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 mi².

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 JUL	OCT AUG	NOV SEP	DEC	JAN	FEB	MAR	APR	MAY	JUN
1 28000	5270 44800	12500 15200	14200	11100	9060	9020	49700	59700	24800
2 32600	5160 44500	12600 15400	15300	10300	8030	9260	54400	57500	23900
3 35500	5060 43000	13100 14400	14800	10400	9340	9210	59400	55500	22600
4 34300	5450 42100	13500 13800	14500	10800	9330	8880	67000	53600	21900
5 34800	5400 40300	13600 12600	14100	10800	9210	9330	75400	51800	21000
3 2 3 3 3	10000								
6	5600	14300	14300	11000	8790	10200	84000	49500	19900
35700 7	36700 5460	12100 14600	15500	10200	9080	10500	92900	48100	18900
36300 8	33000 5470	11800 15200	15800	9410	9420	10700	99900	46900	18200
36800 9	29500 5530	11600 15200	15400	9470	9210	12300	108000	46100	17400
37300	21400	11500	13100	J 170	J210	12300	100000	10100	17100
10 36400	5300 20400	14800 11000	14800	8830	8780	13600	115000	43400	16300
11 35800	5290 19100	15300 10800	15000	8500	8850	14300	124000	41700	16100
12	5410	15000	15400	8450	8880	15100	132000	41800	15600
36200 13	18200 5310	10900	15500	7700	8810	15800	138000	39900	14400
35500 14	17200 5250	10400 13900	15900	7220	8740	16400	138000	39500	13900

35200 15 36100	16400 4900 16200	10000 13100 10300	15400	7500	8740	17300	134000	39100	13100
16	5140	12300	14600	7700	9100	17800	128000	37500	13100
35200	15900	11000							
17	4640	11700	13200	8590	8740	18700	121000	36100	12300
35300 18	15300 5240	11300 11300	12500	10300	8640	20200	113000	35100	11900
37700	14700	10900	12300	10300	0040	20200	113000	33100	11900
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							
0.1		1=000	10000		0.500			0.1.0.0	
21	6390	15200	10800	8910	8590	23200	93300	31000	11100
34200 22	21500 6460	10000 16300	9760	8930	9140	24400	88200	29800	10800
32400	20400	10300	2700	0,50	7140	21100	00200	27000	10000
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			0.71.0		7	0.4.0.0.0	10000
25 38800	9200 19700	16100 9570	11400	9390	8710	29200	76600	24000	12900
30000	19700	9570							
26	10200	15700	11200	9110	8840	29400	73300	25100	14000
40600	18700	10100	11200	7110	0010	25100	, 3300	23100	11000
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	11100	0150		27100	C C C C C C C C C C	06500	10100
29 44300	10800 16900	12700 9520	11100	9150		37100	65000	26500	19100
30	11300	13600	11500	9220		41300	62100	26200	22700
44700	16400	8860							
31	11400		11600	9140		45400		25400	
44900	15600								
moma r	200010	406100	411060	007010	240200	600000	0707600	1101200	402100
TOTAL 1144200	209910	426100 333180	411860	287010	249390	628200	2/9/600	1181300	483100
MEAN	6771	14200	13290	9258	8907	20260	93250	38110	16100
36910	23560	11110	10270	, 200			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	30110	
MAX	11400	16600	15900	11100	9420	45400	138000	59700	24800
44900	44800	15400							
MIN	4640	11300	9760	7220	8030	8880	49700	23800	10800
28000 AC-FT	14700 416400	8860 845200	816900	569300	494700	1246000	EE40000	2343000	050200
		660900	010900	309300	494700	1240000	3349000	2343000	936200
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)

JAN

FEB

MAR

APR

JUN

MAY

DEC

NOV

	001	NOV	DEC		UAIN		LED	MAIN		APK		MAI	UUN	
JUL	AUG	SEP												
MEAN	16190	19580	1281	. 0	9458	3	8687	1781	- 0	686	40	39140	24180	
26700	16510	8534												
MAX	25600	24960	1329	0	965	7	8907	2026	50	932	50	40160	32250	
36910	23560	11110												
(WY)	1996	1996	1997	7	1996	5	1997	1997	7	199	7	1996	1996	
1997	1997	1997												
MIN	6771	14200	1234	ł 0	9258	3	8476	1536	50	440	20	38110	16100	
	9453	5962												
, ,	1997	1997	1996	5	199'	7	1996	1996	5	199	6	1997	1997	
1996	1996	1996												
		CS FOR I	'996 C			YEAR	FOR 1997	WATI				ER YEARS 1	996 - 1997	
ANNUAL 7	TOTAL			6585	5480				888	2250				
ANNUAL M				1799	90				243	30			22360	
HIGHEST	ANNUAL I	MEAN												
24330		1997												
	ANNUAL MI	EAN												
20390		1996												
HIGHEST	DAILY M	EAN		5190	0.0	Apr	24		138	000	Apr	13	138000	Apr
13 199	97													
	DAILY ME	AN		4620)	Sep	29		464	0	Oct	17	4620	Sep
29 199	96													
ANNUAL S	SEVEN-DA	Y MINIMUN	N.	4850)	Sep	23		513	0	Oct	12	4850	Sep
23 199														
ANNUAL F	RUNOFF (AC-FT)		1306	50000)			176	2000	0		1620000	0
ANNUAL F	RUNOFF (CFSM)		.48					.66				.60	
ANNUAL F	RUNOFF (INCHES)		6.60)				8.9	1			8.19	
10 PERCE	ENT EXCE	EDS		4040	00				487	00			42700	
50 PERCE	ENT EXCE	EDS		1190	0.0				148	00			14800	
90 PERCE	ENT EXCE	EDS		5850)				873	0			8280	

(National Water-Quality Assessment Station)

WATER-QUALITY RECORDS

OCT

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	MAX MIN	MIN MEAN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
		OCTOBER			NOVEMBER					
	BER 16.0	15.0	JANUA 15.5	RY 5.0	4.0	4.5				
2	 16.0 		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 		14.5	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		12.5	2.0	1.5	1.5				
13	13.5 	13.0	13.0	1.5	1.0	1.5				
14		13.5	13.5	1.5	1.0	1.0				

15	14.5	13.5	14.0	1.0	.5	.5	 	
	14.5		14.0	2.0	.5	1.0	 	
	14.5		14.5	2.0		1.5	 	
18	13.5	11.0	12.0				 	
19	11.0	10.5	11.0				 	
20	11.5	11.0	11.0	3.0	2.0	2.5	 	
	11.5		11.5	2.5	1.5	2.0	 	
	11.5		11.0	1.5	1.5	1.5	 	
	10.0		9.5	1.5	1.0	1.5	 	
-	9.0		9.0	1.5	1.0	1.5	 	
25	9.5	8.5	9.0	1.0	.5	1.0	 	
	10.5		10.0	. 5	.5	.5	 	
27	10.5	10.0	10.5	2.0	.5	1.0	 	
28	10.0		9.0	2.0	1.0	2.0	 	
29	9.5		9.0				 	
30	9.5	7.0	8.5				 	
31	7.0	5.0	5.5				 	
MONTH	16.0	5.0	12.0				 	

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

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
MAX	MIN	MEAN								
		FEBRUARY			MARCH					
APRIL			MAY							
1										
_										
2										
_										
3										

-						
4			 	 	 	
5			 	 	 	
6			 	 	 	
7			 	 	 	
8 14.0	13.0	 13.5	 	 	 	
9			 	 	 	
14.5	12.5	13.5				
10 15.0	 12.5	 13.5	 	 	 	
10.0	12.0	23.3				
11			 	 	 	
14.5 12	13.5 	14.0	 	 	 	
14.0	12.5	13.0				
13			 	 	 	
13.5 14	12.0	12.5 	 	 	 	
12.5	12.0	12.0	 	 	 	
15			 	 	 	
12.0	11.0	11.5				
16			 	 	 	
12.5	10.5	11.5				
17	 11 E	 12.5	 	 	 	
14.0 18	11.5 	12.5	 	 	 	
15.0	13.0	13.5				
19	12.5		 	 	 	
14.5 20	13.5	14.0	 	 	 	
15.5	13.5	14.0				
0.1						
21 16.5	14.0	 15.0	 	 	 	
22			 	 	 	
16.5	15.0	15.5				
23 17.0	 15.5	 16.0	 	 	 	
24			 	 	 	
17.0	16.0	16.5				
25 16.5	 15.5	 16.0	 	 	 	
10.5	13.3	10.0				
26			 	 	 	
16.5 27	15.0	15.5		 		
27 16.5	 15.5	 16.0	 	 	 	
28			 	 	 	
16.5	15.0	15.5				

_	7.5		16 0				
3	31			 	 	 	
3	30	14.5 14.5		 	 	 	
_		 14.5	 15 0	 	 	 	

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

DAY MAX MIN MEAN MAX MIN MEAN MAX MIN MEAN

MAX	MIN	MEAN	MEAN	MAX	IAITIN	MEAN	MAA	MITIN	MEAN	
AUGUST	Γ	JUNE	SEPTEMB	ER	JULY					
	18.5	16.5	17.0							
2	 19.5	17.5	18.5							
3										
4										
5										
6										
7										
8										
9										
10										
12		 								
13										
14										
15		 								
16										

17		 	 	 	 	
18		 	 	 	 	
19		 	 	 	 	
20		 	 	 	 	
21		 	 	 	 	
22		 	 	 	 	
23		 	 	 	 	
24		 	 	 	 	
25		 	 	 	 	
26		 	 	 	 	
27		 	 	 	 	
27		 	 	 	 	
28		 	 	 	 	
20						
29		 	 	 	 	
30		 	 	 	 	
31		 	 	 	 	
MON	ITH	 	 	 	 	

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

OVVCEN		DIS-		SPE-	PH	PH		BARO-	
OXYGEN,		CHARGE,	SPE-	CIFIC	WATER	WATER		METRIC	
DIS-		IN	CIFIC	CON-	WHOLE	WHOLE		PRES-	
SOLVED		CUBIC	CON-	DUCT-	FIELD	LAB	TEMPER-	SURE	OXYGEN,
(PER-		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)

ATION)		(00000)	(00005)	(00005)	(00400)	(00402)	/ 0.001 0.V	(00005)	(00200)	
(00301)		(00060)	(00095)	(90095)	(00400)	(00403)	(00010)	(00025)	(00300)	
OCT 04	0930	5450	561	575	8.5	8.0	13.5	756	10.7	103
NOV 18	1145	11300	518	534	8.0	7.9	0.5	752	13.4	94
DEC 05	1050	14100	632	638	7.9	7.8	0.0	740	13.2	94
JAN 09	0935	9470	614	619	7.9	7.7	0.0	738	12.7	89
FEB 05	1035	9210	549		7.4		0.5	755	12.8	13
MAR 14 APR	1005	16400	609	611	7.8	7.8	0.5	748	12.7	89
12 23	1038 1145	132000 80100	376 476	391 485	7.7 7.9	7.6 7.9	3.5 10.0	746 744	9.6 10.5	73 95
MAY 07 JUN	1132	48100	514	514	8.5	8.4	13.5	748	11.3	110
03 26	1047 1240	22600 14000	610 624	604 600	8.3 8.1	8.3 8.1	18.5 24.5	749 	9.7 7.2	105 88
JUL 03	1127	35500	517	500	8.0	8.0	21.0	745	5.8	67
AUG 12	1225	18200	594	586	8.1	8.1	23.0	748	7.2	86
SEP 02	1040	15400	575	556	8.2	8.3	24.0	750	7.9	95
	HARD- NESS	ALKA- LINITY WAT DIS	ALKA- LINITY	BICAR- BONATE WATER	NITRO- GEN, AMMONIA	NITRO- GEN, NITRITE	NITRO- GEN,AM- MONIA +	NITRO- GEN,AM- MONIA +		
PHOS-	TOTAL	TOT IT	LAB	DIS IT	DIS-	DIS-	ORGANIC	ORGANIC	DIS-	
PHORUS	(MG/L	FIELD	(MG/L	FIELD	SOLVED	SOLVED	DIS.	TOTAL	SOLVED	
TOTAL DATE	AS	MG/L AS	AS	MG/L AS	(MG/L	(MG/L	(MG/L	(MG/L	(MG/L	
(MG/L	CACO3)	CACO3	CACO3)	нсо3	AS N)	AS N)	AS N)	AS N)	AS N)	AS
P) (00665)	(00900)	(39086)	(90410)	(00453)	(00608)	(00613)	(00623)	(00625)	(00631)	
OCT 04 0.280 NOV	220	182	192	222	<0.020	0.040	0.50	1.0	1.20	
18 0.220	200	134	153	163	0.290	0.060	0.90	1.3	1.50	
DEC 05 0.150	300	206	218	251	0.280	0.040	0.80	1.0	3.60	

	JAN										
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	09 0.160	260	213	216	260	0.390	0.060	1.0	1.0	2.40	
	FEB 05 0.150	250	279		340	0.500	0.100	1.2	1.1	1.70	
	MAR 14 0.080	270	207	218	253	0.370	0.100	1.0	1.0	3.00	
	APR 12 0.300	170	114	124	139	0.330	0.050	0.90	1.5	2.60	
	23 0.195	210	148	149	181	0.094	0.034	0.82	1.1	1.96	
	MAY 07 0.160	250	156	166	190	<0.015	0.019	0.65	1.6	0.897	
	JUN 03	290	210	211	245	<0.015	0.025	0.47	0.91	3.90	
	0.098 26 0.195	290	205	204	250	0.169	0.053	0.58	1.1	1.67	
	JUL 03 0.342	220	194	167	237	0.074	0.095	0.70	1.5	4.98	
	AUG 12 0.226	280	179	214	218	0.022	0.041	0.89	1.1	1.89	
	SEP 02 0.222	260	206	210	248	0.020	0.029	0.63	1.4	1.50	
	CIT O	PHOS-	PHOS- PHORUS	CARBON,	CARBON, ORGANIC		MAGNE-		SODIUM	POTAS-	
	CHLO-	PHORUS	ORTHO,	ORGANIC	SUS-	CALCIUM	SIUM,	SODIUM,	AD-	SIUM,	
	RIDE,	DIS-	DIS-	DIS-	PENDED	DIS-	DIS-	DIS-	SORP-	DIS-	
	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 CL)	AS P)	AS P)	AS C)	AS C)	AS CA)	AS MG)	AS NA)		AS K)	AS
	(00940)	(00666)	(00671)	(00681)	(00689)	(00915)	(00925)	(00930)	(00931)	(00935)	
(]]	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	•	DIS- SOLVED (MG/L AS F)	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)	RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L)	CONSTI- TUENTS, DIS- SOLVED (MG/L)	SEDI-	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT									
04	54	0.30	8.8	<3.0	2.0	342	320		
NOV 18 DEC	63	0.20	9.3	39	39	327	293	19	96
05 JAN	70	0.30	15	43	36	392	374	92	74
09 FEB	53	0.30	15	34	55	375	357	4	97
05 MAR	41	0.20	15	50	70	339	375	5	100
14 APR	57	0.30	15	18	67	376	355	15	94
12 23 MAY	50 75	0.21 0.19	12 13	65 33	51 22	254 303	224 281	157 106	88 81
07 JUN	87	0.25	7.2	27	6.0	342	304	67	98
03	76 72	0.29 0.30	8.4 10	6.1 3.4	17 2.5	393 382	356 360	40 39	98 100

JUL 03 AUG	46	0.29	15	3.4	2.3	328	313	178	100
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