

**UPPER MISSISSIPPI RIVER BASIN**

**05331580 MISSISSIPPI RIVER BELOW LOCK AND DAM 2, AT HASTINGS, MN**

LOCATION.--Lat 44° 44'48", long 92° 51'08", SE¼SE¼ sec. 21, T.115 N., R.17 W., Dakota County, Hydrologic Unit 07010206, near bridge on U.S. Highway 61 in Hastings, 1.2 mi downstream from Lock and Dam 2, 2.5 mi upstream from St. Croix River, and at mile 813.8 upstream from Ohio River.

DRAINAGE AREA.--37,050 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1996 to current year.

REMARKS.--Water-discharge computed on the basis of routed discharge for Mississippi River at St. Paul (station 05331000) adjusted for inflow and travel time.

**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	5270	12500	14200	11100	9060	9020	49700	59700	24800
28000	44800	15200							
2	5160	12600	15300	10300	8030	9260	54400	57500	23900
32600	44500	15400							
3	5060	13100	14800	10400	9340	9210	59400	55500	22600
35500	43000	14400							
4	5450	13500	14500	10800	9330	8880	67000	53600	21900
34300	42100	13800							
5	5400	13600	14100	10800	9210	9330	75400	51800	21000
34800	40300	12600							
6	5600	14300	14300	11000	8790	10200	84000	49500	19900
35700	36700	12100							
7	5460	14600	15500	10200	9080	10500	92900	48100	18900
36300	33000	11800							
8	5470	15200	15800	9410	9420	10700	99900	46900	18200
36800	29500	11600							
9	5530	15200	15400	9470	9210	12300	108000	46100	17400
37300	21400	11500							
10	5300	14800	14800	8830	8780	13600	115000	43400	16300
36400	20400	11000							
11	5290	15300	15000	8500	8850	14300	124000	41700	16100
35800	19100	10800							
12	5410	15000	15400	8450	8880	15100	132000	41800	15600
36200	18200	10900							
13	5310	14800	15500	7700	8810	15800	138000	39900	14400
35500	17200	10400							
14	5250	13900	15900	7220	8740	16400	138000	39500	13900

35200	16400	10000							
15	4900	13100	15400	7500	8740	17300	134000	39100	13100
36100	16200	10300							
16	5140	12300	14600	7700	9100	17800	128000	37500	13100
35200	15900	11000							
17	4640	11700	13200	8590	8740	18700	121000	36100	12300
35300	15300	11300							
18	5240	11300	12500	10300	8640	20200	113000	35100	11900
37700	14700	10900							
19	5640	14300	12700	8980	8650	20900	105000	33600	11500
35400	15700	10500							
20	6250	14800	12100	9150	8750	21800	98700	32200	11400
34800	20000	10300							
21	6390	15200	10800	8910	8590	23200	93300	31000	11100
34200	21500	10000							
22	6460	16300	9760	8930	9140	24400	88200	29800	10800
32400	20400	10300							
23	8070	16600	10200	9090	9050	26000	83900	28200	11300
35700	20500	10300							
24	8620	16000	11800	9420	8980	26900	80100	23800	11100
37900	20700	9720							
25	9200	16100	11400	9390	8710	29200	76600	24000	12900
38800	19700	9570							
26	10200	15700	11200	9110	8840	29400	73300	25100	14000
40600	18700	10100							
27	10300	14700	10700	9230	8790	30700	70200	26200	15500
42400	18100	9450							
28	10400	13300	10800	9020	9140	33300	67500	26500	16400
43400	17500	9560							
29	10800	12700	11100	9150	---	37100	65000	26500	19100
44300	16900	9520							
30	11300	13600	11500	9220	---	41300	62100	26200	22700
44700	16400	8860							
31	11400	---	11600	9140	---	45400	---	25400	---
44900	15600	---							
TOTAL	209910	426100	411860	287010	249390	628200	2797600	1181300	483100
1144200	730400	333180							
MEAN	6771	14200	13290	9258	8907	20260	93250	38110	16100
36910	23560	11110							
MAX	11400	16600	15900	11100	9420	45400	138000	59700	24800
44900	44800	15400							
MIN	4640	11300	9760	7220	8030	8880	49700	23800	10800
28000	14700	8860							
AC-FT	416400	845200	816900	569300	494700	1246000	5549000	2343000	958200
2270000	1449000	660900							
CFSM	.18	.38	.36	.25	.24	.55	2.51	1.03	.43
.99	.64	.30							
IN.	.21	.43	.41	.29	.25	.63	2.81	1.18	.48
1.15	.73	.33							

**STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1996 - 1997, BY WATER YEAR (WY)**

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
JUL	AUG	SEP							
MEAN	16190	19580	12810	9458	8687	17810	68640	39140	24180
26700	16510	8534							
MAX	25600	24960	13290	9657	8907	20260	93250	40160	32250
36910	23560	11110							
(WY)	1996	1996	1997	1996	1997	1997	1997	1996	1996
1997	1997	1997							
MIN	6771	14200	12340	9258	8476	15360	44020	38110	16100
16490	9453	5962							
(WY)	1997	1997	1996	1997	1996	1996	1996	1997	1997
1996	1996	1996							

**SUMMARY STATISTICS FOR 1996 CALENDAR YEAR FOR 1997 WATER YEAR WATER YEARS 1996 - 1997**

ANNUAL TOTAL		6585480		8882250		
ANNUAL MEAN		17990		24330		22360
HIGHEST ANNUAL MEAN						
24330		1997				
LOWEST ANNUAL MEAN						
20390		1996				
HIGHEST DAILY MEAN			51900	Apr 24	138000	Apr 13
13	1997					138000
LOWEST DAILY MEAN			4620	Sep 29	4640	Oct 17
29	1996					4620
ANNUAL SEVEN-DAY MINIMUM			4850	Sep 23	5130	Oct 12
23	1996					4850
ANNUAL RUNOFF (AC-FT)			13060000		17620000	16200000
ANNUAL RUNOFF (CFSM)			.48		.66	.60
ANNUAL RUNOFF (INCHES)			6.60		8.91	8.19
10 PERCENT EXCEEDS			40400		48700	42700
50 PERCENT EXCEEDS			11900		14800	14800
90 PERCENT EXCEEDS			5850		8730	8280

**(National Water-Quality Assessment Station)**

**WATER-QUALITY RECORDS**

PERIOD OF RECORD.--Water years 1996 to current year.

NASQAN samples previously collected at Mississippi River at Ninninger (station no. 05331570), January 1977 to September 1995.

PERIOD OF DAILY RECORD:

WATER TEMPERATURES.-- May 1996 to current year.

INSTRUMENTATION.--Water-quality monitor since May 1996, provides continuous recordings.

Sensor located between Hwy. 61 bridge and railroad bridge at Hastings.

REMARKS.--Records represent water temperature at sensor within 0.5°C. Temperature at the sensor was compared with the average for the river by temperature cross section on Oct. 4, Nov. 18, May 7, June 3. Variation was within 0.9°C.

**EXTREMES FOR PERIOD OF DAILY RECORD:**

WATER TEMPERATURES.-- Maximum, 28.0 °C, June 29, 30, 1996; minimum observed, 0.5 °C, on many days in 1996..

**EXTREMES FOR CURRENT YEAR:**

WATER TEMPERATURES.-- Maximum 19.5 °C, June 2; minimum observed, 0.5 °C, on many days during winter.

**WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997**

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
MAX	MIN	MEAN								
OCTOBER			NOVEMBER							
DECEMBER			JANUARY							
1	16.0	15.0	15.5	5.0	4.0	4.5	---	---	---	---
2	16.0	15.0	15.5	5.0	4.0	4.5	---	---	---	---
3	15.0	14.0	14.5	4.5	3.5	4.0	---	---	---	---
4	14.0	12.0	13.5	4.5	4.0	4.5	---	---	---	---
5	14.0	13.0	13.5	4.5	4.0	4.5	---	---	---	---
6	15.0	14.0	14.5	5.5	4.5	5.0	---	---	---	---
7	15.0	14.0	14.5	5.0	4.5	5.0	---	---	---	---
8	14.0	13.5	14.0	5.0	4.5	5.0	---	---	---	---
9	14.0	13.0	13.5	4.5	3.5	4.0	---	---	---	---
10	13.0	12.5	12.5	3.5	3.0	3.0	---	---	---	---
11	12.5	12.0	12.0	3.0	2.0	2.5	---	---	---	---
12	13.0	12.0	12.5	2.0	1.5	1.5	---	---	---	---
13	13.5	13.0	13.0	1.5	1.0	1.5	---	---	---	---
14	14.0	13.5	13.5	1.5	1.0	1.0	---	---	---	---







17	----	----	----	----	----	----	----	----	----	----
18	----	----	----	----	----	----	----	----	----	----
19	----	----	----	----	----	----	----	----	----	----
20	----	----	----	----	----	----	----	----	----	----
21	----	----	----	----	----	----	----	----	----	----
22	----	----	----	----	----	----	----	----	----	----
23	----	----	----	----	----	----	----	----	----	----
24	----	----	----	----	----	----	----	----	----	----
25	----	----	----	----	----	----	----	----	----	----
26	----	----	----	----	----	----	----	----	----	----
27	----	----	----	----	----	----	----	----	----	----
28	----	----	----	----	----	----	----	----	----	----
29	----	----	----	----	----	----	----	----	----	----
30	----	----	----	----	----	----	----	----	----	----
31	----	----	----	----	----	----	----	----	----	----
MONTH	----	----	----	----	----	----	----	----	----	----

**WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997**

OXYGEN,		DIS-		SPE-	PH	PH		BARO-	
DIS-		CHARGE,	SPE-	CIFIC	WATER	WATER		METRIC	
SOLVED		IN	CIFIC	CON-	WHOLE	WHOLE		PRES-	
(PER-		CUBIC	CON-	DUCT-	FIELD	LAB	TEMPER-	SURE	OXYGEN,
CENT		FEET	DUCT-	ANCE	(STAND-	(STAND-	ATURE	(MM	DIS-
DATE	TIME	PER	ANCE	LAB	ARD	ARD	WATER	OF	SOLVED
SATUR-		SECOND	(US/CM)	(US/CM)	UNITS)	UNITS)	(DEG C)	HG)	(MG/L)





JAN										
09...	260	213	216	260	0.390	0.060	1.0	1.0	2.40	
0.160										
FEB										
05...	250	279	--	340	0.500	0.100	1.2	1.1	1.70	
0.150										
MAR										
14...	270	207	218	253	0.370	0.100	1.0	1.0	3.00	
0.080										
APR										
12...	170	114	124	139	0.330	0.050	0.90	1.5	2.60	
0.300										
23...	210	148	149	181	0.094	0.034	0.82	1.1	1.96	
0.195										
MAY										
07...	250	156	166	190	<0.015	0.019	0.65	1.6	0.897	
0.160										
JUN										
03...	290	210	211	245	<0.015	0.025	0.47	0.91	3.90	
0.098										
26...	290	205	204	250	0.169	0.053	0.58	1.1	1.67	
0.195										
JUL										
03...	220	194	167	237	0.074	0.095	0.70	1.5	4.98	
0.342										
AUG										
12...	280	179	214	218	0.022	0.041	0.89	1.1	1.89	
0.226										
SEP										
02...	260	206	210	248	0.020	0.029	0.63	1.4	1.50	
0.222										

CHLO-	PHOS-	PHOS-	CARBON,	CARBON,		MAGNE-		SODIUM	POTAS-
RIDE,	PHORUS	ORTHO,	ORGANIC	SUS-	CALCIUM	SIUM,	SODIUM,	AD-	SIUM,
DIS-	DIS-	DIS-	DIS-	PENDED	DIS-	DIS-	DIS-	SORP-	DIS-
SOLVED	SOLVED	SOLVED	SOLVED	TOTAL	SOLVED	SOLVED	SOLVED	TION	SOLVED
DATE	(MG/L	(MG/L	(MG/L	(MG/L	(MG/L	(MG/L	(MG/L	RATIO	(MG/L
(MG/L	AS P)	AS P)	AS C)	AS C)	AS CA)	AS MG)	AS NA)		AS K)
CL)	(00666)	(00671)	(00681)	(00689)	(00915)	(00925)	(00930)	(00931)	(00935)
(00940)									

OCT										
04...	0.160	0.140	6.8	2.5	52	23	27	0.8	3.8	36
NOV										
18...	0.160	0.150	8.1	0.60	49	20	26	0.8	3.2	35
DEC										
05...	0.110	0.120	8.3	0.70	72	28	19	0.5	3.4	26

JAN										
09...	0.150	0.150	6.9	0.40	64	24	25	0.7	2.8	33
FEB										
05...	0.140	0.140	7.3	0.30	63	22	24	0.7	3.4	31
MAR										
14...	0.090	0.120	7.0	0.50	68	24	20	0.5	3.7	28
APR										
12...	0.120	0.120	7.2	2.2	44	15	7.0	0.2	4.1	11
23...	0.077	0.068	7.9	2.5	51	20	8.8	0.3	4.1	11
MAY										
07...	<0.010	<0.010	8.3	2.3	58	25	13	0.3	4.1	14
JUN										
03...	<0.010	0.015	7.1	1.1	69	28	15	0.4	3.1	19
26...	0.093	0.088	6.7	1.7	69	28	20	0.5	3.7	27
JUL										
03...	0.129	0.111	7.9	2.8	56	21	14	0.4	3.0	20
AUG										
12...	0.152	0.137	9.2	1.2	69	26	14	0.4	3.7	20
SEP										
02...	0.108	0.093	7.6	3.0	64	25	15	0.4	3.5	22

#### WATER-QUALITY DATA, WATER YEAR OCTOBER 1996 TO SEPTEMBER 1997

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
04...	54	0.30	8.8	<3.0	2.0	342	320	--	--
NOV									
18...	63	0.20	9.3	39	39	327	293	19	96
DEC									
05...	70	0.30	15	43	36	392	374	92	74
JAN									
09...	53	0.30	15	34	55	375	357	4	97
FEB									
05...	41	0.20	15	50	70	339	375	5	100
MAR									
14...	57	0.30	15	18	67	376	355	15	94
APR									
12...	50	0.21	12	65	51	254	224	157	88
23...	75	0.19	13	33	22	303	281	106	81
MAY									
07...	87	0.25	7.2	27	6.0	342	304	67	98
JUN									
03...	76	0.29	8.4	6.1	17	393	356	40	98
26...	72	0.30	10	3.4	2.5	382	360	39	100

JUL									
03...	46	0.29	15	3.4	2.3	328	313	178	100
AUG									
12...	63	0.28	19	8.3	16	408	332	54	100
SEP									
02...	53	0.27	16	4.7	1.3	348	330	54	98