

**ST. CROIX RIVER BASIN**

**05336700 KETTLE RIVER BELOW SANDSTONE, MN**

LOCATION.--Lat 46° 06'20", long 92° 51'50", in NW¼SW¼ sec. 22, T.42 N., R.20 W., Pine County, Hydrologic Unit 07030003, on Sandstone Federal Correctional Institution property, on left bank, about 1.8 mi south of Sandstone.

DRAINAGE AREA.--863 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1967 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 931.50 ft above mean sea level. (Minnesota Department of Transportation bench mark).

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

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965 reached a stage of 12.96 ft, from flood marks, discharge, 13,400 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,600 ft<sup>3</sup>/s and maximum (\*)

**DISCHARGE, IN CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997**

**DAILY MEAN VALUES**

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
JUL	AUG	SEP							
1	250	e690	e1100	e410	e310	e290	1460	1250	384
941	531	386							
2	239	e670	e1000	e400	e300	e290	2760	1140	359
1010	449	308							
3	227	e650	e900	e400	e300	e290	4060	1040	334
971	393	283							
4	214	e630	e820	e390	e300	e290	6090	946	317
994	373	261							
5	207	e620	e760	e390	e300	e290	8530	859	302
1160	375	248							
6	203	e610	e710	e390	e300	e290	10300	787	300
1020	386	233							
7	190	e600	e660	e380	e300	e290	10200	722	291
942	363	221							
8	182	e600	e620	e380	e300	e290	8830	721	280
916	330	213							
9	179	e590	e590	e380	e300	e290	7410	712	260
966	301	201							

10	175	e580	552	e370	e300	e290	5910	665	241
855	268	194							
11	166	e540	534	e370	e300	e290	4720	653	233
717	242	188							
12	163	e495	524	e360	e300	e290	3970	614	225
610	226	181							
13	161	e440	504	e360	e300	e290	3510	571	209
885	207	175							
14	157	e415	488	e350	e300	e290	3350	549	194
1860	200	171							
15	155	e520	481	e350	e300	e295	3430	556	200
2200	213	171							
16	155	e740	499	e350	e300	e295	3570	566	204
1790	251	201							
17	222	e1100	e520	e350	e300	e295	3450	552	202
1560	262	200							
18	324	e1500	e525	e340	e295	e295	3230	534	207
1240	259	227							
19	394	e1900	e525	e340	e295	e295	3160	553	205
1020	250	222							
20	400	e2300	e520	e340	e295	e290	3060	608	199
862	279	220							
21	397	e2600	e510	e330	e295	288	2910	609	189
741	363	220							
22	379	e2550	e500	e330	e295	297	2690	573	177
645	401	218							
23	403	e2500	e490	e330	e295	297	2450	543	168
576	406	207							
24	514	e2300	e480	e320	e295	304	2200	541	178
509	383	198							
25	580	e2100	e470	e320	e295	327	1990	571	434
607	364	190							
26	603	e1800	e460	e320	e295	320	1790	573	627
1270	341	183							
27	680	e1550	e450	e310	e295	e370	1620	521	537
1230	318	176							
28	668	e1350	e440	e310	e295	e420	1560	483	514
1050	283	180							
29	671	e1250	e430	e309	---	e540	1470	460	577
913	281	178							
30	786	e1200	e420	e310	---	e700	1350	430	666
776	306	175							
31	e720	---	e410	e310	---	e1000	---	409	---
636	285	---							
TOTAL	10764	35390	17892	10899	8355	10688	121030	20311	9213
31472	9889	6429							
MEAN	347	1180	577	352	298	345	4034	655	307
1015	319	214							
MAX	786	2600	1100	410	310	1000	10300	1250	666
2200	531	386							

MIN	155	415	410	309	295	288	1350	409	168
509	200	171							
AC-FT	21350	70200	35490	21620	16570	21200	240100	40290	18270
62420	19610	12750							
CFSM	.40	1.37	.67	.41	.35	.40	4.67	.76	.36
1.18	.37	.25							
IN.	.46	1.53	.77	.47	.36	.46	5.22	.88	.40
1.36	.43	.28							

o e Estimated

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1997, BY WATER YEAR (WY)**

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
JUL	AUG	SEP							
MEAN	759	611	287	186	178	531	2402	1263	880
685	396	560							
MAX	2652	2414	652	411	417	1742	4653	3168	2799
2869	2094	3065							
(WY)	1969	1972	1984	1984	1984	1973	1969	1986	1993
1972	1972	1986							
MIN	80.6	85.8	98.3	77.3	98.5	141	435	222	131
110	86.4	71.3							
(WY)	1977	1977	1977	1971	1977	1980	1977	1980	1988
1988	1976	1976							
SUMMARY STATISTICS	FOR 1996 CALENDAR YEAR			FOR 1997 WATER YEAR			WATER YEARS		
1968 - 1997									
ANNUAL TOTAL	314350			292332					
ANNUAL MEAN	859			801			728		
HIGHEST ANNUAL MEAN							1390		
LOWEST ANNUAL MEAN							254		
HIGHEST DAILY MEAN	9160			Apr 20	10300	Apr 6	16400	Jul 23	1972
1972							1977		
LOWEST DAILY MEAN	151			Sep 20	155	Oct 15,16	43	Nov 12	
1976									
ANNUAL SEVEN-DAY MINIMUM	161			Sep 15	162	Oct 10	62	Jan 14	
1971									
INSTANTANEOUS PEAK FLOW				10900			Apr 6	17200	Jul 23
1972									
INSTANTANEOUS PEAK STAGE				12.02			Apr 6	15.38	Jul
23	1972								
INSTANTANEOUS LOW FLOW				155			Oct 14		
25a Nov 11	1977								
ANNUAL RUNOFF (AC-FT)	623500			579800			527500		
ANNUAL RUNOFF (CFSM)	1.00			.93			.84		
ANNUAL RUNOFF (INCHES)	13.55			12.60			11.46		
10 PERCENT EXCEEDS	1720			1690			1780		
50 PERCENT EXCEEDS	481			393			297		
90 PERCENT EXCEEDS	200			204			130		

a Result of freezeup.

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**(National Water Quality Assessment Station),**

**WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997**

DATE	TIME	DIS-CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE-CIFIC CONDUCTANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND-ARDS UNITS) (00400)	TEMPER-ATURE (DEG C) (00010)	BARO-METRIC PRES-SURE (MM HG) (00025)	OXYGEN, (PER-CENT SATUR-ATION) (00300)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N) (00301)	(00608)
APR 03...	1530	4060	72	6.9	2.0	738	12.4	91	0.280

DATE	NITRO-GEN, NITRITE DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, AM-MONIA + ORGANIC DIS. (MG/L AS N) (00623)	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N) (00631)	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) (00671)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
APR 03...	<0.010	0.90	1.0	0.260	0.130	0.050	0.040	39	66