89.59	90.22	90.86	91.50	92.14	92.79	93.43	94.08	94.72
8.80	95.37	96.02	96.68	97.33	97.99	98.64	99.30	99.96	100.6	101.3
8.90	102.0	102.6	103.3	104.0	104.6	105.3	106.0	106.7	107.3	108.0
9.00	108.7	109.4	110.1	110.7	111.4	112.1	112.8	113.5	114.2	114.9
9.10	115.6	116.3	117.0	117.7	118.4	119.1	119.8	120.5	121.2	121.9
9.20	122.6	123.4	124.1	124.8	125.5	126.2	126.9	127.7	128.4	129.1
9.30	129.8	130.6	131.3	132.0	132.8	133.5	134.2	135.0	135.7	136.4
9.40	137.2	137.9	138.7	139.4	140.2	140.9	141.7	142.4	143.2	143.9
9.50	144.7	145.4	146.2	146.9	147.7	148.5	149.2	150.0	150.8	151.5
9.60	152.3	153.1	153.8	154.6	155.4	156.2	156.9	157.7	158.5	159.3
9.70	160.1	160.9	161.6	162.4	163.2	164.0	164.8	165.6	166.4	167.2
9.80	168.0	168.8	169.6	170.4	171.2	172.0	172.8	173.6	174.4	175.2
9.90	176.0	176.9	177.7	178.5	179.3	180.1	180.9	181.8	182.6	183.4
10.00	184.2	185.1	185.9	186.7	187.5	188.4	189.2	190.0	190.9	191.7
10.10	192.5	193.4	194.2	195.1	195.9	196.8	197.6	198.4	199.3	200.1
10.20	201.0	202.0	203.0	204.0	205.0	206.0	207.0	208.0	209.0	210.0
10.30	211.0	212.1	213.2	214.3	215.4	216.5	217.6	218.7	219.8	220.9
10.40	222.0	223.2	224.4	225.6	226.8	228.0	229.2	230.4	231.6	232.8
10.50	234.0	235.3	236.6	237.9	239.2	240.5	241.8	243.1	244.4	245.7
10.60	247.0	248.4	249.8	251.2	252.5	253.9	255.3	256.8	258.2	259.6
10.70	261.0	262.5	264.0	265.4	266.9	268.4	269.9	271.4	273.0	274.5
10.80	276.0	277.6	279.2	280.7	282.3	283.9	285.5	287.1	288.8	290.4
10.90	292.0	293.8	295.5	297.3	299.1	300.9	302.7	304.5	306.3	308.2

**Table 5.--Relation between gage height and streamflow for the Mississippi River at Bemidji, Minnesota (05200445)--Continued**

Gage height	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
11.00	310.0	312.0	313.9	315.9	317.9	319.9	321.9	323.9	325.9	328.0
11.10	330.0	332.3	334.5	336.8	339.1	341.4	343.7	346.0	348.3	350.7
11.20	353.0	355.6	358.3	360.9	363.6	366.3	369.0	371.7	374.5	377.2
11.30	380.0	383.1	386.2	389.4	392.6	395.8	399.0	402.2	405.4	408.7
11.40	412.0	415.7	419.4	423.1	426.9	430.7	434.5	438.3	442.2	446.1
11.50	450.0	454.4	458.9	463.4	468.0	472.6	477.2	481.8	486.5	491.2
11.60	496.0	501.2	506.4	511.7	517.1	522.4	527.9	533.3	538.8	544.4
11.70	550.0	555.8	561.6	567.5	573.4	579.4	585.4	591.5	597.6	603.8
11.80	610.0	616.3	622.6	628.9	635.4	641.8	648.4	654.9	661.6	668.3
11.90	675.0	681.7	688.6	695.4	702.3	709.3	716.3	723.4	730.5	737.7
12.00	745.0	752.7	760.5	768.3	776.2	784.2	792.2	800.3	808.5	816.7
12.10	825.0	833.2	841.5	849.8	858.2	866.6	875.2	883.8	892.4	901.2
12.20	910.0	918.7	927.4	936.3	945.2	954.1	963.2	972.3	981.4	990.7
12.30	1000	1009	1018	1026	1035	1044	1053	1062	1071	1081
12.40	1080	1089	1108	1116	1125	1134	1143	1152	1162	1171
12.50	1180	1189	1198	1206	1215	1224	1233	1242	1252	1261
12.60	1270	1279	1288	1297	1305	1314	1323	1333	1342	1351
12.70	1360	1369	1378	1387	1395	1404	1413	1423	1432	1441
12.80	1450	1459	1468	1477	1486	1496	1505	1514	1523	1533
12.90	1542	1552	1561	1571	1580	1590				

**Table 6.--Relation between gage height and streamflow for the  
Schoolcraft River near Bemidji, Minnesota (05200450)**

[Streamflow values in cubic feet per second; gage-height values in feet]

Gage height	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
1.50						10.00	10.79	11.58	12.39	13.20
1.60	14.02	14.85	15.68	16.53	17.37	18.23	19.09	19.95	20.82	21.70
1.70	22.58	23.47	24.36	25.26	26.16	27.07	27.98	28.90	29.82	30.74
1.80	31.67	32.60	33.54	34.48	35.42	36.37	37.32	38.28	39.24	40.20
1.90	41.16	42.13	43.11	44.08	45.06	46.04	47.03	48.02	49.01	50.00
2.00	51.00	51.99	52.98	53.97	54.97	55.97	56.97	57.97	58.98	59.99
2.10	61.00	61.99	62.99	63.98	64.98	65.98	66.98	67.98	68.99	69.99
2.20	71.00	71.98	72.97	73.95	74.94	75.93	76.92	77.91	78.90	79.89
2.30	80.89	81.88	82.88	83.88	84.88	85.88	86.88	87.88	88.89	89.89
2.40	90.90	91.90	92.91	93.92	94.93	95.94	96.95	97.97	98.98	100.0
2.50	101.0	102.0	103.0	104.1	105.1	106.1	107.1	108.2	109.2	110.2
2.60	111.2	112.3	113.3	114.3	115.3	116.4	117.4	118.4	119.5	120.5
2.70	121.5	122.6	123.6	124.6	125.7	126.7	127.8	128.8	129.8	130.9
2.80	131.9	133.0	134.0	135.1	136.1	137.2	138.2	139.2	140.3	141.3
2.90	142.4	143.5	144.5	145.6	146.6	147.7	148.7	149.8	150.8	151.9
3.00	152.9	154.0	155.1	156.1	157.2	158.2	159.3	160.4	161.4	162.5
3.10	163.6	164.6	165.7	166.8	167.8	168.9	170.0	171.0	172.1	173.2
3.20	174.3	175.3	176.4	177.5	178.5	179.6	180.7	181.8	182.8	183.9
3.30	185.0	186.1	187.2	188.3	189.3	190.4	191.5	192.6	193.7	194.8
3.40	195.9	197.0	198.1	199.2	200.2	201.3	202.4	203.5	204.6	205.7
3.50	206.8	207.9	209.0	210.1	211.2	212.3	213.4	214.5	215.6	216.7
3.60	217.8	218.9	220.0	221.1	222.2	223.3	224.5	225.6	226.7	227.8
3.70	228.9	230.0	231.1	232.2	233.3	234.4	235.5	236.7	237.8	238.9
3.80	240.0									



**Table 7.--Relation between gage height and streamflow for the  
Mississippi River near Bemidji, Minnesota (05200510)**

[Streamflow values in cubic feet per second; gage-height values in feet]

Gage height	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
1.50	3.82	4.02	4.22	4.42	4.62	4.82	5.02	5.22	5.42	5.62
1.60	5.82	6.06	6.29	6.50	6.71	6.91	7.11	7.29	7.47	7.65
1.70	7.82	8.03	8.25	8.45	8.66	8.86	9.06	9.25	9.44	9.63
1.80	9.82	10.12	10.43	10.73	11.03	11.33	11.63	11.93	12.22	12.52
1.90	12.82	13.12	13.42	13.72	14.02	14.32	14.62	14.92	15.22	15.52
2.00	15.82	16.12	16.42	16.72	17.02	17.32	17.62	17.92	18.22	18.52
2.10	18.82	19.32	19.83	20.35	20.87	21.39	21.92	22.45	22.99	23.53
2.20	24.08	24.83	25.60	26.38	27.17	27.97	28.79	29.62	30.46	31.31
2.30	32.18	33.10	34.04	34.99	35.96	36.94	37.94	38.95	39.98	41.02
2.40	42.08	43.20	44.33	45.48	46.65	47.83	49.04	50.26	51.49	52.75
2.50	54.02	55.35	56.71	58.08	59.47	60.88	62.32	63.77	65.24	66.73
2.60	68.24	69.80	71.39	73.00	74.62	76.27	77.94	79.64	81.35	83.09
2.70	84.85	86.66	88.49	90.35	92.23	94.13	96.06	98.01	99.98	102.0
2.80	104.0	106.2	108.4	110.6	112.9	115.1	117.5	119.8	122.2	124.6
2.90	127.0	129.3	131.6	133.9	136.3	138.7	141.1	143.5	146.0	148.5
3.00	151.0	153.3	155.6	158.0	160.4	162.8	165.2	167.6	170.0	172.5
3.10	175.0	177.4	179.9	182.3	184.8	187.3	189.8	192.3	194.9	197.4
3.20	200.0	202.7	205.4	208.2	211.0	213.7	216.6	219.4	222.2	225.1
3.30	228.0	230.8	233.6	236.5	239.4	242.3	245.2	248.1	251.0	254.0
3.40	257.0	259.9	262.9	265.8	268.8	271.8	274.8	277.8	280.9	283.9
3.50	287.0	289.9	292.9	295.8	298.8	301.8	304.8	307.8	310.9	313.9
3.60	317.0	320.2	323.5	326.7	330.0	333.3	336.6	339.9	343.3	346.6
3.70	350.0	354.2	358.4	362.6	366.8	371.1	375.4	379.8	384.2	388.6
3.80	393.0	397.2	401.4	405.6	409.9	414.2	418.5	422.8	427.2	431.6
3.90	436.0	440.2	444.4	448.7	452.9	457.2	461.5	465.9	470.2	474.6
4.00	479.0	483.2	487.4	491.7	496.0	500.2	504.6	508.9	513.2	517.6
4.10	522.0	526.3	530.6	535.0	539.4	543.8	548.2	552.6	557.0	561.5
4.20	566.0	570.4	574.9	579.3	583.8	588.3	592.8	597.3	601.9	606.4
4.30	611.0	615.4	619.9	624.3	628.8	633.3	637.8	642.3	646.9	651.4
4.40	656.0	660.5	665.1	669.6	674.2	678.8	683.4	688.0	692.7	697.3
4.50	702.0	706.5	711.1	715.7	720.2	724.8	729.4	734.1	738.7	743.3
4.60	748.0	752.7	757.5	762.2	767.0	771.8	776.6	781.4	786.3	791.1
4.70	796.0	801.1	806.3	811.4	816.6	821.8	827.0	832.2	837.5	842.7
4.80	848.0	853.5	859.0	864.6	870.2	875.8	881.4	887.0	892.6	898.3
4.90	904.0	909.9	915.8	921.8	927.7	933.7	939.7	945.8	951.8	957.9
5.00	964.0	970.3	976.6	983.0	989.3	995.7	1002	1009	1015	1021
5.10	1028									

**Table 8.--Summary of streamflow and runoff characteristics  
at three streamflow gaging stations on the  
Mississippi and Schoolcraft Rivers**

[Runoff and mean are only for 1989 water year. Maximum and minimum represent instantaneous streamflows during entire period of study (July 1987-September 1989; in., inches; ft<sup>3</sup>/s, cubic feet per second]

Station no.	Station name	Runoff (in.)	Streamflow (ft <sup>3</sup> /s)		
			Maximum	Minimum	Mean
05200445	Mississippi River at Bemidji, Minnesota	3.77	623	34	111
05200450	Schoolcraft River near Bemidji, Minnesota	5.84	189	11	71
05200510	Mississippi River near Bemidji, Minnesota	5.08	887	16	228

**Table 9.--Suspended- and bottom-sediment data for the Mississippi River at Bemidji, Minnesota (05200445)**

[ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; °C, degree Celsius; mm, millimeter; --, no data; <, less than]

Date	Time	Instantaneous streamflow (ft <sup>3</sup> /s)	Water temperature (°C)	Suspended- sediment concentration (mg/L)	Suspended- sediment discharge (tons/day)	Suspended sediment finer than 0.062 mm (percent)
July 1, 1987	1245	54	--	4	0.58	85
Aug. 11	0900	268	22.0	10	7.2	94
Sept. 3	0930	121	16.0	4	1.3	100
Nov. 9	1350	109	2.0	21	6.2	83
Apr. 27, 1988	1130	170	6.0	14	6.4	77
May 26	1300	111	--	10	3.0	85
June 28	1110	54	24.0	7	1.0	75
Aug. 3	1220	44	23.0	5	.59	97
May 2, 1989	1050	373	7.0	41	41	11
Aug. 4	0820	38	24.0	10	1.0	100
Sept. 14	1320	53	13.5	5	.72	84

**Bottom sediment**

Date	Percent finer than 4.0 mm	Percent finer than 2.0 mm	Percent finer than 1.0 mm	Percent finer than 0.50 mm	Percent finer than 0.25 mm	Percent finer than 0.125 mm	Percent finer than 0.062 mm
Aug. 11, 1987	100	96	77	45	11	1	<1
May 26, 1988	100	96	89	64	17	4	<1

**Table 10.--Suspended- and bottom-sediment data for the Schoolcraft River near Bemidji, Minnesota (05200450)**

[ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; °C, degree Celsius; mm, millimeter; <, less than]

Date	Time	Instantaneous streamflow (ft <sup>3</sup> /s)	Water temperature (°C)	Suspended-sediment concentration (mg/L)	Suspended-sediment discharge (tons/day)	Suspended sediment finer than 0.062 mm (percent)
Apr. 21, 1988	1115	127	5.0	3	1.0	92
May 26	1030	72	17.5	15	2.9	85
June 28	1315	33	23.5	22	2.0	84
July 26	1120	19	24.0	2	.10	67
Aug. 3	0940	34	25.0	4	.37	93
May 2, 1989	0845	178	5.0	4	1.9	97
Aug. 3	1600	25	29.0	4	.27	93
Sept. 14	1000	20	14.0	3	.16	79

Bottom sediment								
Date	Percent finer than 8.0 mm	Percent finer than 4.0 mm	Percent finer than 2.0 mm	Percent finer than 1.0 mm	Percent finer than 0.50 mm	Percent finer than 0.25 mm	Percent finer than 0.125 mm	Percent finer than 0.062 mm
May 26, 1988	96	92	89	81	53	9	1	<1

**Table 11.--Suspended- and bottom-sediment data for the Mississippi River near Bemidji, Minnesota (05200510)**

[ft<sup>3</sup>/s, cubic feet per second; mg/L, milligrams per liter; °C, degree Celsius; mm, millimeter; <, less than]

Date	Time	Instantaneous streamflow (ft <sup>3</sup> /s)	Water temperature (°C)	Suspended- sediment concentration (mg/L)	Suspended- sediment discharge (tons/day)	Suspended sediment finer than 0.062 mm (percent)
Sept. 3, 1987	1200	230	17.5	1	0.62	100
Nov. 9	1115	190	4.0	3	1.5	77
Apr. 27, 1988	1415	410	7.0	3	3.3	74
May 26	1500	132	20.0	1	.36	100
June 28	0925	88	21.5	6	1.4	79
July 15	1215	20	24.0	4	.22	80
Aug 3	1435	62	25.0	6	1.0	91
May 2, 1989	1400	720	6.0	3	5.8	80
Aug 4	1130	93	24.0	1	.25	80

Bottom sediment								
Date	Percent finer than 8.0 mm	Percent finer than 4.0 mm	Percent finer than 2.0 mm	Percent finer than 1.0 mm	Percent finer than 0.50 mm	Percent finer than 0.25 mm	Percent finer than 0.125 mm	Percent finer than 0.062 mm
Nov. 9, 1987	98	93	88	85	78	54	19	10
May 26, 1988	67	50	34	21	9	2	<1	<1