

**MINNESOTA RIVER BASIN**

**05325000 MINNESOTA RIVER AT MANKATO, MN**

LOCATION(REVISED).--Lat 44° 10'08", long 94° 00'11", in SE¼SW¼ sec. 7, T. 108 N., R. 26 W., Blue Earth County, Hydrologic Unit 07020007, on right bank 300 ft downstream from Memorial bridge in Mankato, 2.0 mi downstream from Blue Earth River and at mile 106.2 upstream from Mississippi River.

DRAINAGE AREA.--14,900 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--May 1903 to current year (no winter records 1904, 1906-10, 1918-29). Monthly discharge only for some periods, published in WSP 1308. Published as "near Mankato": 1903-21.

REVISED RECORDS.--WSP 875: 1917. WSP 955: Drainage area. WSP 1085: 1929. WSP 1238: 1903, 1908, 1919. WSP 1508: 1916(M), 1918(M), 1926(M), 1928, 1930, 1932(M), 1938(M). WDR-MN-76-1: 1881(M).

GAGE.--Water-stage recorder. Datum of gage is 747.92 ft above sea level. Prior to Oct. 19, 1921, nonrecording gage, at site 1.8 mi upstream at datum 6.4 ft higher. Mar. 15, 1922 to Nov. 30, 1924, nonrecording gage, and Dec. 1, 1924 to May 24, 1971, recorder at site 0.2 mi upstream at present datum. May 25, 1971 to Aug. 14, 1977, recorder at site 0.5 mi upstream at present datum. Aug. 14, 1977 to July 27, 1978, nonrecording gage; and from July 28, 1978 to Sept. 30, 1993, recording gage at site 0.7 mi upstream of present site.

REMARKS.--Records fair.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum stage, 29.9 ft, Apr. 26, 1881, near present site and datum, from floodmark (discharge, 110,000 ft<sup>3</sup>/s).

**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	1190	2930	e3400	e2300	e1600	e2350	42100	20600	10700
13400	12500	3270							
2	1190	3000	e3300	e2300	e1600	e2800	42700	19700	10100
14000	11400	3150							
3	1100	3030	e3300	e2300	e1600	e3400	43600	19100	9720
e13500	10000	2790							
4	1070	3070	e3300	e2200	e1600	e3900	44600	18500	9160
e12300	9080	2540							
5	1060	3190	e3300	e2200	e1550	e4500	47000	18700	8780

e11400	7440	2470								
6	1030	3280	e3300	e2100	e1550	e4900	51800	18500	8320	
e10800	6740	2420								
7	968	3290	e3400	e2000	e1550	e5200	61900	18100	7940	
e10600	6340	2370								
8	962	3220	e3400	e1900	e1550	e5500	72600	17600	7590	
10300	6040	2300								
9	970	3170	e3400	e1850	e1550	e5800	78500	17300	7230	
10200	5520	2260								
10	932	3120	e3300	e1800	e1550	e7400	77900	17000	6900	
10500	5080	2220								
11	897	2980	e3300	e1750	e1550	8920	74700	16500	6610	
10200	4880	2190								
12	890	2740	e3100	e1700	e1550	10700	70200	15900	6110	
9700	4640	2050								
13	905	2450	e3000	e1650	e1550	12100	64800	15300	5720	
9500	4520	1920								
14	883	2400	e3000	e1650	e1550	13000	59100	14600	5410	
10400	4380	1900								
15	893	2380	e2900	e1610	e1550	12600	53500	14100	5050	
11000	4240	1830								
16	910	2850	e2800	e1610	e1550	12200	49000	13400	4830	
11300	4160	1750								
17	1140	e4000	e2800	e1650	e1550	11900	45500	12800	4440	
10700	4190	1660								
18	1390	e4200	e2700	e1700	e1550	11600	42700	12200	4100	
10400	4050	1570								
19	1510	e4400	e2700	e1700	e1550	11100	40600	11800	4100	
10000	4020	1560								
20	1700	e4400	e2600	e1650	e1550	12400	38400	11300	4040	
9400	4040	1520								
21	1920	e4200	e2600	e1650	e1550	15500	36300	10700	4180	
9200	4410	1470								
22	1970	e4000	e2500	e1600	e1600	18700	34300	10000	4170	
11300	5490	1460								
23	2140	e3800	e2500	e1600	e1650	22200	32400	9570	4380	
12100	5240	1490								
24	2180	e3700	e2500	e1600	e1750	25400	30500	9610	5730	
11400	4690	1520								
25	2310	3540	e2500	e1600	e1850	25400	28800	11100	6790	
11400	4310	1530								
26	2610	e3500	e2400	e1600	e1950	24200	26800	12100		
7840		13000	3910	1540						
27	2800	e3500	e2300	e1600	e2050	24600	25500	12300	8120	
14800	3660	1490								
28	2730	e3500	e2300	e1600	e2200	27000	24100	11700	7700	
15400	3310	1480								
29	2750	e3400	e2300	e1600	---	29400	22800	11200	10200	
15500	e3170	1450								
30	2880	e3400	e2300	e1600	---	33000	21800	11200	12200	



INSTANTANEOUS LOW FLOW		869	Oct 14	26b
Aug 4 1934				
ANNUAL RUNOFF (AC-FT)	4084000	6765000		2518000
ANNUAL RUNOFF (CFSM)	.38	.63		.23
ANNUAL RUNOFF (INCHES)	5.14	8.52		3.17
10 PERCENT EXCEEDS	12600	23300		9090
50 PERCENT EXCEEDS	3000	3800		1240
90 PERCENT EXCEEDS	1420	1550		186

a Median of annual mean discharges is 2759 ft<sup>3</sup>/s.

b Minimum observed.

## WATER-QUALITY RECORDS

PERIOD OF RECORD.-- Water years 1963-66, 1968 to current year.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- October 1967 to September 30, 1981, October 1982 to current year (fragmentary records).

SUSPENDED-SEDIMENT DISCHARGE.-- October 1967 to current year.

REMARKS.--Sediment samples were collected approximately daily by an observer during the open-water period. In general, daily concentrations and loads for the open-water period are considered good to fair. During the winter period, daily sediment concentrations and loads are based primarily on concentrations of sediment in samples that were collected monthly, and on daily water-discharge records. Sediment records for the winter period are considered fair to poor. Water temperatures were obtained by the observer at the time of sediment sampling, and monthly by U.S. Geological Survey personnel during the winter period. Some temperatures are not published because of questionable values.

EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- Maximum observed, 31.0 °C, July 4-9, 1989; minimum observed, 0.0 °C on many days each year.

SEDIMENT CONCENTRATIONS.-- Maximum daily mean, 2850 µg/L, Aug. 7, 1968; minimum daily mean, 9 µg/L, Jan. 15-19, 1991.

SEDIMENT LOADS.-- Maximum daily, 414,000 tons, June 21, 1993; minimum daily, 5.2 tons, Nov. 6, 1976.

EXTREMES FOR CURRENT YEAR:

WATER TEMPERATURES.-- Maximum observed, 27.5 °C, June 23; minimum observed, 1.5 °C,



19	---	---	---	---	---	3.5	---	---	24.0	---
20	---	---	---	---	---	4.5	---	15.5	24.5	---
21	12.0	---	---	---	---	3.5	11.0	17.5	---	---
	22.0	---								
22	---	---	---	---	---	---	12.5	17.0	---	
23.5	22.0	---								
23	9.5	---	---	---	---	3.5	10.5	17.0	27.5	
24.0	---	---								
24	8.5	---	---	---	---	1.5	13.0	17.0	25.5	
23.0	---	---								
25	9.5	---	---	---	---	---	13.0	---	25.0	
25.0	23.0	---								
26	---	---	---	---	---	---	13.0	---	---	---
27	---	---	---	---	---	7.0	---	14.5	25.5	---
	24.0	---								
28	11.0	---	---	---	---	5.0	15.0	13.0	---	
25.5	---	---								
29	11.5	---	---	---	---	---	15.5	13.5	---	
24.0	25.0	---								
30	---	---	---	---	---	---	12.0	---	---	
24.5	---	---								
31	---	---	---	---	---	7.0	---	20.0	---	
23.5	---	---								
MEAN	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---

MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN	MEAN
LOAD	CONCEN- TRATION	LOAD	CONCEN- TRATION	LOAD	CONCEN- TRATION	LOAD	CONCEN- TRATION	LOAD	CONCEN- TRATION
(TONS/ DAY)	(MG/L)	(TONS/ DAY)	(MG/L)	(TONS/ DAY)	(MG/L)	(TONS/ DAY)	(MG/L)	(TONS/ DAY)	(MG/L)

	OCTOBER		NOVEMBER		DECEMBER		JANUARY		
FEBRUARY		MARCH							
1	126	404	265	2100	233	2140	195	1210	164
707	165	1050							
2	147	473	264	2140	232	2060	194	1210	163
703	167	1270							
3	82	243	263	2150	230	2050	193	1200	162

699	170	1560							
4	111	322	263	2180	229	2040	192	1140	161
695	173	1820							
5	121	346	271	2330	228	2030	191	1130	160
669	175	2130							
6	111	307	280	2480	226	2020	190	1080	159
665	178	2350							
7	101	264	267	2370	225	2070	189	1020	158
662	181	2540							
8	92	239	247	2150	224	2050	188	962	157
658	187	2770							
9	81	213	229	1960	223	2040	187	932	156
654	251	3940							
10	72	180	213	1800	221	1970	186	902	155
650	435	8690							
11	64	155	200	1610	220	1960	184	871	155
647	711	17100							
12	64	154	188	1390	219	1830	183	842	154
643	800	23100							
13	66	162	180	1190	218	1760	182	812	153
639	774	25300							
14	69	164	173	1120	216	1750	181	808	152
636	742	26100							
15	72	173	172	1110	215	1680	180	784	151
632	711	24200							
16	78	192	210	1610	214	1620	179	779	150
629	644	21200							
17	198	610	256	2760	213	1610	178	794	149
625	559	18000							
18	201	753	272	3080	211	1540	177	813	149
621	486	15200							
19	203	827	281	3340	210	1530	176	809	148
618	414	12400							
20	207	952	277	3290	209	1470	175	781	147
614	468	15700							
21	212	1100	271	3080	208	1460	174	776	146
613	682	28600							
22	214	1140	262	2830	207	1400	173	748	148
640	800	40400							
23	216	1250	253	2590	206	1390	172	744	151
670	882	52900							
24	234	1380	245	2450	204	1380	171	740	153
722	852	58400							
25	206	1290	242	2310	203	1370	170	736	155
775	777	53300							
26	237	1670	240	2270	202	1310	169	731	158
830	705	46100							
27	249	1880	239	2260	201	1250	168	727	160
886	711	47200							
28	258	1900	237	2240	200	1240	167	723	162
965	706	51500							

29	266	1980	236	2160	199	1230	166	719	---	---
	617	49000								
30	267	2080	234	2150	198	1230	166	715	---	---
	515	45900								
31	266	2030	---	---	196	1220	165	711	---	---
	438	45900								
TOTAL	---	24833	---	66500	---	51700	---	26949	---	---
19167	---	745620								

### SUSPENDED-SEDIMENT, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

MEAN LOAD (TONS/ DAY)	MEAN		MEAN		MEAN		MEAN		CONCEN- TRATION (MG/L)
	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	CONCEN- TRATION (MG/L)	LOAD (TONS/ DAY)	
	APRIL		MAY		JUNE		JULY		
AUGUST	SEPTEMBER								
1	492	55900	95	5310	272	7860	445	16100	301
10100	82	722							
2	394	45400	93	4930	245	6690	438	16600	301
9260	77	657							
3	318	37500	101	5220	266	6980	433	15800	302
8140	73	551							
4	363	43700	114	5670	276	6830	401	13300	301
7370	73	503							
5	277	35200	127	6390	253	6000	381	11700	291
5850	75	501							
6	278	38900	128	6380	219	4920	363	10600	325
5920	77	503							
7	339	56600	138	6740	186	3990	344	9830	328
5610	79	504							
8	390	76500	136	6440	169	3470	310	8620	304
4950	81	500							
9	409	86600	126	5860	155	3030	305	8390	272
4050	80	489							
10	378	79500	120	5530	130	2420	380	10800	241
3300	79	474							
11	285	57500	117	5220	136	2420	370	10200	217
2850	78	461							
12	243	46000	114	4900	146	2420	360	9430	179
2240	77	426							
13	214	37400	111	4590	160	2470	365	9370	158
1920	76	394							
14	189	30100	110	4340	159	2320	432	12100	190
2250	75	385							
15	172	24900	125	4760	150	2050	451	13400	197

2260	74	366							
16	129	17100	132	4770	144	1880	418	12800	190
2140	73	345							
17	87	10700	136	4700	154	1840	432	12500	184
2080	72	323							
18	76	8770	141	4650	139	1540	494	13900	178
1940	71	301							
19	73	7990	147	4670	156	1720	438	11800	174
1890	70	294							
20	72	7420	150	4590	173	1890	403	10200	171
1870	68	280							
21	70	6900	135	3910	197	2220	423	10500	192
2280	67	265							
22	71	6600	139	3750	230	2590	913	27900	134
1980	65	257							
23	77	6760	157	4070	272	3220	584	19100	120
1700	64	257							
24	81	6710	200	5180	390	6030	427	13100	119
1500	62	256							
25	91	7060	267	7990	525	9630	447	13800	118
1370	61	252							
26	98	7090	353	11500	452	9580	539	18900	123
1300	60	248							
27	101	6940	420	13900	480	10500	547	21900	127
1260	58	235							
28	103	6680	389	12300	467	9710	446	18500	113
1010	57	228							
29	104	6370	335	10100	460	12700	352	14700	99
847	56	218							
30	100	5900	313	9460	452	14900	322	13100	91
770	55	202							
31	---	---	301	9010	---	---	302	11300	87
757	---	---							
TOTAL	---	870690	---	196830	---	153820	---	420240	---
100764	---	11397							

YEAR 2688510

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, (PER- CENT SATUR- ATION) (00300)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)
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MAR

18...	1445	12000	790	7.5	0.5	756	11.4	80	0.350
28...	1530	27500	537	7.9	3.5	733	10.8	85	0.310
APR									
04...	1400	44900	486	7.9	6.5	735	10.6	90	0.310
10...	1545	78100	588	8.1	2.5	740	10.8	82	0.310
16...	1400	49300	562	7.7	4.0	751	--	--	--
24...	1300	30900	624	8.1	11.0	748	10.2	94	0.075
MAY									
01...	1210	21000	719	8.6	12.5	742	12.0	115	<0.015
08...	1210	17800	718	8.5	14.0	743	12.0	119	<0.015
14...	1500	14700	786	8.5	11.0	742	10.9	102	0.016
21...	1400	10800	803	8.3	16.0	754	11.3	116	0.024
28...	1425	11800	803	8.2	14.0	747	9.3	93	0.015
JUN									
04...	1410	9250	821	8.2	20.0	744	9.3	106	0.029
10...	1530	6960	911	8.3	22.5	749	9.2	109	<0.015
17...	1345	4390	862	8.3	23.0	740	9.2	111	<0.015
26...	1245	7820	778	8.0	24.5	748	--	--	0.021
JUL									
03...	1415	13500	757	7.8	20.0	737	8.4	96	--
09...	1400	10400	836	8.0	20.0	748	8.0	90	0.019
15...	1430	11300	746	8.0	23.0	743	7.2	87	<0.015
22...	1450	11500	626	7.8	24.5	746	8.9	110	0.024
29...	1510	15600	712	8.0	24.5	751	--	--	0.016
AUG									
04...	1510	9540	946	8.0	27.0	746	6.6	84	0.030
11...	1420	5530	806	8.3	23.0	748	7.3	87	0.088
21...	1340	5140	795	8.3	21.0	749	9.2	106	<0.015
27...	1030	4470	910	7.9	23.5	744	7.9	95	<0.015

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	PHOS- PHORUS DIS- TOTAL (MG/L AS P) (00665)	PHOS- ORTH, DIS- SOLVED (MG/L AS P) (00671)	RESIDUE TOTAL AT 105 DEG. C, SUS- PENDED (MG/L) (00530)	RESIDUE VOLTA- TILE, SUS- PENDED (MG/L) (00535)	CHLOR-A PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70953)	CHLOR-B PHYTO- PLANK- TON CHROMO FLUOROM (UG/L) (70954)
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MAR								
18...	0.080	5.40	0.260	0.170	94	17	--	--
28...	0.060	5.20	0.560	0.150	190	22	1.30	<0.100
APR								
04...	0.070	3.50	--	0.170	--	--	E0.550	<0.100
10...	0.070	2.60	0.230	0.130	120	28	1.18	<0.100
16...	--	--	--	--	58	36	0.830	<0.100
24...	0.033	3.01	0.198	0.116	42	8	4.74	0.590
MAY								
01...	0.015	1.91	0.172	0.032	38	11	13.0	E0.590
08...	0.014	2.09	0.117	<0.010	45	11	8.60	<0.100
14...	0.027	2.27	0.046	<0.010	61	22	7.90	<0.100
21...	0.018	1.69	0.105	<0.010	75	10	3.10	<0.100
28...	0.031	7.17	0.249	0.036	125	23	4.30	<0.100
JUN								
04...	0.022	5.46	0.038	0.016	109	23	21.0	0.600

10...	0.019	3.71	0.049	0.012	84	14	33.0	1.20
17...	0.018	3.77	0.109	<0.010	46	14	20.0	1.30
26...	0.043	7.13	0.109	0.063	--	--	16.0	0.340
JUL								
03...	--	--	--	--	169	21	5.80	0.290
09...	0.055	5.57	0.312	0.099	116	30	10.0	0.360
15...	0.031	6.76	0.378	0.101	204	44	11.0	0.470
22...	0.035	9.90	0.412	0.117	672	80	9.10	E0.920
29...	0.056	5.94	0.346	0.141	97	16	7.10	0.520
AUG								
04...	0.037	4.99	0.235	0.115	124	22	21.0	1.80
11...	0.022	3.29	0.270	0.108	93	14	3.70	0.500
21...	0.016	2.43	0.206	0.061	80	8	10.0	E0.350
27...	0.015	2.77	0.208	0.075	71	10	17.0	1.40