

## 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 poor. Regulation from hydropower dam from 1908 to 1963.

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 3,200 ft<sup>3</sup>/s and maximum (\*):

	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)		Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr 1	1130	*5,040	*8.49				

Minimum discharge, 98 ft<sup>3</sup>/s, Sept. 5, gage height, 3.90 ft.

DISCHARGE, CUBIC FEET PER SECOND  
WATER YEAR OCTOBER 2004 TO SEPTEMBER 2005  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	402	575	e236	e190	e157	e154	4,920	692	1,340	1,680	138	112
2	530	579	e230	e185	e158	e152	4,690	651	1,150	1,510	131	107
3	623	568	e220	e176	e163	e150	4,310	615	973	1,300	126	103
4	598	531	e226	e172	e169	e148	3,990	572	859	1,140	120	103
5	534	499	e231	e167	e172	e143	3,630	538	846	960	113	102
6	477	467	230	e163	e174	e136	3,640	535	1,160	789	108	117
7	436	441	224	e158	e172	e140	3,660	540	1,220	667	107	113
8	399	412	223	e154	e168	e143	3,480	533	1,240	575	105	112
9	370	388	225	e152	e162	e145	3,250	538	1,850	517	110	112
10	342	370	237	e147	e159	e147	2,970	544	1,800	460	132	109
11	326	353	248	e145	e162	e155	2,770	554	1,760	410	146	108
12	304	333	e229	e143	e166	e164	2,760	554	1,690	368	135	125
13	293	308	e212	e141	e170	e171	2,590	554	1,580	332	127	218
14	289	296	e206	e140	e175	e167	2,250	541	1,690	300	121	258
15	293	302	e206	e139	e181	e135	1,960	543	2,190	271	114	241
16	297	298	e212	e140	e182	e128	1,710	536	2,140	259	110	211
17	292	293	e204	e141	e177	e127	1,510	513	1,810	241	107	188
18	290	295	e204	e144	e167	e126	1,360	515	1,470	220	138	171
19	283	292	e195	e149	e167	e127	1,260	1,010	1,210	201	127	169
20	282	305	e190	e152	e169	e128	1,250	1,880	1,100	187	124	178
21	281	315	e185	e156	e172	e129	1,310	1,890	1,690	172	122	185
22	280	316	e182	e159	e170	133	1,280	1,760	1,780	162	120	177
23	309	312	e179	e159	e166	139	1,200	1,590	1,390	155	118	164
24	377	279	e177	e158	e167	146	1,110	1,420	1,110	150	115	160
25	422	259	e174	e158	e164	162	1,010	1,270	885	150	113	179
26	427	e254	e172	e158	e163	186	921	1,800	720	147	127	222
27	417	e252	e171	e157	e162	240	881	2,310	621	147	126	245
28	420	e249	e172	e156	e161	405	853	2,240	550	162	121	240
29	444	e246	e176	e157	---	1,290	805	2,050	500	166	120	219
30	492	e242	e182	e157	---	3,070	748	1,830	891	158	118	208
31	555	---	e195	e157	---	4,340	---	1,580	---	148	115	---
TOTAL	12,084	10,629	6,353	4,830	4,695	13,126	68,078	32,698	39,215	14,104	3,754	4,956
MEAN	390	354	205	156	168	423	2,269	1,055	1,307	455	121	165
MAX	623	579	248	190	182	4,340	4,920	2,310	2,190	1,680	146	258
MIN	280	242	171	139	157	126	748	513	500	147	105	102
AC-FT	23,970	21,080	12,600	9,580	9,310	26,040	135,000	64,860	77,780	27,980	7,450	9,830
CFSM	0.45	0.41	0.24	0.18	0.19	0.49	2.61	1.22	1.51	0.52	0.14	0.19
IN.	0.52	0.46	0.27	0.21	0.20	0.56	2.92	1.40	1.68	0.60	0.16	0.21

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2005, BY WATER YEAR (WY)

MEAN	645	511	278	186	193	554	2,337	1,252	918	650	379	533
MAX	2,071	1,569	652	411	447	1,451	6,459	3,168	2,799	1,960	1,575	3,065
(WY)	(1983)	(1992)	(1984)	(1984)	(1998)	(1992)	(2001)	(1986)	(1993)	(1993)	(1999)	(1986)
MIN	129	137	118	86.4	108	141	453	222	131	110	97.2	90.0
(WY)	(1988)	(1990)	(1990)	(1981)	(2003)	(1980)	(1987)	(1980)	(1988)	(1988)	(1989)	(1998)

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SUMMARY STATISTICS	FOR 2004 CALENDAR YEAR		FOR 2005 WATER YEAR		WATER YEARS 1979 - 2005	
ANNUAL TOTAL	202,879		214,522		703	
ANNUAL MEAN	554		588		318	
HIGHEST ANNUAL MEAN					1,352	1986
LOWEST ANNUAL MEAN					318	1988
HIGHEST DAILY MEAN	4,460	Jun 1	4,920	Apr 1	14,200	Apr 24, 2001
LOWEST DAILY MEAN	116	Jan 29	102	Sep 5	78	Sep 22, 1998
ANNUAL SEVEN-DAY MINIMUM	119	Jan 28	108	Sep 1	80	Jan 23, 1981
MAXIMUM PEAK FLOW			5,040	Apr 1	17,200	Jul 23, 1972
MAXIMUM PEAK STAGE			8.49	Apr 1	15.38	Jul 23, 1972
INSTANTANEOUS LOW FLOW			98	Sep 5	a25	Nov 11, 1977
ANNUAL RUNOFF (AC-FT)	402,400		425,500		509,100	
ANNUAL RUNOFF (CFSM)	0.639		0.677		0.810	
ANNUAL RUNOFF (INCHES)	8.69		9.19		11.00	
10 PERCENT EXCEEDS	1,290		1,680		1,710	
50 PERCENT EXCEEDS	282		230		309	
90 PERCENT EXCEEDS	134		127		135	

a Result of freezeup.  
e Estimated.

