

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 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 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)
Mar 29	1630	4,540	8.18	Jun 1	1530	*4,640	*8.24

Minimum discharge, 116 ft³/s, Aug. 7 (estimated daily mean).

DISCHARGE, CUBIC FEET PER SECOND
WATER YEAR OCTOBER 2003 TO SEPTEMBER 2004
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	237	329	e254	e172	e121	191	3,160	1,070	4,460	256	182	160
2	220	329	e241	e173	e124	197	2,990	957	4,400	241	175	151
3	208	327	e231	e170	e124	189	2,950	844	3,720	228	162	147
4	198	336	e225	e167	e124	189	2,770	753	2,980	237	151	141
5	192	340	e222	e165	e124	189	2,510	686	2,450	246	141	171
6	187	316	e219	e160	e120	186	2,280	629	2,330	262	134	269
7	179	e286	e216	e148	e121	183	2,090	576	1,970	293	141	314
8	176	e271	e216	e144	e121	e185	1,930	537	1,640	285	152	370
9	174	e265	e215	e142	e120	191	1,770	503	1,460	267	184	361
10	164	e273	e215	e142	e120	193	1,600	472	1,260	251	170	336
11	175	279	e207	e138	e124	e197	1,430	452	1,100	306	184	316
12	199	303	e192	e137	e124	e197	1,280	445	1,170	425	201	304
13	226	296	e194	e136	e124	201	1,160	449	1,290	494	214	285
14	231	319	e193	e137	e125	195	1,050	480	1,140	579	216	276
15	240	315	e195	e133	e128	e196	966	464	1,010	546	211	309
16	230	307	e204	e131	e127	e194	879	453	885	479	206	341
17	218	315	e199	e133	e127	197	825	693	774	422	198	374
18	216	339	e190	e132	e127	193	894	1,260	663	368	192	374
19	211	357	e186	e131	e129	196	1,260	1,260	567	329	176	369
20	208	361	e182	e128	e135	208	1,440	1,170	500	316	166	333
21	212	351	e178	e127	e144	202	1,970	1,050	447	279	154	353
22	203	339	e184	e126	e151	214	2,450	965	414	248	151	472
23	194	298	e183	e125	e158	219	2,220	1,030	385	223	147	569
24	188	e229	e177	e124	e169	226	1,940	1,090	389	202	151	613
25	184	e222	e173	e124	e175	288	1,750	1,070	383	185	145	606
26	181	e256	e173	e125	e181	495	1,680	1,030	357	170	208	579
27	184	e273	e173	e125	e187	1,350	1,520	1,140	340	159	196	528
28	203	e267	e176	e119	192	2,380	1,390	1,080	324	164	201	471
29	241	e265	e180	e116	190	4,270	1,290	958	297	194	192	426
30	289	e261	e182	e116	---	3,980	1,190	982	276	192	179	389
31	317	---	e174	e116	---	3,370	---	2,900	---	190	168	---
TOTAL	6,485	9,024	6,149	4,262	4,036	20,861	52,634	27,448	39,381	9,036	5,448	10,707
MEAN	209	301	198	137	139	673	1,754	885	1,313	291	176	357
MAX	317	361	254	173	192	4,270	3,160	2,900	4,460	579	216	613
MIN	164	222	173	116	120	183	825	445	276	159	134	141
AC-FT	12,860	17,900	12,200	8,450	8,010	41,380	104,400	54,440	78,110	17,920	10,810	21,240
CFSM	0.24	0.35	0.23	0.16	0.16	0.78	2.02	1.02	1.51	0.34	0.20	0.41
IN.	0.28	0.39	0.26	0.18	0.17	0.89	2.26	1.18	1.69	0.39	0.23	0.46

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1979 - 2004, BY WATER YEAR (WY)

MEAN	655	517	281	187	194	559	2,340	1,260	903	658	389	547
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 2003 CALENDAR YEAR		FOR 2004 WATER YEAR		WATER YEARS 1979 - 2004	
ANNUAL TOTAL	216,714		195,471		707	
ANNUAL MEAN	594		534		318	
HIGHEST ANNUAL MEAN					1,352	1986
LOWEST ANNUAL MEAN					318	1988
HIGHEST DAILY MEAN	5,960	Jun 24	4,460	Jun 1	14,200	Apr 24, 2001
LOWEST DAILY MEAN	92	Mar 3	a116	Jan 29-31	78	Sep 22, 1998
ANNUAL SEVEN-DAY MINIMUM	92	Feb 28	119	Jan 28	80	Jan 23, 1981
MAXIMUM PEAK FLOW			4,640	Jun 1	17,200	Jul 23, 1972
MAXIMUM PEAK STAGE			8.24	Jun 1	15.38	Jul 23, 1972
INSTANTANEOUS LOW FLOW			a116	Jan 29	b25	Nov 11, 1977
ANNUAL RUNOFF (AC-FT)	429,900		387,700		512,300	
ANNUAL RUNOFF (CFSM)	0.684		0.615		0.815	
ANNUAL RUNOFF (INCHES)	9.29		8.38		11.07	
10 PERCENT EXCEEDS	1,790		1,290		1,720	
50 PERCENT EXCEEDS	256		228		312	
90 PERCENT EXCEEDS	105		134		136	

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

