

## ST. CROIX RIVER BASIN

05336700 KETTLE RIVER BELOW SANDSTONE, MN

LOCATION.--Lat 46°06'20", long 92°51'50", in NW<sup>1</sup>/<sub>4</sub>SW<sup>1</sup>/<sub>4</sub> 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.--868 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 sea level (NGVD of 1929, Minnesota Department of Transportation benchmark).

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

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.

PEAK DISCHARGES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Mar 9	1800	*2730	6.99	No peak greater than base discharge.			

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1999 TO SEPTEMBER 2000  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	751	1460	372	e148	e115	1170	1080	695	396	414	232	246
2	681	1290	362	e148	e120	906	1010	675	368	369	347	244
3	623	1160	382	e148	e122	789	981	646	348	329	434	240
4	571	1040	386	e148	e122	771	1010	614	349	295	398	235
5	525	933	376	e146	e123	635	974	586	352	275	356	227
6	481	826	324	e145	e123	592	996	565	338	278	327	213
7	465	735	352	e145	e124	577	1060	537	316	271	296	209
8	498	671	342	e145	e124	655	978	780	299	306	283	201
9	554	621	319	e145	e124	2360	917	2030	277	1270	267	205
10	551	581	299	e145	e124	2330	862	1990	259	2040	242	211
11	519	546	287	e145	e120	2030	801	1750	249	1540	227	202
12	494	514	280	e146	e116	1740	788	1630	233	1150	215	190
13	469	483	278	e146	e115	1500	769	1450	217	940	206	185
14	447	460	279	e144	e115	1310	742	1280	209	761	226	179
15	439	441	253	e142	e115	1080	718	1140	215	618	615	171
16	429	419	e220	e141	e115	859	682	1050	343	519	882	164
17	415	399	e190	e140	e115	755	656	1000	541	442	780	160
18	403	387	e180	e140	e116	743	647	893	591	376	727	162
19	395	378	e190	e140	e118	675	660	777	608	335	638	156
20	382	375	e180	e140	e120	670	734	681	657	308	557	151
21	374	377	e155	e135	e120	721	1040	619	1040	276	509	145
22	362	380	e135	e130	e120	772	1230	603	1100	252	492	147
23	346	387	e130	e128	e150	891	1220	592	1030	232	447	143
24	332	390	e130	e125	e245	1140	1150	556	899	215	397	141
25	327	399	e135	e120	e320	1710	1050	511	766	214	361	139
26	320	410	e137	e115	e640	1860	958	466	691	257	341	141
27	311	409	e138	e107	e2000	1770	879	434	664	268	320	139
28	302	403	e140	e108	e1400	1640	813	453	587	253	300	132
29	310	361	e142	e108	1310	1460	753	476	516	239	285	129
30	632	357	e146	e109	---	1320	706	453	466	220	269	126
31	1600	---	e148	e110	---	1180	---	419	---	204	257	---
TOTAL	15308	17592	7387	4182	8691	36611	26864	26351	14924	15466	12233	5333
MEAN	494	586	238	135	300	1181	895	850	497	499	395	178
MAX	1600	1460	386	148	2000	2360	1230	2030	1100	2040	882	246
MIN	302	357	130	107	115	577	647	419	209	204	206	126
AC-FT	30360	34890	14650	8290	17240	72620	53280	52270	29600	30680	24260	10580
CFSM	.57	.68	.28	.16	.35	1.37	1.04	.98	.58	.58	.46	.21
IN.	.66	.76	.32	.18	.37	1.58	1.16	1.14	.64	.67	.53	.23

05336700 KETTLE RIVER BELOW SANDSTONE, MN--Continued

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2000, BY WATER YEAR (WY)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
MEAN	713	535	294	195	205	608	2253	1228	863	637	397	591
MAX	2071	1569	652	411	447	1451	4034	3168	2799	1960	1575	3065
(WY)	1983	1992	1984	1984	1998	1992	1997	1986	1993	1993	1999	1986
MIN	129	137	118	86.4	111	141	453	222	131	110	97.2	90.0
(WY)	1988	1990	1990	1981	1990	1980	1987	1980	1988	1988	1989	1998

SUMMARY STATISTICS FOR 1999 CALENDAR YEAR FOR 2000 WATER YEAR WATER YEARS 1979 - 2000

ANNUAL TOTAL		263597		190942								
ANNUAL MEAN		722		522					710			
HIGHEST ANNUAL MEAN									1352			1986
LOWEST ANNUAL MEAN									318			1988
HIGHEST DAILY MEAN				3780	Apr 8	2360	Mar 9	13000	Apr 21 1979			
LOWEST DAILY MEAN				130	Dec 23	107	Jan 27	78	Sep 22 1998			
ANNUAL SEVEN-DAY MINIMUM				135	Dec 22	110	Jan 26	80	Jan 23 1981			
INSTANTANEOUS PEAK FLOW						2730	Mar 9	17200	Jul 23 1972			
INSTANTANEOUS PEAK STAGE						7.16 <sup>a</sup>	Feb 27	15.38	Jul 23 1972			
INSTANTANEOUS LOW FLOW						96 <sup>b</sup>	Dec 16	25 <sup>b</sup>	Nov 11 1977			
ANNUAL RUNOFF (AC-FT)			522800			378700		514200				
ANNUAL RUNOFF (CFMS)			.84			.60		.82				
ANNUAL RUNOFF (INCHES)			11.36			8.23		11.18				
10 PERCENT EXCEEDS			1710			1110		1710				
50 PERCENT EXCEEDS			483			378		323				
90 PERCENT EXCEEDS			150			131		139				

<sup>a</sup> Backwater from ice.  
<sup>b</sup> Result of freezeup.  
<sup>e</sup> Estimated.

