

05336700 KETTLE RIVER BELOW SANDSTONE, MN

LOCATION.--Lat 46°06'20", long 92°51'50", in NW¹/₄SW¹/₄ 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 mi².

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 to poor.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in April 1965 reached a stage of 12.96 ft, from flood marks, discharge, 13,400 ft³/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
Apr 22	0200	3,420	7.75	Jun 24	1230	*6,300	*9.40

Minimum daily-mean discharge, 92 ft³/s, Mar. 6, (backwater from ice).

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2002 TO SEPTEMBER 2003
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	473	478	e223	e165	e113	e93	326	777	680	2,240	417	126
2	440	455	e213	e163	e115	e93	383	690	632	1,860	421	117
3	402	443	e205	e159	e118	e92	362	625	576	1,980	402	112
4	488	429	e198	e158	e117	e92	295	579	519	2,290	383	106
5	1,150	411	e194	e158	e117	e92	307	776	474	1,950	361	104
6	1,370	400	e185	e157	e118	e92	342	1,930	452	1,600	341	105
7	1,440	388	e182	e158	e117	e96	337	2,160	495	1,480	325	102
8	1,430	382	e175	e157	e116	e97	310	1,970	517	2,110	305	102
9	1,340	407	e174	e150	e115	e98	302	2,020	538	1,830	281	102
10	1,240	425	e173	e145	e116	e98	311	2,780	823	1,740	264	101
11	1,130	416	e177	e140	e114	e102	331	3,040	1,530	2,290	255	108
12	1,130	400	e178	e137	e112	e100	365	2,890	1,530	2,420	252	263
13	1,200	379	e178	e134	e111	e102	373	2,580	1,360	2,020	237	386
14	1,130	356	e178	e128	e110	e104	420	2,230	1,180	1,710	229	355
15	1,030	326	e176	e127	e106	e108	457	1,940	994	1,760	215	319
16	944	339	e174	e126	e103	e113	597	1,670	801	1,570	206	281
17	841	323	e173	e122	e100	e118	885	1,440	678	1,350	198	247
18	765	306	e180	e120	e99	e123	889	1,270	650	1,180	186	261
19	731	301	e190	e118	e99	e115	1,320	1,220	624	1,040	175	361
20	705	295	e200	e115	e99	e105	2,230	1,990	581	949	169	471
21	683	294	e200	e111	e100	e120	3,080	2,070	518	833	162	491
22	655	288	e195	e108	e104	e150	3,200	1,840	451	753	153	479
23	621	288	e185	e107	e105	e200	2,620	1,740	3,450	675	147	460
24	583	272	e180	e105	e103	e240	2,120	1,580	5,960	602	145	424
25	554	255	e175	e104	e102	e305	1,770	1,410	5,280	548	142	383
26	545	236	e175	e103	e97	e300	1,500	1,250	4,300	510	154	351
27	540	e220	e175	e102	e95	293	1,280	1,100	3,790	474	150	324
28	526	e225	e175	e101	e93	249	1,140	958	3,230	439	147	301
29	508	e230	e175	e102	---	219	1,010	849	2,950	422	149	274
30	506	e230	e170	e105	---	247	893	753	2,710	406	140	254
31	500	---	e168	e108	---	283	---	708	---	402	133	---
TOTAL	25,600	10,197	5,699	3,993	3,014	4,639	29,755	48,835	48,273	41,433	7,244	7,870
MEAN	826	340	184	129	108	150	992	1,575	1,609	1,337	234	262
MAX	1,440	478	223	165	118	305	3,200	3,040	5,960	2,420	421	491
MIN	402	220	168	101	93	92	295	579	451	402	133	101
AC-FT	50,780	20,230	11,300	7,920	5,980	9,200	59,020	96,860	95,750	82,180	14,370	15,610
CFSM	0.95	0.39	0.21	0.15	0.12	0.17	1.14	1.81	1.85	1.54	0.27	0.30
IN.	1.10	0.44	0.24	0.17	0.13	0.20	1.28	2.09	2.07	1.78	0.31	0.34

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2003, BY WATER YEAR (WY)

MEAN	673	526	285	189	196	554	2,363	1,275	887	672	397	555
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 2002 CALENDAR YEAR		FOR 2003 WATER YEAR		WATER YEARS 1979 - 2003	
ANNUAL TOTAL	253,487		236,552		714	
ANNUAL MEAN	694		648		318	
HIGHEST ANNUAL MEAN					1,352	1986
LOWEST ANNUAL MEAN					318	1988
HIGHEST DAILY MEAN	5,460	Apr 12	5,960	Jun 24	14,200	Apr 24, 2001
LOWEST DAILY MEAN	120	Mar 3	92	Mar 3-6	78	Sep 22, 1998
ANNUAL SEVEN-DAY MINIMUM	122	Mar 1	92	Feb 28	80	Jan 23, 1981
MAXIMUM PEAK FLOW			6,300	Jun 24	17,200	Jul 23, 1972
MAXIMUM PEAK STAGE			9.40	Jun 24	15.38	Jul 23, 1972
INSTANTANEOUS LOW FLOW			a92	Mar 3	b25	Nov 11, 1977
ANNUAL RUNOFF (AC-FT)	502,800		469,200		517,400	
ANNUAL RUNOFF (CFSM)	0.80		0.75		0.82	
ANNUAL RUNOFF (INCHES)	10.86		10.14		11.18	
10 PERCENT EXCEEDS	1,520		1,790		1,730	
50 PERCENT EXCEEDS	390		323		316	
90 PERCENT EXCEEDS	142		105		136	

- a Estimated daily-mean, backwater from ice.
- b Result of freezeup.
- e Estimated.

