

STREAMS TRIBUTARY TO LAKE SUPERIOR

04015330 KNIFE RIVER NEAR TWO HARBORS, MN

LOCATION.--Lat 4656'49", long 9147'32", in SW 1 / 4 NW 1 / 4 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 mi² (revised).

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, year round by fish ladder operation just upstream of gage.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft³/s and maximum (*):

Discharge			Discharge		
Date	Time	Gage height (ft)	Date	Time	Gage height (ft)
		(ft ³ /s)			(ft ³ /s)
Mar 28	1945 1540	6.09	June 02	0515 1410	5.93
Mar 29	2230 *1950	6.57	June 18	1430 1100	5.53
Apr 07	2345 1080	5.52			

DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	55	e14	e7.6	e8.4	e300	366	29	24	23	4.6	2.7
2	15	73	e13	e7.6	e8.6	e240	434	29	617	17	4.0	2.4
3	13	62	e12	e7.6	e8.7	e185	471	27	174	17	3.7	2.2
4	13	52	e11	e7.5	e8.6	e140	392	25	93	15	3.4	2.0
5	14	42	e11	e7.5	e8.6	e110	309	33	60	14	3.3	1.9
6	20	37	e10	e7.5	e8.5	e84	292	34	43	19	2.9	1.8
7	18	35	e10	e7.5	e8.6	e60	527	30	33	20	2.7	1.6
8	18	34	e10	e7.4	e8.7	e44	765	25	26	17	3.0	1.4

9	18	33	e9.5	e7.4	e8.9	e35	371	22	20	15	5.1	1.3
10	16	31	e9.2	e7.4	e9.1	e31	257	21	18	12	4.7	1.4
11	19	24	e9.0	e7.4	e9.4	e25	235	19	21	11	3.6	1.3
12	65	e28	e8.8	e7.4	e9.6	e23	228	18	67	9.9	3.1	1.2
13	228	e24	e8.6	e7.4	e9.8	e22	257	24	177	9.0	2.7	6.3
14	161	e23	e8.4	e7.7	e10	e20	235	27	96	9.1	2.8	295
15	95	e21	e8.2	e7.7	e10	e19	182	25	55	16	2.5	181
16	64	e20	e8.5	e7.7	e10	e19	140	52	36	15	3.1	79
17	47	e19	e8.8	e7.7	e11	e18	114	50	25	11	13	38
18	38	e18	e9.0	e7.8	e18	e17	98	35	483	9.0	14	23
19	31	e16	e9.2	e7.8	e70	e17	84	26	678	8.3	8.2	16
20	26	e15	e8.7	e7.8	e80	e16	74	20	322	7.8	5.9	13
21	24	e15	e8.4	e7.8	e87	e16	67	17	200	6.9	4.8	11
22	22	e14	e8.3	e7.9	e76	e16	62	14	122	5.4	4.8	8.9
23	20	e14	e8.1	e8.0	e60	e17	54	13	78	4.4	9.5	7.6
24	19	e14	e8.0	e8.0	e80	e17	50	12	52	4.1	15	6.7
25	18	e14	e7.9	e8.0	e120	e19	46	12	39	3.9	9.9	6.0
26	17	e15	e7.9	e8.2	e250	e52	40	11	36	3.8	6.8	6.8
27	16	e15	e7.8	e8.2	e770	e200	36	9.7	27	4.0	5.7	14
28	15	e15	e7.8	e8.2	e450	1230	31	13	48	5.3	5.4	13
29	15	e15	e7.7	e8.4	---	1240	29	16	45	4.9	5.0	11
30	16	e14	e7.7	e8.4	---	1400	28	14	33	5.1	3.8	9.9
31	17	---	e7.6	e8.4	---	705	---	25	---	5.8	3.1	---
TOTAL	1134	807	284.1	240.9	2217.5	6337	6274	727.7	3748	328.7	170.1	767.4
MEAN	36.6	26.9	9.16	7.77	79.2	204	209	23.5	125	10.6	5.49	25.6
MAX	228	73	14	8.4	770	1400	765	52	678	23	15	295
MIN	13	14	7.6	7.4	8.4	16	28	9.7	18	3.8	2.5	1.2
AC-FT	2250	1600	564	478	4400	12570	12440	1440	7430	652	337	1520
CFSM	.43	.31	.11	.09	.93	2.39	2.44	.27	1.46	.12	.06	.30
IN.	.49	.35	.12	.10	.96	2.75	2.73	.32	1.63	.14	.07	.33

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1998, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	92.2	72.9	21.7	11.7	12.4	58.3	372	157	93.0	83.5	35.7	82.0
MAX	267	198	60.6	31.4	79.2	204	631	427	241	345	163	314
(WY)	1996	1992	1983	1975	1998	1998	1982	1979	1984	1993	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 1997 CALENDAR YEAR		FOR 1998 WATER YEAR		WATER YEARS 1974 - 1998		
ANNUAL TOTAL	32196.6		23036.4				
ANNUAL MEAN	88.2		63.1			91.5	
HIGHEST ANNUAL MEAN						147	1986
LOWEST ANNUAL MEAN						44.2	1977
HIGHEST DAILY MEAN	1600	Apr 6	1400	Mar 30	4480	May 10	1979
LOWEST DAILY MEAN	5.9	Sep 13	1.2	Sep 12	.00a	Dec 2	1976
ANNUAL SEVEN-DAY MINIMUM	6.6	Sep 10	1.4	Sep 6	.00	Dec 2	1976
INSTANTANEOUS PEAK FLOW			1950	Mar 29	7440	May 10	1979
INSTANTANEOUS PEAK STAGE			6.64b	Feb 27	11.16	May 10	1979
INSTANTANEOUS LOW FLOW			.21c	Sep 9	.00a	Dec 2	1976
ANNUAL RUNOFF (AC-FT)	63860		45690			66290	
ANNUAL RUNOFF (CFSM)	1.03		.74			1.07	
ANNUAL RUNOFF (INCHES)	13.99		10.01			14.52	
10 PERCENT EXCEEDS	184		166			228	

50 PERCENT EXCEEDS	20		15		22		
90 PERCENT EXCEEDS	8.2		4.9		4.9		

- a Many days in 1977.
- b Backwater from ice.
- c Result of regulation.

