

Minnesota DNR

F-29-R(P)

Area F312

April 1, 2009

MINNESOTA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF FISHERIES AND WILDLIFE

Smallmouth Bass Assessment Report

Spring Smallmouth Bass Assessment on the Mississippi River from Blanchard Dam to Sartell Dam,

May 28 and 30, 2008,

River Miles 932 to 957.

By

Steve Marod

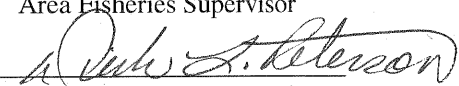
Little Falls Area Fisheries

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Area Fisheries Supervisor

Date: 4-28-2009

Approved by:  _____
Regional Fisheries Supervisor

Date: 04/01/09

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ABSTRACT

A special smallmouth bass assessment of the Mississippi River (M-1) from Blanchard Dam (near Royalton, Minnesota) to Sartell Dam was conducted on May 28 and 30, 2008. Population data was gathered to compare to a similar assessment on the river where a special regulation exists from the St. Cloud Dam to the Crow River confluence in the Montrose Fisheries Management Area. Smallmouth bass were targeted although all gamefish encountered during sampling were captured. A total of 361 smallmouth bass were sampled in four boat electrofishing stations. Catch per unit of effort (CPUE) of smallmouth bass was 106.25/hour which was the highest ever recorded on this section of the Mississippi River. Other gamefish species sampled included: black crappie, bluegill, channel catfish, largemouth bass, muskellunge, northern pike and walleye. Catch rates for black crappie, bluegill and channel catfish were also the highest ever recorded while other species catch rates were within the range observed in previous assessments.

STUDY AREA

The Mississippi River from Blanchard Dam to Sartell Dam covers approximately 25.5 miles. Blanchard Dam is a hydroelectric power generating facility owned by Minnesota Power Company and is located approximately 3.25 miles northwest of Royalton, Minnesota. Sartell Dam is a hydroelectric power generating facility owned by Verso Corporation located in the City of Sartell. This stretch of the river flows through primarily agricultural lands with bottomland forest common on riparian lands. Access is available near Royalton (private), at Two Rivers Park (private), at Stearns County Park, and on the east bank in Sartell (state). Some areas of the river are difficult to access due to the presence of shallow riffle/rapids areas. In general, from the Blanchard Dam tailwater downstream to the County Road 2 Bridge crossing (Rice Bridge), the river is characterized by pool, riffle, run habitat due to significant gradient. Substrates are typically coarse in this section of the river. Downstream of Rice Bridge, gradient decreases and the river deepens and becomes more navigable down to Sartell Dam. Substrates are primarily sand and gravel. The river in the entire study area is important for recreational activities and is used by anglers, campers, canoeists, hunters, recreational boaters, and wildlife and nature viewers.

Development within the riparian zone is light to moderate upstream of Rice Bridge, and moderate to heavy downstream to Sartell. Development is primarily residential and agricultural upstream, and residential and industrial near Sartell. Lands adjacent to the river are mainly used for crop production and irrigation is prevalent.

Several major tributaries enter the Mississippi River between Blanchard and Sartell Dams and drain predominately agricultural lands. The Platte River and Little Rock Creek (through Little Rock Lake) enter from the east, and Hay Creek, Little Two Rivers, Two Rivers, Spunk Creek, and Stoney Creek enter from the west. Little Rock Creek is a designated trout stream.

Soil types in the watershed are diverse and include sandy loam, fine sandy loam, loamy sand and loamy fine sand. According to the Ecological Classification System, the eastern portion of the watershed is part of the Anoka sandplain and Mille Lacs uplands ecoregion, while the western watershed is considered part of the hardwood hills ecoregion. Pre-settlement vegetation types were diverse and included aspen-oak land, big woods hardwoods, oak openings and barrens, mixed white and red pine, brush prairie and wet prairie.

Catch rates of black crappie were also high when compared to historic catches. A total of 42 black crappie were sampled for a catch rate of 12.36/hour. Historical catch rates ranged from 0.0/hour in 1994 through 1997, to 1.8/hour in 2006. Black crappie captured averaged 8.32 inches in total length and ranged from 6.2 to 11.3 inches. Age 3, 4 and 5 individuals were present with age 3 dominant, comprising 83.9% of the sample. Growth was fast when compared to area means.

Bluegill catch rates in 2008 were high when compared to prior assessments. CPUE observed in 2008 was 7.1/hour which was the highest ever recorded. Historical catch rates ranged from 0.0/hour in 1995, 1997, 2000, 2002, and 2004 to 2.2/hour in 2006. Bluegill sampled (n=25) averaged 6.6 inches in total length and ranged from 3.5 to 9.0 inches. Age 3 individuals were most common comprising 72% of the aged sample. Growth was extremely fast when compared to area means. Individuals averaged 4.3 inches at age 2, 6.7 inches at age 3, and 7.8 inches at age 4.

Two largemouth bass, both 9.7 inches in total length, were captured during the 2008 assessment. Largemouth bass are infrequently caught in the Mississippi River and are probably immigrants from connected lakes. Habitat in the river is not suited to this species.

A single age 3 muskellunge, 27.8 inches in total length, was captured during 2008 sampling. A healthy, self-sustaining population of muskellunge that has supported a popular sport fishery exists in the river. Muskellunge were sampled in low numbers in 7 of 9 assessments with catch rates ranging from 0.0/hour in 1996 and 2006 to 1.3/hour in 2004. Angler diaries have proven to be a better assessment tool for muskellunge on the river than active electrofishing sampling methods.

Hydrology

Mississippi River discharge information was obtained from the USGS Water Resources website. Daily discharge has been monitored near Royalton, MN since 1924. Flow measured at Royalton ranged from 254 cfs on November 25, 1936 to 38,200 cfs on April 8, 1997. Discharge in 2008 followed historical patterns with high flows observed in April and May, low flows during summer, and a slight increase in fall flow (Figure 5). Discharge was below normal through mid April, above normal from mid April through early July, below normal during summer and near normal in fall. Peak discharge occurred on May 3 (15,300 cfs) while low flows for the year occurred on September 5 and 6 (1080 cfs). Discharge during the 2008 assessment was 8,550 cfs on May 28, and 7,900 cfs on May 30.

was 84, the third lowest value calculated for this section of the Mississippi River, and is probably explained by an increased number of yearling and age 2 individuals in the sample. PSD values are probably biased high due to sampling during spawning season where mature fish dominate the catch.

Scale samples were taken from a subsample of 139 smallmouth bass for age determination of which 135 were readable. Fish age 1 through 13 were present in the subsample suggesting that consistent recruitment is characteristic of this stretch of the river. Length at annulus formation is reported in Table 3. In general, smallmouth exceeded quality and preferred size (11.0 and 13.8 inches) in their third and fourth years and attained memorable size (16.9 inches) by age 7. Trophy individuals exceeding 20.0 inches were typically older than age 10. Length at annulus formation was similar to that seen on other sections of the Mississippi River and growth is normal to fast when compared to other Midwest smallmouth bass populations.

A total of 36 walleye were captured during the 2008 assessment ranging from 5.0 to 28.1 inches in total length. CPUE for walleye in 2008 sampling was 10.6/hour, which was at the lower end of the range observed in prior assessments. CPUE in previous assessments ranged from 10.5/hour in 2005 to 19.8/hour in 1997. Mean length of walleye sampled was 12.45 inches. A total of 25 walleye were aged with ages 1 through 7, 9 and 10 represented in the sample. Age 2 individuals were most common comprising 56% of the aged sample. Walleye length at annulus formation was fast for ages 1 and 2 and slow for ages 4 through 7 when compared to area means. Two large walleye, 27.8 and 28.1 inches, were age 9 and 10 respectively.

Northern pike catch rates (CPUE=6.47/hour) were within the range observed in previous assessments. Twenty-two northern pike ranging from 9.9 to 28.5 inches in total length were sampled. Catch rates in past surveys ranged from 1.0/hour in 1996 to 10.4/hour in 1997. Ages 1 through 6 were represented in the catch in 2008 with ages 3, 4 and 5 most common. Growth was in the normal range when compared to area means.

Channel catfish were sampled in high numbers during 2008 sampling. A total of 73 catfish were captured for a catch rate of 21.5/hour, which was the highest catch rate ever observed on this section of the Mississippi River. CPUE in previous assessments ranged from 1.8/hour in 1997 to 19.2/hour in 2006. It appears that channel catfish numbers may be increasing on this stretch of the river as significantly higher catch rates have been observed in the last two population assessments. Catfish averaged 20.9 inches in total length and ranged from 13.7 inches to 27.7 inches. No aging structures were taken during sampling in 2008.

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Table 1. List of species captured, scientific name, and number caught at each electrofishing station, and total number of fish caught on the Mississippi River from Blanchard Dam to Sartell Dam.

Species	Scientific Name	Number Caught				Total
		EF1	EF2	EF3	EF4	
Black crappie	<i>Pomoxis nigromaculatus</i>	12	5	9	16	42
Bluegill	<i>Lepomis macrochirus</i>	9	3	8	4	24
Channel catfish	<i>Ictalurus punctatus</i>	4	24	22	23	73
Largemouth bass	<i>Micropterus salmoides</i>	2				2
Muskellunge	<i>Esox masquinongy</i>	1				1
Northern pike	<i>Esox lucius</i>	12	2	6	2	22
Smallmouth bass	<i>Micropterus dolomieu</i>	69	130	110	52	361
Walleye	<i>Sander vitreus</i>	17	11	4	4	36

Table 2. Gamefish catch per unit effort (CPUE) history on the Mississippi River from Blanchard Dam to Sartell Dam.

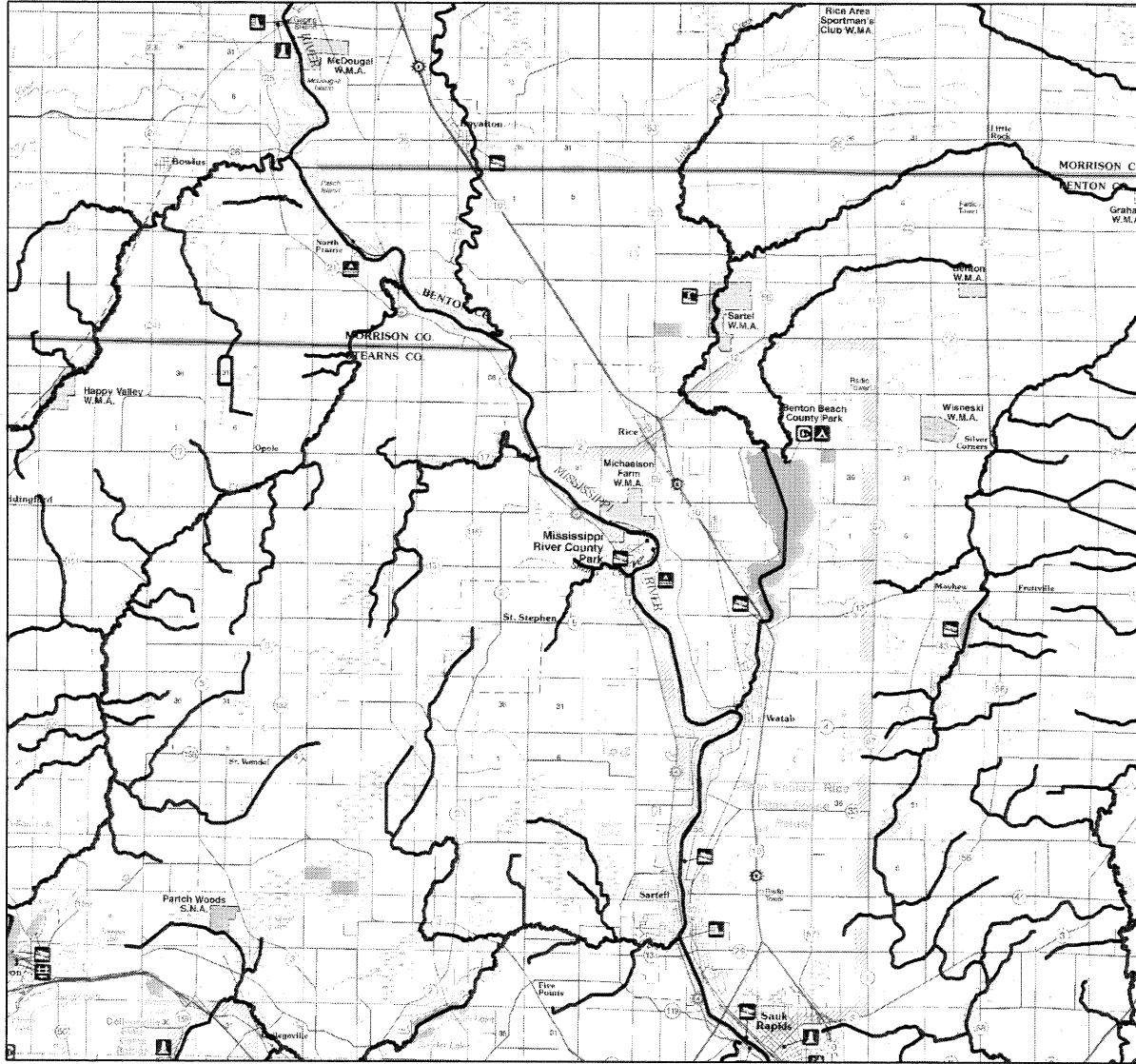
Species	Catch Per Unit Effort of Gamefish (fish/hour)								
	2008	2006	2004	2002	2000	1997	1996	1995	1994
Black crappie	12.4	1.8	0.3	0.3	0.3	0	0	0	0
Bluegill	7.1	2.2	0	0	0	0	0.5	0	0.5
Channel catfish	21.5	19.2	7.5	6.9	8.1	1.8	0	2.7	4.6
Largemouth bass	0.6	0.6	0	0.3	0	0	0	0	0
Muskellunge	0.3	0	1.3	0.3	0.6	0.9	0	0.6	1
Northern pike	6.5	8.1	6.5	5.8	6.3	10.4	1	3.8	2.1
Smallmouth bass	106.3	49.9	75.2	44	38.1	39.6	17.2	26.8	45.4
Walleye	10.6	14.8	19.5	15.8	10.5	19.8	14.7	13.1	14.9
Total Effort (hours)	3.4	3.6	3.1	2.9	3.3	2.2	2	1.8	1.9

Table 3. Length at annulus formation for gamefish sampled in May 2008 on the Mississippi River from Blanchard Dam to Sartell Dam.

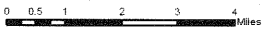
Species	Age	Mean Length at Annulus Formation												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Smallmouth bass	Mean length	4.7	8.4	12.0	14.0	14.8	16.3	17.1	18.0	18.6	19.5	19.0	20.0	20.3
	Standard error	0.09	0.20	0.18	0.45	0.20	0.23	0.25	0.20	0.19	0.17	N.A.	N.A.	N.A.
	Sample size	9	34	19	11	20	9	10	11	4	5	1	1	1
	Minimum length	4.1	6.5	9.8	11.6	13.7	15.5	16.0	17.0	18.2	19.1	19.0	20.0	20.3
	Maximum length	5.0	10.3	13.2	16.0	16.7	17.3	18.4	19.4	19.4	20.0	19.0	20.0	20.3
Walleye	Mean length	7.8	11.4	12.4	15.3	17.7	17.6	19.6	27.8	28.1				
	Standard error	N.A.	0.26	N.A.	0.15	0.6	0.58	0.92	N.A.	N.A.				
	Sample size	1	14	1	2	2	3	3	1	1				
	Minimum length	7.8	10.3	12.4	15.1	17.1	16.6	18.4	27.8	28.1				
	Maximum length	7.8	13.5	12.4	15.4	18.3	18.6	21.4	27.8	28.1				
Northern pike	Mean length	9.9	13.8	18.4	20.2	22.3	19.7							
	Standard error	N.A.	0.79	0.46	0.34	1.98	N.A.							
	Sample size	1	3	7	5	5	1							
	Minimum length	9.9	12.7	16.8	19.0	18.1	19.7							
	Maximum length	9.9	15.3	20.6	21.0	28.5	19.7							
Black crappie	Mean length			8	10	9.4								
	Standard error			0.18	0.48	N.A.								
	Sample size			26	4	1								
	Minimum length			6.2	9.0	9.4								
	Maximum length			9.3	11.3	9.4								
Bluegill	Mean length		4.3	6.7	7.8	8.6	7.5	9						
	Standard error		0.31	0.17	0.09	N.A.	N.A.	0.05						
	Sample size		5	13	3	1	1	2						
	Minimum length		3.5	5.5	7.6	8.6	7.5	8.9						
	Maximum length		4.9	7.6	7.9	8.6	7.5	9.0						



Mississippi River - Blanchard Dam to Sartell Dam



Major Watershed 1, Mississippi River
Kittle Number M-1, Mississippi River
Clearwater, Hubbard, Beltrami, Cass, Itasca, Aitkin,
Crow Wing, Morrison, Benton, and Stearns
Counties



Legend

- Kittle numbers assigned
- County Boundaries
- Lakes previously surveyed

Figure 1. DNR PRIM Map showing the section of the Mississippi River from Blanchard Dam to Sartell Dam.



Mississippi River - Blanchard Dam to Sartell Dam Electrofishing Stations

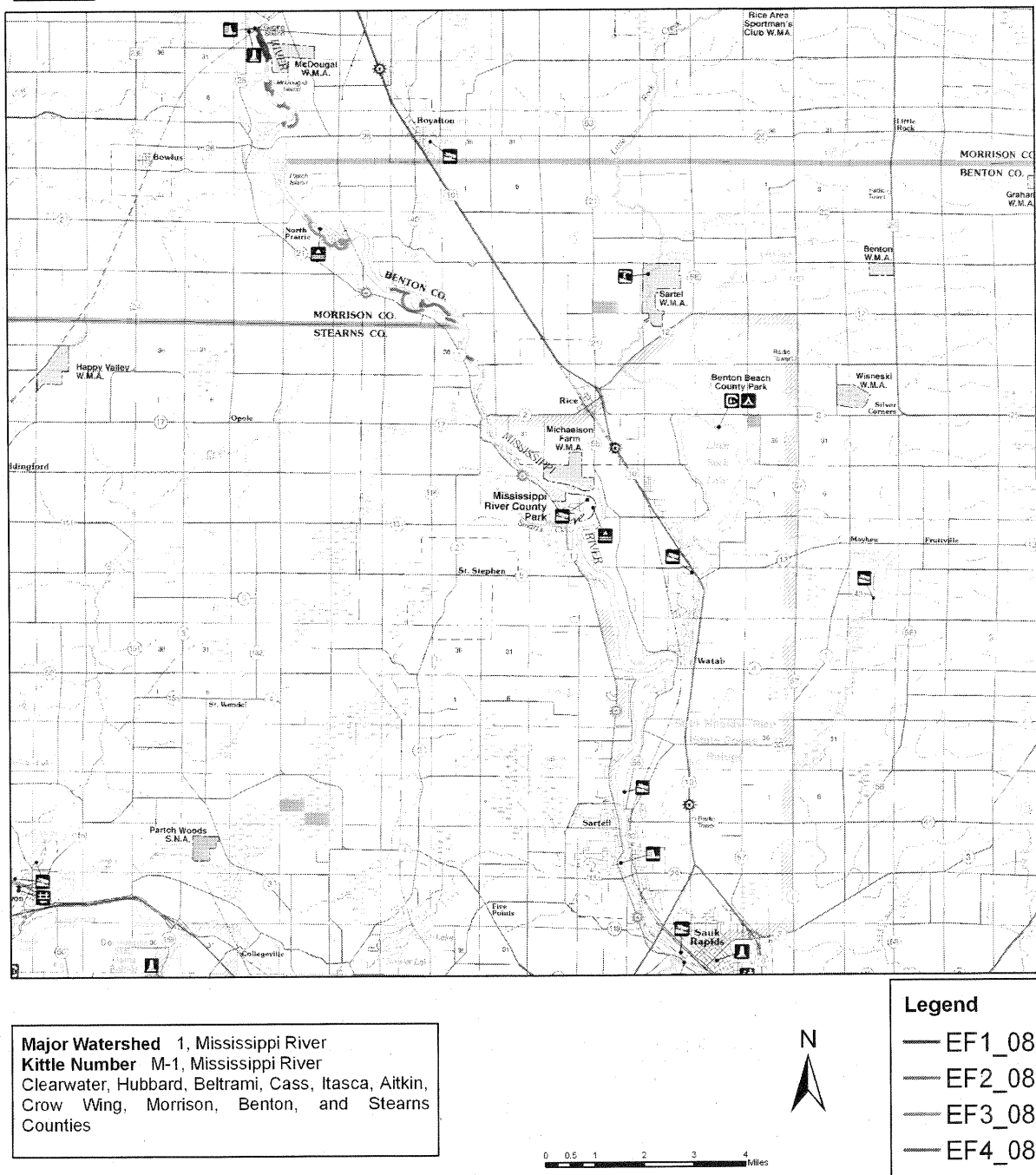


Figure 2. DNR PRIM Map showing electrofishing sampling stations on the Mississippi River from Blanchard Dam to Sartell Dam, May 2008.

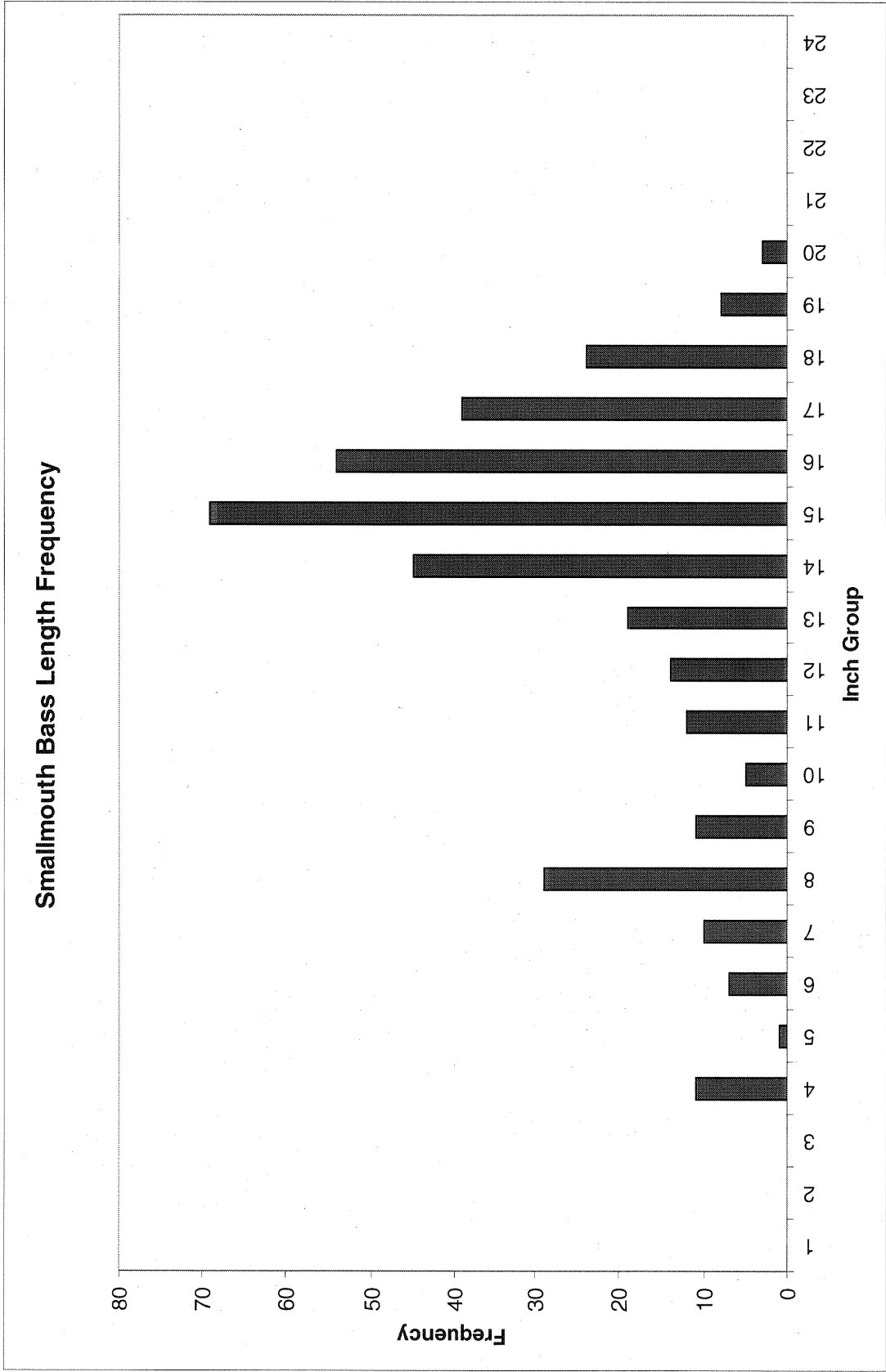


Figure 3. Length frequency distribution of smallmouth bass captured during electrofishing sampling on the Mississippi River from Blanchard Dam to Sartell Dam, May 2008.

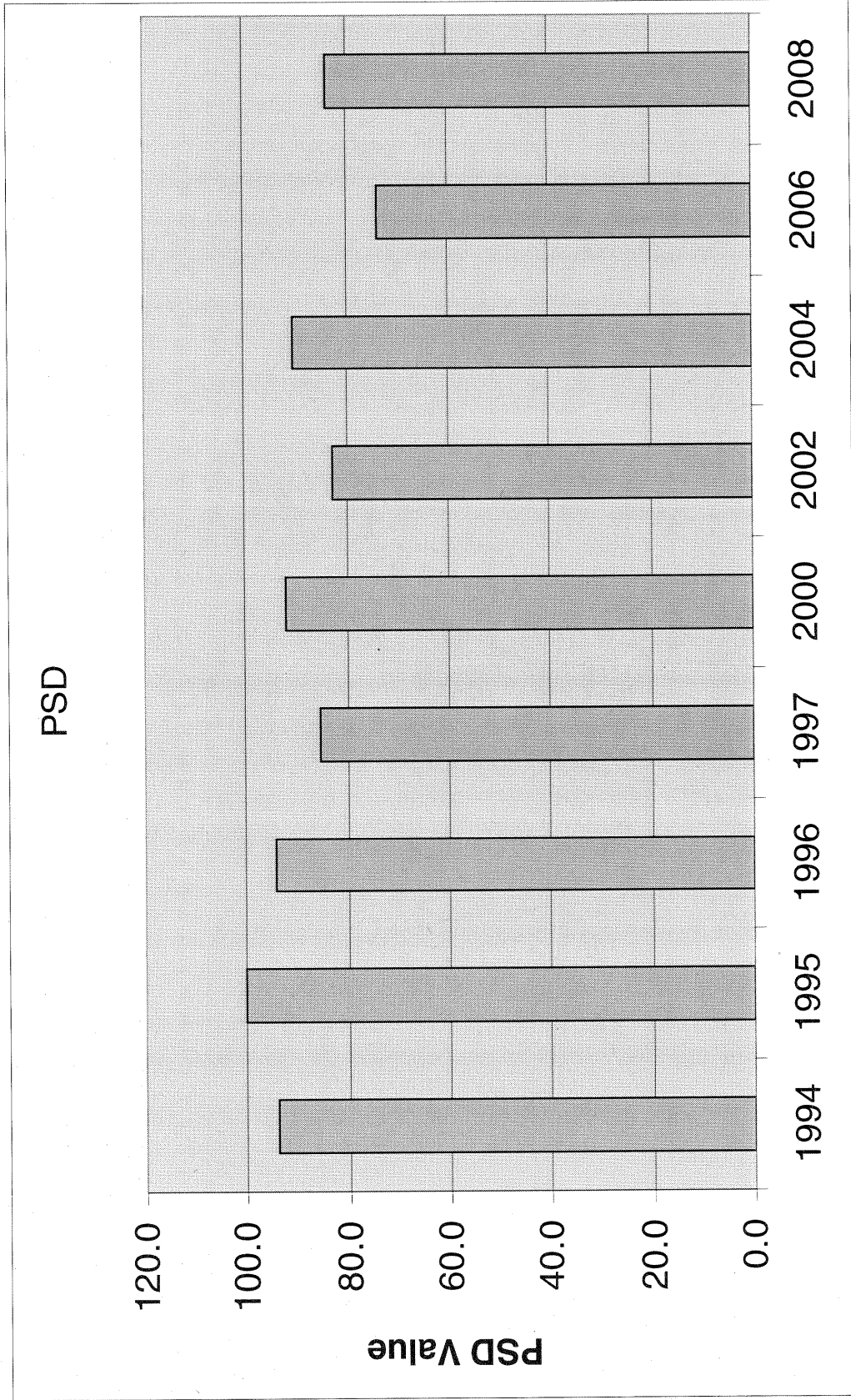


Figure 4. Calculated PSD values from smallmouth bass assessments completed on the Mississippi River from Blanchard Dam to Sartiell Dam from 1994 through 2008.

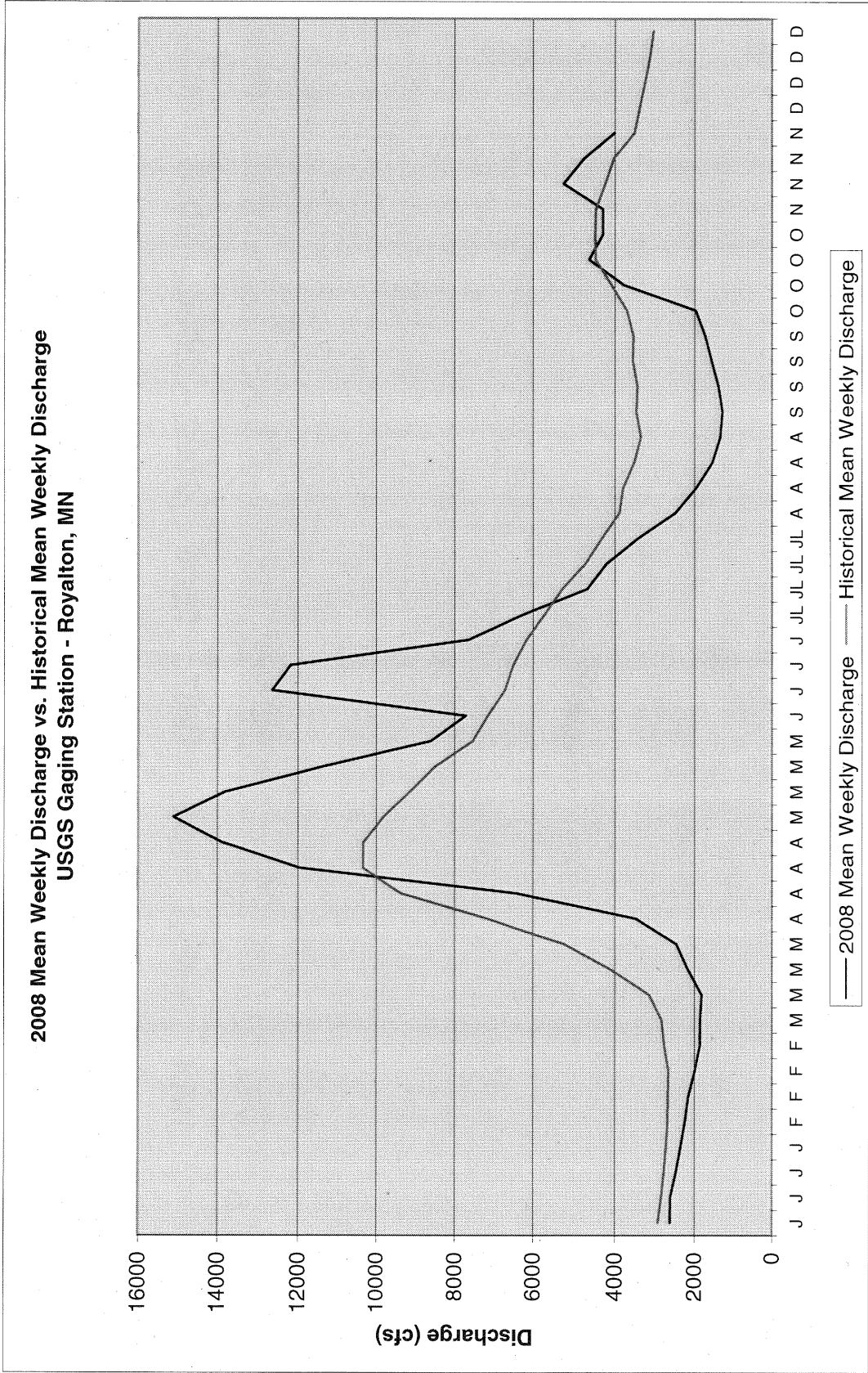


Figure 5. Mean weekly discharge on the Mississippi River in 2008 vs. historical mean weekly discharge recorded at the USGS gaging station at Royalton, MN.