

STREAMS TRIBUTARY TO LAKE SUPERIOR--Continued

04015330 KNIFE RIVER NEAR TWO HARBORS, MN

LOCATION.--Lat 46°56'49", long 91°47'32", in SW<sup>1</sup>/<sub>4</sub>NW<sup>1</sup>/<sub>4</sub> sec. 31, T.52 N., R.11 W., Lake County, Hydrologic Unit 04010102, on right bank 600 ft downstream from bridge on U.S. Highway 61, 0.5 mi upstream from bridge on County Highway 102, in town of Knife River, 0.8 mi upstream from Lake Superior, and 7.8 mi southwest of Two Harbors.

DRAINAGE AREA.--83.6 mi<sup>2</sup>.

PERIOD OF RECORD.--Occasional low-flow measurements, water years 1970-71, July 1974 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 640 ft above sea level from topographic map.

REMARKS.--Records good except those for estimated daily discharges, which are poor. Flow regulated intermittently by fish ladder operation just upstream of gage.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,800 ft<sup>3</sup>/s (revised) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct 17	0645	2,600	7.33	Jul 8	2030	1,830	6.19
Nov 10	2000	2,780	7.50	Aug 18	2045	1,880	6.25
Apr 7	2030	1,960	6.66	Sep 26	0745	2,640	7.09
Jul 5	0645	*9,100	*12.14				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1998 TO SEPTEMBER 1999  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	62	122	e20	15	18	509	34	30	76	25	28
2	11	49	102	e20	16	17	379	31	37	61	21	24
3	9.2	41	90	e20	16	16	347	28	34	76	19	23
4	8.0	35	85	e20	16	16	1220	27	26	93	18	549
5	9.0	27	336	e19	16	16	908	58	26	4840	17	672
6	602	25	361	e19	16	15	472	321	39	1880	16	158
7	287	23	182	e19	15	14	1020	e558	33	657	14	81
8	155	21	107	e19	15	14	1260	244	27	786	14	98
9	104	20	76	e18	17	14	1020	139	21	1340	15	67
10	71	1240	71	e18	19	15	731	105	19	663	27	52
11	51	1270	60	e17	19	15	640	100	19	252	25	45
12	41	422	66	e16	19	14	578	e216	45	139	78	109
13	33	211	64	e16	18	14	484	134	32	88	491	106
14	26	140	70	15	17	15	476	97	21	65	153	71
15	23	117	58	15	18	16	505	77	16	52	86	56
16	194	102	52	15	17	18	560	66	15	208	258	45
17	1940	87	e48	16	17	e19	353	67	16	230	112	38
18	911	252	e44	16	17	e22	224	60	22	107	523	36
19	398	1010	e40	16	16	e27	162	50	21	68	791	127
20	199	333	e35	15	16	e30	135	45	24	51	238	114
21	131	152	e30	15	15	e48	118	46	20	41	106	72
22	99	150	e27	15	14	e56	103	41	101	35	65	54
23	80	320	e25	16	14	e68	87	e125	275	38	75	45
24	67	279	e24	16	14	e85	74	135	174	38	76	39
25	66	172	e23	15	14	e110	66	97	87	37	53	36
26	124	140	e22	15	15	155	61	74	54	251	40	1640
27	106	115	e22	15	15	328	55	52	41	107	33	858
28	82	102	e22	15	17	917	48	40	38	68	27	349
29	72	106	e21	16	---	909	42	31	44	47	23	160
30	85	131	e21	16	---	793	38	24	44	36	20	111
31	81	---	e21	15	---	622	---	23	---	30	26	---
TOTAL	6077.2	7154	2327	518	453	4436	12675	3145	1401	12460	3485	5863
MEAN	196	238	75.1	16.7	16.2	143	422	101	46.7	402	112	195
MAX	1940	1270	361	20	19	917	1260	558	275	4840	791	1640
MIN	8.0	20	21	15	14	14	38	23	15	30	14	23
AC-FT	12050	14190	4620	1030	899	8800	25140	6240	2780	24710	6910	11630
CFSM	2.29	2.79	.88	.20	.19	1.67	4.94	1.19	.55	4.70	1.31	2.28
IN.	2.64	3.11	1.01	.23	.20	1.93	5.51	1.37	.61	5.41	1.51	2.55

e Estimated

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STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1999, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	96.3	79.5	23.9	11.9	12.5	61.7	374	155	91.2	95.8	38.7	86.3
MAX	267	238	75.1	31.4	79.2	204	631	427	240	402	163	314
(WY)	1996	1999	1999	1975	1998	1998	1982	1979	1984	1999	1988	1977
MIN	3.06	1.58	.000	.000	.000	8.65	73.6	16.0	13.0	4.87	2.95	1.43
(WY)	1977	1977	1977	1977	1977	1980	1977	1976	1995	1988	1976	1976

SUMMARY STATISTICS	FOR 1998 CALENDAR YEAR	FOR 1999 WATER YEAR	WATER YEARS 1974 - 1999
ANNUAL TOTAL	36369.5	59994.2	
ANNUAL MEAN	99.6	164	94.4
HIGHEST ANNUAL MEAN			164 1999
LOWEST ANNUAL MEAN			44.2 1977
HIGHEST DAILY MEAN	1940	Oct 17	4840 Jul 5 1999
LOWEST DAILY MEAN	1.2	Sep 12	.00a Dec 2 1976
ANNUAL SEVEN-DAY MINIMUM	1.4	Sep 6	14 Mar 7 Dec 2 1976
INSTANTANEOUS PEAK FLOW			9100 Jul 5 1999
INSTANTANEOUS PEAK STAGE			12.14 Jul 5 1999
INSTANTANEOUS LOW FLOW			3.0b Jun 15 Dec 2 1976
ANNUAL RUNOFF (AC-FT)	72140	119000	68400
ANNUAL RUNOFF (CFSM)	1.16	1.92	1.10
ANNUAL RUNOFF (INCHES)	15.81	26.07	14.99
10 PERCENT EXCEEDS	257	479	235
50 PERCENT EXCEEDS	23	48	23
90 PERCENT EXCEEDS	4.9	15	5.0

a Many days in 1977.  
 b Result of regulation.

