1. Stream Name (Alternate Name)	Minnesota River (None)
2. Tributary Number	M-55
3. Counties (mainstem)	Dakota, Hennepin, Scott, Carver, Sibley, Le Seuer, Nicollet, Blue Earth, Brown, Renville, Redwood, Yellow Medicine, Chippewa, Lac Qui Parle, Big Stone
4. Major Watersheds, Numbers	Minnesota River-Shakopee, 33 Minnesota River-Mankato, 28 Minnesota River-Granite Falls, 25 Minnesota River-Headwaters, 22
5. Length of Stream	333 mi (536 km)
6. Size of Watershed	16,900 sq mi (43,771 sq km) 14,920 sq mi (38,643 sq km) in Minnesota
7. USGS Gauging Stations (lat/long-DD)	Jordan (44.69306/-93.64167) Mankato (44.16944/-94.00417) Montevideo (44.93333/-95.73333) Lac Qui Parle (45.02139/-95.86806) Ortonville (45.29556/-96.44389)
8. Previous Sampling	Initial Survey, 1985, DNR Ecological Services Population Assessment, 1992, DNR Fisheries Population Assessment, 1998, DNR Fisheries
9. Sampling Sites	Figures 1-4 Table 1

The river was reapportioned into three slightly different reaches for this assessment. Reach 1 is the dredged section from river mile (RM) 0 to 14.7 or river kilometer (RK) 23.7, Reach 2 is the free-flowing section from RM 14.7 to Minnesota Falls at RM 254.7 (RK 409.8), and Reach 3 is the remainder upstream to Big Stone Lake. Previous assessments considered the downstream reach to extend from the mouth to confluence of the Blue Earth River at approximately RM 112 (RK 180.4).

Fourteen Index of Bioloical Integrity electrofishing (IBI EF) sites were replicates of Minnesota Pollution Control Agency's (MPCA) 2003 sites. MPCA chose these sites for a better longitudinal coverage of the mainstem than the sites that were previously established in the Minnesota River Assessment Project (MRAP) in 1993 (Bailey et al.), which addressed the entire watershed (Mike Feist, MPCA personal communication). Three IBI EF sites were added by Ortonville Area in 2004 in Reach 3: Granite Falls Memorial Park, Louisburg Grade and Big Stone National Wildlife Refuge. Sites for other sampling gear were selected to provide riverwide coverage and manageable access.

10. Methods

Table 1

The fish community was sampled with IBI EF and trap nets in August during the historically low flow period. Gill nets, trot lines and low-frequency electrofishing were used at different times during the summer to target specific species or size classes. In Reaches 1 and 2, Hutchinson Area conducted electrofishing, gillnetting and trotlining; and Windom, Waterville and West Metro Areas conducted trapnetting and water sampling. All sampling in Reach 3 was conducted by Ortonville Area.

The Fish Community Sampling Protocol for Stream Monitoring Sites from MPCA was followed for IBI EF. Sampling was conducted during daylight with two netters and a boom-shocker electrofishing boat. An attempt was made to collect all fish during runs of 500 m (547 yd) along the left bank, right bank and mid-channel at each station. On-time, species, number and individual or bulk weights were recorded. Individual lengths or length ranges were recorded for large fish. Small fish were not measured. Some fish were preserved in 10% formalin for later identification and possible deposition in the Minnesota Bell Muesum of Natural History.

Trap nets were used to sample fish less susceptible to electrofishing. Two ¼ in bar mesh, single-frame nets (1/4 TN) and four ¾ in bar mesh, double-frame trap nets (3/4 TN) were set for 24 h at each site. Most were randomly set along both banks, but some were set mid-channel where snag habitat existed. Length, weight and species were recorded for each fish.

Gill nets (GN) were randomly set in May and August in the deep pools around Minnesota Falls to sample paddlefish and lake sturgeon. Special gill nets (150x15 ft, 5 in bar mesh) were set for 60-90 minutes. Eye-fork and total length, weight, maximum pool depth, and water temperature were recorded.

Trot lines were used during the prespawn period of June and early July to sample large catfish. Five 10-hook lines were set at 13 sites for flathead catfish (FTL) using 8/0 hooks baited with 6-8 in live black bullhead. FTL were not set at all sites in Reach 3 because of their historically rare incidence in the upstream reach. Five 10-hook lines were set at 17 sites for channel catfish (CTL) using 4/0 hooks baited with cut white sucker. Trot lines were randomly set along both banks and lifted after 24 h. Length, weight and species were recorded for each fish.

Low-frequency electrofishing (LFEF) was used in late August and early September to sample young-of-the-year and small flathead catfish, although larger fish were also caught. Approximately two miles of bank and woody habitat was electrofished at each of eight sites in Reaches 1 and 2. Again, LFEF was not done in Reach 3 because of infrequent occurrence. Sampling was done during daylight with one netter in an electrofishing boat and one in a chase boat. On-time and individual lengths and weights were recorded.

Ageing structures were collected per Frasier-Lee protocol (Lake Survey Manual guidelines) by reach. Hutchinson Area analyzed spines from catfish and sturgeon and Ortonville analyzed scales from all other fish. Back-calculation of age at annulus formation was determined by DisBCal89 software (Missouri Department of Conservation). A minimum of two fish was required by the program to perform the back-calculations.

Fish were collected for contaminant testing during sampling from six areas of approximately 50-60 mi (80-97 km). Six to ten individuals of various sizes were analyzed by the Department of Agriculture Laboratory (MDA) for mercury and polychlorinated biphenyls (PCB). Standard water samples were also taken from 13 sites in August. Discharge data were obtained from the US Geological Survey (USGS) website http://waterdata.usgs.gov.

Data were summarized by reach for catch per unit effort (CPUE) and length frequency. Data for individual sites were summarized in appendices. The EF catch was further categorized into 12 group or metrics for IBI analysis (Bailey et al. 1993; Niemela and Feist 2000): benthic insectivores (%); darter species (#); fish with deformities, eroded fins, lesions, or tumors (%); intolerant species (#); native species (#); catch rate minus tolerant species (#/min); omnivore species (%); simple lithophil species (%); sucker species minus tolerant species (#); sunfish species (#); tolerant species (%); and top carnivore species (%). Data were entered into the MPCA database for scoring and computation.

Scoring for each metric was calculated by comparing the catch with an expected catch from a natural or presettlement condition and assigning a score of 5 (minimal human disturbance), 3 or 1 (severe human disturbance). Metric scores were then summed for each site and interpreted as excellent (50-60), good (40-49), fair (30-39), poor (20-20), very poor (12-20), and no fish (0-11). These interpretations are also relative to the amount of degradation at each site compared with a natural state.

11. Results and Discussion

Tables 2-16
Appendices 1-12

A total of 8,992 fish from 64 species and 14 families was sampled riverwide with all gear. A black buffalo *Ictiobus niger* was collected from the Minnesota River for the first time. Thirty-one species were represented by 10 or fewer individuals. Comparisons with previous riverwide investigations are difficult in part because gear and protocols have changed in an attempt to balance fish community sampling with assessments of sport species.

The initial survey collected 7,232 fish from 53 species and 14 families using only electrofishing, on 37 miles of river between 1978 and 1982. Three subsequent population assessments used several gear types over the course of a single sampling season and electrofished different distances. The 1992 and 1998 population assessments electrofished the same sites and covered approximately 42 miles of river. In 1992, over 17,000 fish from 64 species and 14 families were sampled, and in1998, 33,777 fish from 68 species from 15 families were sampled. In 2004, a little more than 5 linear miles of river were electrofished, but the protocol covered both banks and mid-channel which equates to approximately 16 miles of river.

Other differences inherent in the river, such as discharge patterns, contribute to differences in catch. Six dams in the upstream reach create lacustrine habitat, whereas the river itself is naturally smaller than the downstream reaches. Forty fish species were sampled in Reach 3 in 2004, nine of which were only sampled in the upstream reach. A species list compiled from all four riverwide investigations shows only brown bullhead has been found exclusively above Minnesota Falls. Fifty-four species were sampled in Reaches 2 and 3, 24 of which were only sampled in the downstream reaches. The compiled species list shows 15 species have been found exclusively below Minnesota Falls: shovelnose sturgeon, paddlefish, long- and shortnose gar, gizzard shad, creek and speckled chub, goldeye, mooneye, blue and highfin sucker, river redhorse, black buffalo, river shiner, and sauger. Minnesota Falls may be an effective barrier to fish movement for some species; therefore, dividing the river into two rather than three similar reaches may be more appropriate for some fish community analysis.

IBI EF, ¼ TN and ¾ TN were used to sample the entire fish community which reflects the biological health of the river. A total of 6,736 individuals from 50 species and 14 families was collected by IBI EF. Catch rates decreased from 2,014 fish/h in Reach 1, to 548/h in Reach 2, to 260/h in Reach 3. The high rate in Reach 1 resulted from a catch of 1,052 emerald shiner at a rate of 1,677/h. The typical sport fish (northern pike, catfish, bass, bluegill, crappie, yellow perch, sauger, and walleye) comprised 8% of the total IBI EF catch. Catches of sport fish by electrofishing in the three previous riverwide investigations varied from 8% in 1985 to16% in 1998.

A total of 1,054 individuals from 37 species and 9 families was collected by ¼ TN, and 522 individuals from 31 species and 10 families by ¾ TN. Catch rates for ¼ TN increased from 56/net in Reach 1, to 357/net in Reach 2, and 641/net in Reach 3. Similarly, catch rates increased for ¾ TN from 13/net in Reach 1, to 87/net in Reach 2, to 422/net in Reach 3. Sport fish comprised 34% of the ¼ TN catch and 30% of the ¾ TN catch. The two previous assessments did not sample the entire river with both sizes of trap nets and the initial survey did not use trap nets.

In 2004, 16 species were only caught by IBI EF, and an additional species, shovelnose sturgeon, was caught by trot lines and IBI EF. Eight species were only caught by trap nets (one or both sizes), and one additional species, brown bullhead, was caught by trot lines and trap nets. Other species not sampled by IBI EF included paddlefish and black buffalo (GN), and bowfin (FTL). IBI EF had a higher and more diverse catch than trap nets, but a few species and a greater percentage of sport fish were caught with them.

The mean riverwide fish IBI score in 2004 was 31.6. Scores of seven sites were in the poor category (20-29), nine sites were fair (30-39), and one site was good (40-49). The scores for all repeated sites, except two, were lower than the 2003 scores. The mean riverwide score in 2003 was 39.0, which had scores from six sites in the fair category and eight in the good. Discharge may have contributed to the difference. Flow rates at the three upstream gauging stations were below the period of record means in August for both years. Flow rates at the two downstream gauging stations, however, were less than half the mean flow in August in 2003, but just slightly above average in 2004. Other factors contributing to the lower 2004 scores may have been greater variability at the more degraded sites, higher turbidity, and crew variability.

Large flathead and channel catfish were sampled with trot lines and small flathead catfish were sampled with low-frequency electrofishing. FTL collected 77 flathead catfish between 21 and 49 in long (545 and 1255 mm). Approximately 38% of these were over 39 in (1000 mm). CTL collected 118 channel catfish between 11 and 33 in long (277 and 831 mm). LFEF collected 412 flathead catfish between 5 and 44 in long (120 and 1125 mm). Approximately 84% of these were under 18 in long (457 mm).

Riverwide CPUEs for flathead catfish caught on FTL and channel catfish caught on CTL were 1.2/line and 1.4/line, respectively. The 2004 rates are comparable with the 1998 riverwide trot line CPUEs of 1.2/line for flathead and 1.5/line for channel catfish. No trot lines were set during the initial survey and 25 hook lines were used in 1992 instead of the 10 hook sets. By eliminating FTL sets in Reach 3 from CPUE calculation, rates in 1998 and 2004 were 1.7/line and 1.9/line, respectively. The combined CPUE for LFEF in Reaches 1 and 2 in 2004 was 27.3/h. LFEF has not been done in previous riverwide investigations.

Age and back-calculated length at annulus formation were determined for 14 species. Four species were analyzed from all three reaches (black crappie, bluegill, channel catfish, and walleye), but only a single bluegill was aged from Reach 1. Channel catfish individuals were aged up to 17 years and flathead catfish up to 21 years. Except for flathead catfish ages I, II and III in Reach 2, all fish had few individuals in each year class which resulted in large standard deviations in back-calculated length. Length frequency distributions of sport fish generally displayed the full range of sizes for those species with 30 or more individuals sampled.

Mercury and PCB contamination were examined in bluegill, black crappie, channel catfish, common carp, flathead catfish, freshwater drum, and walleye. Of the 211 fish tested for mercury, the majority was between 0.05 and 1.00 ppm. Two flathead catfish had mercury levels above 1.00 ppm. Of the 150 fish tested for PCBs, most were below 0.05 ppm. Advice for fish consumption should be obtained from the Minnesota Department of Health (MDH) website www.health.state.mn.us.

Water samples taken in August reflect lower erosion levels from vegetative cover and lower precipitation than would occur in May or June. Comprehensive water monitoring programs that are being conducted by watershed groups address long-term changes in water quality. Discharge was low to very low in May at all five USGS gauging stations. Heavy rains in the watershed downstream of the Ortonville station raised the mean June discharge to almost 2.5 times the

period of record mean at the Jordan station. Flows remained high through September at Jordan and Mankato, while the upstream stations fell to average levels or below beginning in July.

A riverwide management plan is needed to clarify direction and monitoring needs. In the absence of one, a combination of fish community sampling and targeted sport fish sampling would parallel previous efforts. IBI EF appears to be the direction that fish community sampling is taking when large river sampling is addressed for a survey manual. This can be augmented with trap netting, trot lining, seining, low-frequency electrofishing, gill netting, or water sampling provided appropriate workloads are arranged among Area Offices. The development of a stream database is needed for standardization and evaluation.

12. References

Bailey, P.A., J.W. Enblom, S.R. Hanson, P.A. Renard, and K. Schmidt. 1993. A fish community analysis of the Minnesota River Basin in Minnesota River Assessment Project Report, v. III. Minnesota Pollution Control Agency, St. Paul. 212 p.

Niemela, S. and M. Feist. 2000. Index of biotic integrity (IBI) guidance for coolwater rivers and streams of the St. Croix Basin in Minnesota. Minnesota Pollution Control Agency. St. Paul. 47p.

13. Credits and Signatures

Funding	F-29-R(P)-24 Federal Aid to Sportfish Restoration in Minnesota
Field Crew	Hutchinson Area Fisheries staff Ortonville Area Fisheries staff Waterville Area Fisheries staff West Metro Area Fisheries staff Windom Area Fisheries staff (assisted by DNR personnel from other offices and disciplines and non-DNR staff)
Report Author	Bobbi Chapman/Fisheries Specialist

Approved by _____ Date 9/6/05
Area Fisheries Supervisor

Approved by _____ Date 14 Sep 05
Regional Fisheries Manager

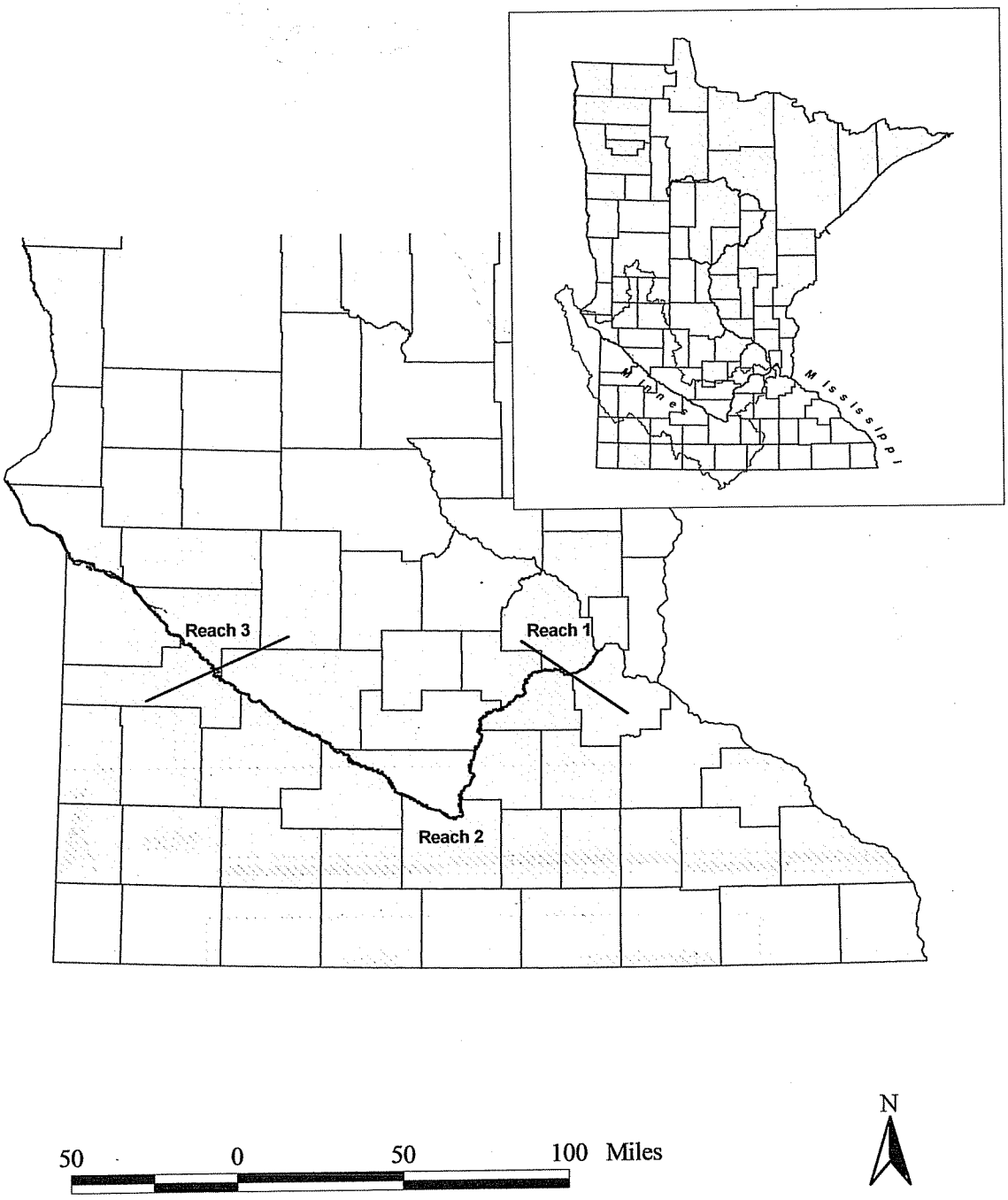
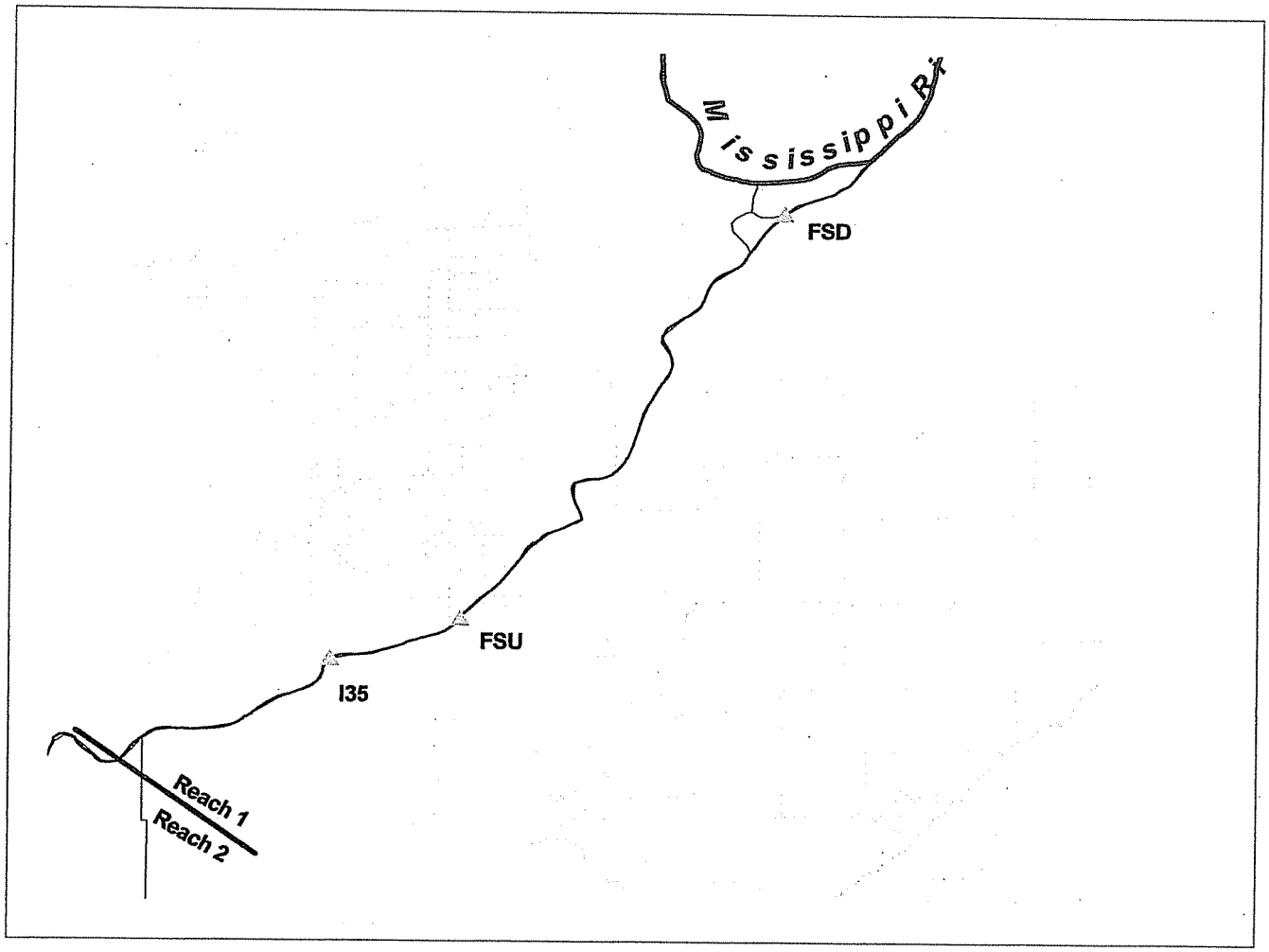
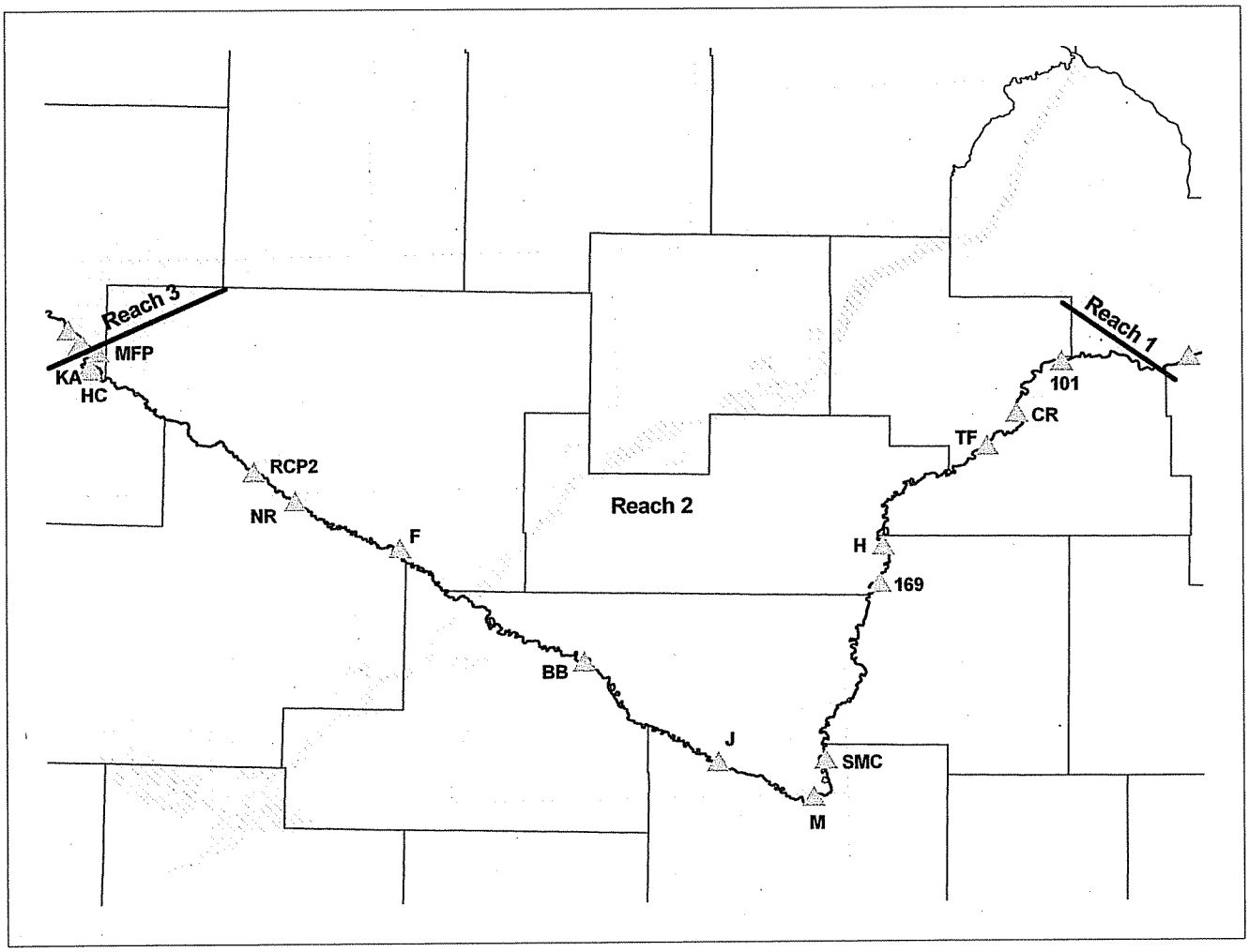


Figure 1. Minnesota River watershed and sampling reach designations.



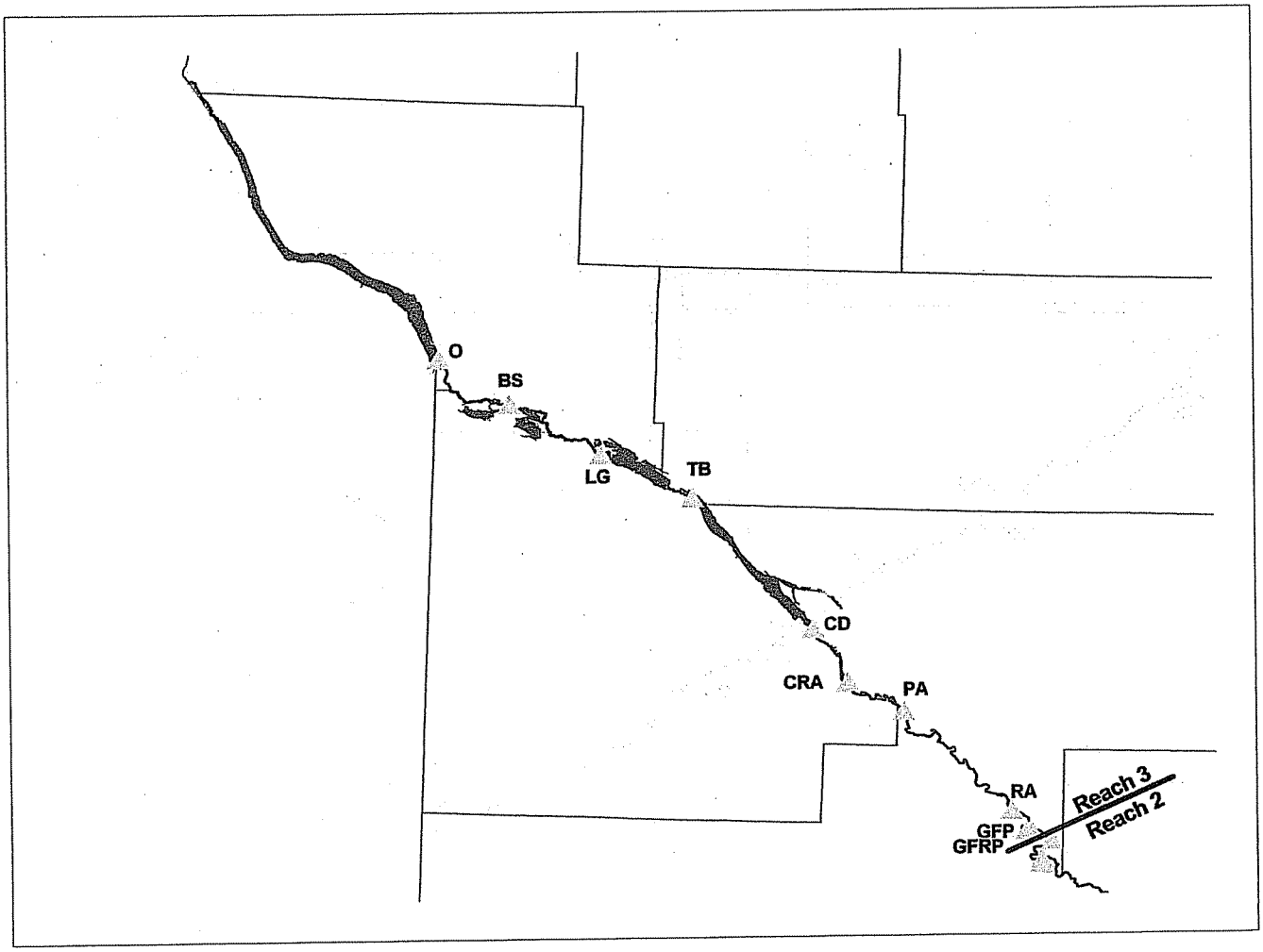
Abbreviation	Name
FSD	Ft Snelling Downstream
FSU	Ft Snelling Upstream
I35	Interstate 35

Figure 2. Sampling sites in Reach 1 of the Minnesota River.



Abbreviation	Name
101	Hwy 101
CR	Carver Rapids
TF	Thompson Ferry
H	Henderson
169	Hwy 169
SMC	Seven Mile Creek
M	Mankato
J	Judson
BB	Buessman Bridge
F	Franklin
NR	North Redwood
RCP2	Renville County Park 2
HC	Hazel Creek
KA	Kinney Access
MFP	Minnesota Falls Pool

Figure 3. Sampling sites in Reach 2 of the Minnesota River.



Abbreviation	Name
GFRP	Granite Falls Roadside Park
GFP	Granite Falls Pool
RA	Rowe Access
PA	Priens Access
CRA	Camp Release Access
CD	Churchill Dam
TB	Twin Bridges
LG	Louisburg Grade
BS	Big Stone NWR
O	Ortonville

Figure 4. Sampling sites in Reach 3 of the Minnesota River.

Table 1. Sampling sites, gear and effort.

Sites		Sampling Gear Effort					
Name (Abbreviation)	River Mile	IBI EF[1] Time h	¼ TN[4] # Set/ # Fished	¾ TN[5] # Set/# Fished	FTL[2] # Lines	CTL[3] # Lines	LFEF[6] Time h
Fort Snelling Downstream (FSD)	1.3		2/2	4/4			
Fort Snelling Upstream (FSU)	8.0				5	5	1.78
Interstate 35 (I35)	9.9	0.63					
Reach 1 Total		0.63	2/2	4/4	5	5	1.78
MN Highway 101 (101)	25.6	0.56					
Carver Rapids (CR)	35.3	0.59					
Thompson Ferry (TF)	42.0		2/2	4/4	5	5	2.09
Henderson (H)	68.4		2/2	4/4	5	5	1.92
MN Highway 169 (169)	74.5	1.14					
Seven Mile Creek (SMC)	105.0	0.63	2/2	4/4	5	5	2.01
Mankato (M)	112.0	0.71					
Judson (J)	126.0	0.89	2/2	4/4	5	5	1.72
Beussman Bridge (BB)	156.5		2/1	4/4	5	5	1.78
Franklin (F)	198.4		2/2	4/3	5	5	1.74
Redwood Falls (RF)	209.9	0.82					
North Redwood Access (NRA)	217.6	0.67	2/2	4/4			
Renville County Park 2 (RCP2)	225.0				5	5	
Hazel Creek (HC)	250.7	0.82					
Kinney Access (KA)	251.0						2.08
Minnesota Falls Pool (MFP)	254.5						
Reach 2 Total		6.83	14/13	28/27	35	35	13.33
Granite Falls Memorial Park (GFMP)	256.9	0.97	2/2	4/2	5	5	
Rowe Access (RA)	259.5	1.00	2/2	4/4	5	5	
Montevideo Downstream (MD)	272.2	1.00	2/2	4/4	5	5	
Priens Access (PA)	275.0						
Montevideo Upstream (MU)	276.6	1.00	2/2	4/4	5	5	
Camp Release Access (CRA)	283.1						
Churchill Dam (CD)	288.0				5	5	
Twin Bridges (TB)	304.0	0.92	2/2	4/4		5	
Louisburg Grade (LG)	313.0	0.88	2/2	4/4		5	
Big Stone National Wildlife Refuge (BS)	323.2	0.90	2/2	4/4		5	
Ortonville (O)	331.5		2/2	4/4		5	
Reach 3 Total		6.67	16/16	32/30	25	45	NA

[1]Index of Biological Integrity Electrofishing, [2]¼ Inch Mesh Trapnetting, [3]¾ Inch Mesh Trapnetting, [4]Flathead Catfish Trotlining, [5]Channel Catfish Trotlining, [6]Low-Frequency Electrofishing

Table 2. Species sampled by gear (IBI-Index of Biological Integrity Electrofishing, FTL-Flathead Catfish Trotlining, CTL-Channel Catfish Trotlining, ¼TN-¼ Inch Mesh Trapnetting, ¾TN-¾ Inch Mesh Trapnetting, LF-Low-Frequency Electrofishing, and GN-gillnetting).

	Reach 1						Reach 2						Reach 3					
Bigmouth Buffalo							IBI		¾TN				IBI		¾TN		CTL	
Bigmouth Shiner	IBI						IBI	¼TN										
Black Buffalo												GN						
Black Bullhead								¼TN					IBI	¼TN	¾TN			
Black Crappie	IBI	¼TN	¾TN				IBI	¼TN	¾TN				IBI	¼TN	¾TN			
Blackside Darter							IBI						IBI					
Bluegill		¼TN					IBI	¼TN	¾TN				IBI	¼TN	¾TN			
Blue Sucker							IBI											
Bluntnose Minnow							IBI	¼TN					IBI	¼TN				
Bowfin										FTL								
Brassy Minnow	IBI						IBI						IBI					
Brown Bullhead															¾TN		CTL	
Buffalo species								¼TN										
Central Stoneroller													IBI					
Channel Catfish	IBI		¾TN		CTL		IBI	¼TN	¾TN	FTL	CTL		IBI	¼TN	¾TN		CTL	GN
Common Carp	IBI		¾TN				IBI	¼TN	¾TN				IBI	¼TN	¾TN	FTL	CTL	GN
Common Shiner							IBI						IBI					
Crappie Species								¼TN										
Creek Chub							IBI											
Emerald Shiner	IBI	¼TN					IBI	¼TN					IBI					
Fathead Minnow							IBI						IBI					
Flathead Catfish	IBI			FTL		LF	IBI	¼TN	¾TN	FTL	CTL	LF						
Freshwater Drum	IBI		¾TN		CTL		IBI	¼TN	¾TN		CTL		IBI	¼TN	¾TN		CTL	GN
Gizzard Shad	IBI	¼TN					IBI	¼TN	¾TN									
Golden Redhorse	IBI						IBI						IBI	¼TN	¾TN			GN
Golden Shiner								¼TN						¼TN				
Goldeye							IBI											
Green Sunfish							IBI						IBI	¼TN				
Highfin Sucker							IBI											
Horneyhead Chub							IBI											
Hybdrid Sunfish									¾TN					¼TN	¾TN			
Johnny Darter								¼TN										
Largemouth Bass		¼TN											IBI					

Table 2 Continued.

	Reach 1			Reach 2					Reach 3				
Logperch									IBI				
Longnose Gar				IBI									
Mooneye				IBI		¾TN							
Northern Hog Sucker				IBI					IBI				
Northern Pike						¾TN			IBI	¼TN	¾TN	CTL	
Orangespotted Sunfish					¼TN				IBI	¼TN			
Paddlefish								GN					
Pumpkinseed Sunfish											¾TN		
Quillback				IBI					IBI		¾TN		
River Carpsucker	IBI			IBI	¼TN	¾TN			IBI	¼TN	¾TN		GN
River Redhorse				IBI									
River Shiner				IBI	¼TN								
Rock Bass										¼TN	¾TN		
Sand Shiner	IBI			IBI	¼TN				IBI				
Sauger	IBI			IBI	¼TN	¾TN							
Shorthead Redhorse	IBI			IBI	¼TN	¾TN			IBI	¼TN	¾TN		
Shortnose Gar				IBI		¾TN		CTL					
Shovelnose Sturgeon				IBI			FTL						
Silver Chub				IBI		¾TN							
Silver Redhorse				IBI					IBI	¼TN	¾TN		
Slenderhead Darter				IBI					IBI				
Smallmouth Buffalo				IBI		¾TN							
Speckled Chub				IBI									
Spotfin Shiner	IBI	¼TN		IBI	¼TN	¾TN			IBI	¼TN			
Spottail Shiner					¼TN					¼TN			
Stonecat									IBI	¼TN			
Tadpole Madtom					¼TN								
Walleye	IBI			IBI			FTL		IBI	¼TN	¾TN	CTL	
White Bass	IBI		¾TN	IBI	¼TN	¾TN			IBI	¼TN	¾TN		
White Crappie					¼TN	¾TN							
White Sucker									IBI		¾TN		GN
Yellow Bullhead									IBI	¼TN	¾TN	CTL	
Yellow Perch									IBI	¼TN	¾TN		GN

Table 3. Number of fish sampled and catch per unit effort in Reach 1.

	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE	LF Number CPUE
Bigmouth Shiner	1 1.59/h					
Black Crappie	1 1.59/h	1 0.50/net	4 1.00/net			
Bluegill		1 0.50/net				
Brassy Minnow	1 1.59/h					
Channel Catfish	6 9.57/h		1 0.25/net		6 1.20/line	
Common Carp	30 47.83/h		4 1.00/net			
Emerald Shiner	1052 1677.30/h	37 18.50/net				
Flathead Catfish	3 4.78/h			12 2.40/line		62 34.78/h
Freshwater Drum	9 14.35/h		1 0.25/net		2 0.40/line	
Gizzard Shad	115 183.35/h	15 7.50/net				
Golden Redhorse	1 1.59/h					
Largemouth Bass		1 0.50/net				
River Carpsucker	1 1.59/h					
Sand Shiner	3 4.78/h					
Sauger	6 9.57/h					
Shorthead Redhorse	4 6.38/h					
Spotfin Shiner	11 17.54/h	1 0.50/net				
Walleye	3 4.78/h					
White Bass	16 25.51/h		3 0.75/net			
Total	1,263 2013.71/h	56 28.00/net	13 3.25/net	12 2.40/line	8 1.60/line	62 34.78/h

Table 4. Number of fish sampled and catch per unit effort in Reach 2.

	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE	LF Number CPUE
Bigmouth Buffalo	34 4.98/h		1 0.04/net			
Bigmouth Shiner	35 5.13/h	2 0.15/net				
Black Bullhead		1 0.08/net				
Black Crappie	2 0.29/h	3 0.23/net	2 0.07/net			
Blackside Darter	1 0.15/h					
Bluegill	5 0.73/h	3 0.23/net	6 0.22/net			
Blue Sucker	5 0.73/h					
Bluntnose Minnow	43 6.30/h	7 0.54/net				
Bowfin				1 0.03/line		
Brassy Minnow	19 2.78/h					
Channel Catfish	96 14.07/h	17 1.31/net	27 1.00/net	4 0.11/line	32 0.91/line	
Common Carp	356 52.16/h	13 1.00/net	7 0.26/net			
Common Shiner	2 0.29/h					
Creek Chub	1 0.15/h					
Emerald Shiner	1672 244.97/h	107 8.23/net				
Fathead Minnow	1 0.15/h					
Flathead Catfish	9 1.32/h	1 0.08/net	1 0.04/net	65 1.86/line	2 0.06/line	350 26.25/h
Freshwater Drum	162 23.74/h	7 0.54/net	13 0.48/net		1 0.03/line	
Gizzard Shad	342 50.11/h	7 0.54/net	4 0.15/net			
Golden Redhorse	19 2.78/h					
Golden Shiner		1 0.08/net				
Goldeye	1 0.15/h					
Green Sunfish	1 0.15/h					
Highfin Sucker	9 1.32/h					
Horneyhead Chub	2 0.29/h					
Hybrid Sunfish			1 0.04/net			
Johnny Darter		1 0.08/net				

Table 4 continued.

	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE	LF Number CPUE
Longnose Gar	1 0.15/h					
Mooneye	2 0.29/h		2 0.07/net			
Northern Hog Sucker	1 0.15/h					
Northern Pike			1 0.04/net			
Orangespotted Sunfish		2 0.15/net				
Quillback	25 3.66/h					
River Carpsucker	77 11.28/h	2 0.15/net	5 0.19/net			
River Redhorse	1 0.15/h					
River Shiner	1 0.15/h	1 0.08/net				
Sand Shiner	125 18.31/h	2 0.15/net				
Sauger	20 2.93/h	1 0.08/net	2 0.07/net			
Shorthead Redhorse	76 11.14/h	2 0.15/net	1 0.04/net			
Shortnose Gar	36 5.27/h		1 0.04/net		4 0.11/line	
Shovelnose Sturgeon	14 2.05/h			1 0.03/line		
Silver Chub	12 1.76/h		1 0.04/net			
Silver Redhorse	1 0.15/h					
Slenderhead Darter	8 1.17/h					
Smallmouth Buffalo	112 16.41/h		8 0.30/net			
Speckled Chub	1 0.15/h					
Spotfin Shiner	373 54.65/h	152 11.69/net	1 0.04/net			
Spottail Shiner		15 1.15/net				
Tadpole Madtom		1 0.08/net				
Walleye	25 3.67/h			2 0.06/line		
White Bass	12 1.76/h	3 0.23/net	1 0.04/net			
White Crappie		2 0.15/net	2 0.07/net			
Total	3,740 547.96/h	357* 27.46/net	87 3.22/net	73 2.09/line	41 1.17/line	350 26.25/h

* 2 unidentified buffalo specimens and 2 unidentified crappie specimens not included

Table 5. Number of fish sampled and catch per unit effort in Reach 3.

	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE
Bigmouth Buffalo	64 9.60/h		1 0.03/net		2 0.04/line
Black Bullhead	3 0.45/h	165 10.31/net	101 3.37/net		
Black Crappie	6 0.90/h	272 17.00/net	31 1.03/net		
Blackside Darter	5 0.75/h				
Bluegill	12 1.80/h	35 2.19/net	18 0.60/net		
Bluntnose Minnow	1 0.15/h	8 0.50/net			
Brassy Minnow	1 0.15/h				
Brown Bullhead			1 0.03/net		1 0.02/line
Central Stoneroller	1 0.15/h				
Channel Catfish	146 21.90/h	10 0.63/net	14 0.47/net	17 0.68/line	80 1.78/line
Common Carp	591 88.65/h	11 0.69/net	35 1.17/net	1 0.04/line	3 0.07/line
Common Shiner	4 0.60/h				
Emerald Shiner	11 1.65/h				
Fathead Minnow	1 0.15/h				
Freshwater Drum	315 47.25/h	16 1.00/net	43 1.43/net		1 0.02/line
Golden Redhorse	40 6.00/h	1 0.06/net	3 0.10/net		
Golden Shiner		2 0.13/net			
Green Sunfish	1 0.15/h	1 0.06/net			
Hybrid Sunfish		1 0.06/net	1 0.03/net		
Largemouth Bass	4 0.60/h				

Table 5 continued.

	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE
Logperch	1 0.15/h				
Northern Hog Sucker	5 0.75/h				
Northern Pike	9 1.35/h	3 0.19/net	15 0.50/net		1 0.02/line
Orangespotted Sunfish	8 1.20/h	5 0.31/net			
Pumpkinseed Sunfish			3 0.10/net		
Quillback	2 0.30/h		9 0.30/net		
River Carpsucker	7 1.05/h	2 0.13/net	8 2.67/net		
Rock Bass		2 0.13/net	15 0.50/net		
Sand Shiner	1 0.15/h				
Shorthead Redhorse	146 21.90/h	28 1.75/net	74 2.47/net		
Silver Redhorse	12 1.80/h	1 0.06/net	9 0.30/net		
Slenderhead Darter	16 2.40/h				
Spotfin Shiner	75 11.25/h	45 2.81/net			
Spottail Shiner		5 0.31/net			
Stonecat	2 0.30/h	2 0.13/net			
Walleye	41 6.15/h	1 0.06/net	20 0.67/net		1 0.02/line
White Bass	126 18.90/h	5 0.31/net	5 0.17/net		
White Sucker	24 3.60/h		4 0.13/net		
Yellow Bullhead	3 0.45/h	18 1.13/net	8 0.27/net		2 0.04/line
Yellow Perch	49 7.35/h	2 0.13/net	4 0.13/net		
Total	1,733 259.95/h	641 40.06/net	422 14.07/net	18 0.72/line	91 2.02/line

Table 6. Fish index of biological integrity (IBI) scores by reach.

Reach 1		
	I35	Mean (STD)
2004	36	36 (---)
2003 *MPCA*	44	44 (---)

Reach 2										
	101	CR	169	SMC	M	J	RF	NRA	HC	Mean (STD)
2004	38	38	34	36	30	32	40	34	28	34.4 (4.0)
2003 *MPCA*	36	44	36	44	44	42	40	44	36	40.7 (3.7)

Reach 3								
	GFP	RA	MD	MU	TB	LG	BS	Mean (STD)
2004	26	34	28	26	24	28	26	27.4 (3.2)
2003 *MPCA*	NA	40	34	32	30	NA	NA	34.0 (4.3)

Score	Classification
50 - 60	Excellent
40 - 49	Good
30 - 39	Fair
20 - 29	Poor
12 - 20	Very Poor
0 - 11	No Fish

Table 7. Mean back-calculated total length at annulus and number of fish aged in Reach 1.

	N	Age (years)										
		0	1	2	3	4	5	6	7	8	9	10
Black Crappie	4											
Number Aged		0	1	1	1	1						
Mean Length (mm)1			62.20	107.85	164.84	224.71						
Standard Error			2.587	10.645	36.832	0.000						
Bluegill	1[2]											
Number Aged		0	0	1								
Mean Length (mm)												
Standard Error												
Channel Catfish	13											
Number Aged		0	0	2	2	3	1	3	0	1	1	
Mean Length (mm)			64.00	134.94	221.50	292.71	368.07	437.31	552.45	650.05	665.00	
Standard Error			8.785	8.629	12.524	18.363	17.291	30.267	79.325	66.170	0.000	
Flathead Catfish	73											
Number Aged		0	5	24	26	1	2	3	1	1	3	0
Mean Length (mm)			61.18	157.17	247.74	309.00	411.58	473.47	530.66	596.61	640.40	672.69
Standard Error			5.389	4.158	7.243	16.002	22.075	21.256	23.142	25.518	30.229	41.798
Walleye	3											
Number Aged		1	2									
Mean Length (mm)			212.96									
Standard Error			5.478									

[1]Back-calculated length at annulus
[2]DisBCal requires 2 or more fish for back-calculation

Table 7 continued.

	N	Age (years)								
		11	12	13	14	15	16	17	18	19
Flathead Catfish	73									
Number Aged		1	0	0	1	0	0	2	0	3
Mean Length (mm)		711.05	735.02	774.10	814.81	811.70	860.44	900.59	981.89	100.18
Standard Error		45.653	49.549	53.288	55.798	37.252	37.088	46.469	56.912	63.867

Table 8. Mean back-calculated total length at annulus and number of fish aged in Reach 2.

	N	Age (years)										
		0	1	2	3	4	5	6	7	8	9	10
Black Crappie	7											
Number Aged		2	2	2	1							
Mean Length (mm)[1]			72.27	135.89	215.49							
Standard Error			3.587	13.277	0.000							
Bluegill	14											
Number Aged		0	0	10	3	1						
Mean Length (mm)			51.45	92.12	106.44	151.32						
Standard Error			2.076	3.665	13.321	0.000						
Channel Catfish	155											
Number Aged		0	8	16	20	22	14	12	15	8	5	7
Mean Length (mm)			56.37	124.78	187.89	240.96	293.21	339.57	382.07	437.07	469.59	506.61
Standard Error			1.872	2.563	2.974	4.088	5.518	7.477	8.799	11.145	11.836	12.226
Flathead Catfish	216											
Number Aged		0	40	33	32	8	11	17	10	5	5	2
Mean Length (mm)			58.33	146.22	222.63	310.66	391.88	454.84	505.33	568.90	626.01	675.22
Standard Error			2.796	3.513	5.114	7.012	8.796	9.777	10.767	11.841	12.570	13.583
Northern Pike	1[2]											
Number Aged		0	0	0	1							
Mean Length (mm)												
Standard Error												

[1]Back-calculated length at annulus
[2]DisBCal requires 2 or more fish for back-calculation

Table 8 continued.

	N	Age (years) 0	1	2	3	4	5	6	7	8	9	10
Sauger	29											
Number Aged		0	0	1	20	2	3	2	1			
Mean Length (mm)			146.36	253.60	319.93	385.84	436.74	458.57	474.83			
Standard Error			6.936	8.664	8.770	13.960	3.614	4.211	0.000			
Shovelnose Sturgeon	9											
Number Aged		0	0	0	0	1	2	1	4	0	1	
Mean Length (mm)			175.39	307.92	429.74	532.08	597.80	643.26	676.18	663.65	711.05	
Standard Error			17.411	19.662	21.285	24.429	27.429	28.207	27.740	0.000	0.000	
Walleye	26											
Number Aged		2	0	1	17	0	0	2	1	1	0	1
Mean Length (mm)			183.54	317.49	396.18	513.94	555.54	579.51	617.68	648.13	675.26	684.46
Standard Error			7.506	9.176	11.787	25.871	28.319	30.551	31.123	34.524	52.125	50.471
White Bass	30											
Number Aged		19	3	1	6	0	1					
Mean Length (mm)			132.90	238.85	313.85	368.17	385.68					
Standard Error			8.881	13.435	5.339	0.000	0.000					
White Crappie	4											
Number Aged		0	4									
Mean Length (mm)			64.42									
Standard Error			4.114									

Table 8 continued.

	N	Age (years)										
		11	12	13	14	15	16	17	18	19	20	21
Channel Catfish	155											
Number Aged		6	4	7	1	6	3	1				
Mean Length (mm)		547.23	592.35	624.38	653.54	690.53	692.57	788.65				
Standard Error		15.898	19.433	21.251	24.457	27.084	61.278	0.000				
Flathead Catfsih	216											
Number Aged		4	2	7	5	3	7	13	4	3	4	1
Mean Length (mm)		722.76	769.49	803.06	857.56	915.51	954.83	985.73	1031.10	1050.73	1055.83	1076.41
Standard Error		13.952	15.892	17.434	19.657	19.772	20.355	23.739	31.000	37.366	60.680	0.000
Walleye	26											
Number Aged		0	1									
Mean Length (mm)		642.41	648.32									
Standard Error		0.000	0.000									

Table 9. Mean back-calculated total length at annulus and number of fish aged in Reach 3.

	N	Age (years) 0	1	2	3	4	5	6	7	8	9	10
Black Crappie	51											
Number Aged		0	17	12	19	1						
Mean Length (mm)*			83.80	167.88	226.17	280.13						
Standard Error			2.100	4.048	5.200	0.000						
Bluegill	32											
Number Aged		0	25	2	3	1	1					
Mean Length (mm)			55.92	121.84	172.13	190.16	220.84					
Standard Error			2.317	11.042	9.866	23.040	0.000					
Channel Catfish	167											
Number Aged		0	0	5	11	8	9	19	20	17	21	20
Mean Length (mm)			55.80	114.79	179.16	240.15	294.86	342.86	392.04	433.93	458.86	494.88
Standard Error			2.290	3.053	3.199	3.983	4.943	6.081	7.586	7.955	8.132	8.949
Hybrid Sunfish	2											
Number Aged		0	2									
Mean Length (mm)			54.69									
Standard Error			5.240									
Largemouth Bass	3											
Number Aged		2	0	0	0	1						
Mean Length (mm)			70.18	166.44	289.41	367.94						
Standard Error			0.000	0.000	0.000	0.000						

*Back-calculated length at annulus

Table 9 continued.

	N	Age (years)										
		0	1	2	3	4	5	6	7	8	9	10
Northern Pike	24											
Number Aged		2	7	4	5	1	2	2	0	1		
Mean Length (mm)*			332.50	522.67	627.46	734.91	822.01	849.95	885.14	900.41		
Standard Error			13.388	18.716	23.356	32.589	14.029	16.234	0.000	0.000		
Rock Bass	2											
Number Aged		0	2									
Mean Length (mm)			60.25									
Standard Error			1.148									
Walleye	54											
Number Aged		5	5	5	32	2	1	1	1	0	0	0
Mean Length (mm)			170.96	296.05	363.15	487.74	545.10	589.62	625.91	664.94	677.42	685.69
Standard Error			4.508	6.529	8.106	17.272	18.821	15.638	19.081	7.585	1.121	2.895
White Bass	14											
Number Aged		5	3	0	3	3						
Mean Length (mm)			113.19	214.27	311.55	338.11						
Standard Error			14.500	28.150	12.311	5.234						
Yellow Perch	34											
Number Aged		5	22	2	2	3						
Mean Length (mm)			81.52	125.90	170.41	212.22						
Standard Error			1.946	7.478	7.170	13.837						

Table 9 continued.

	N	Age (years)					
		11	12	13	14	15	16
Channel Catfish	167						
Number Aged		13	13	7	3	0	1
Mean Length (mm)		518.17	538.25	574.68	576.77	647.20	680.55
Standard Error		10.530	13.494	16.106	28.223	0.000	0.000
Walleye	54						
Number Aged		0	1	0	0	1	
Mean Length (mm)		691.23	696.19	689.99	692.78	696.74	
Standard Error		5.938	8.400	0.000	0.000	0.000	

Table 10. Length frequency distribution of large fish sampled in Reach 1.

Length (mm)	Black Crappie	Bluegill	Channel Catfish	Common Carp	Flathead Catfish	Freshwater Drum	Gizzard Shad
0-24							
25-49							
50-74	1						16
75-99							68
100-124	1					2	30
125-149		1			1		
150-174	2				1		
175-199			4		4	2	
200-224					5	4	
225-249	1			1	12		
250-274	1		1		8		1
275-299			1		2		
300-324					4	1	
325-349			2		6		
350-374			1		8		
375-399				1	3		
400-424				1	3	1	
425-449			1		1		
450-474			1	1	1		
475-499				4	1		
500-524				5	1		
525-549				2			
550-574				10			
575-599				5	1		
600-624				2	1		
625-649				2	2		
650-674			1		1		
675-699					1		
700-724							
725-749			1		1		
750-774							
775-799					2		
800-824							
825-849							
850-874							
875-899					1		
900-924					1		
925-949							
950-974							
975-999					2		
1000-1024					1		
1025-1049							
1050-1074					1		
1075-1099							
1100-1124							
1125-1149					1		
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	0	0	0	0	0	2	15
Total	6	1	13	34	77	12	130

Table 10 continued.

Length (mm)	Golden Redhorse	Largemouth Bass	River Carpsucker	Sauger	Shorthead Redhorse	Walleye	White Bass
0-24							
25-49							
50-74		1					
75-99							4
100-124							10
125-149			1		1		1
150-174						1	
175-199							
200-224							
225-249							1
250-274							1
275-299	1						
300-324					1	2	1
325-349				3	1		1
350-374				2	1		
375-399							
400-424							
425-449							
450-474							
475-499				1			
500-524							
525-549							
550-574							
575-599							
600-624							
625-649							
650-674							
675-699							
700-724							
725-749							
750-774							
775-799							
800-824							
825-849							
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	0	0	0	0	0	0	0
Total	1	1	1	6	4	3	19

Table 11. Length frequency distribution of large fish sampled in Reach 2.

Length (mm)	Bigmouth Buffalo	Black Buffalo	Black Bullhead	Black Crappie	Bluegill	Blue Sucker	Bowfin
0-24							
25-49			1	1			
50-74	1			2			
75-99					1		
100-124					6		
125-149				1	6		
150-174				2	1		
175-199							
200-224							
225-249				1			
250-274							
275-299							
300-324							
325-349							
350-374							
375-399							
400-424	1						
425-449	6						
450-474	6						
475-499	5						
500-524	2						
525-549	1					1	
550-574	6					2	
575-599	3						
600-624	1						
625-649	1					1	
650-674	2					1	
675-699							
700-724		1					
725-749							
750-774							
775-799							
800-824							
825-849							
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	0	0	0	0	0	0	1
Total	35[1]	1	1	7[2]	14	5	1

[1]2 unidentified buffalo specimens not included
[2]2 unidentified crappie specimens not included

Table 11 continued.

Length (mm)	Channel Catfish	Common Carp	Flathead Catfish	Freshwater Drum	Gizzard Shad	Golden Redhorse	Goldeye
0-24							
25-49	5	8				3	
50-74	5	5		9	22	6	
75-99		1		24	182	4	
100-124	1		1	30	61	1	
125-149	4		21		2	1	
150-174	3		50				
175-199	11		30	14			
200-224	24		17	18	5		
225-249	22		20	5	55		
250-274	13		44	4	18		
275-299	12		32	15	1		
300-324	5		20	31			
325-349	7	5	24	11		1	
350-374	7	9	7	11		1	
375-399	5	12	12	3		1	
400-424	4	11	6	4			
425-449	1	39	7	2		1	1
450-474	6	58	6				
475-499	4	49	6	1			
500-524	1	53	7				
525-549	5	40	8				
550-574	5	27	10				
575-599	4	19	11				
600-624	4	16	9				
625-649	3	13	7				
650-674	5	6	8				
675-699	1	3	8				
700-724	2	2	2				
725-749	2	2	3				
750-774			1				
775-799	2		2				
800-824	1		2				
825-849	2		2				
850-874			5				
875-899			5				
900-924			1				
925-949			2				
950-974			2				
975-999			1				
1000-1024			4				
1025-1049			4				
1050-1074			5				
1075-1099			4				
1100-1124			9				
1125-1149			2				
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274			1				
Not Measured	0	0	0	1	7	0	0
Total	176	378	428	183	353	19	1

Table 11 continued.

Length (mm)	Green Sunfish	Highfin Sucker	Longnose Gar	Mooneye	Northern Hog Sucker	Northern Pike	Paddlefish
0-24							
25-49							
50-74							
75-99	1			1			
100-124							
125-149		1					
150-174					1		
175-199				1			
200-224		1		1			
225-249		1					
250-274		1					
275-299		2					
300-324		1					
325-349		2		1			
350-374							
375-399							
400-424							
425-449							
450-474							
475-499							
500-524							
525-549							
550-574							
575-599							
600-624							
625-649							
650-674			1				
675-699						1	
700-724							
725-749							
750-774							
775-799							
800-824							
825-849							
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							1
1225-1249							
1250-1274							
Not Measured	0	0	0	0	0	0	0
Total	1	9	1	4	1	1	1

Table 11 continued.

Length (mm)	Quillback	River Carpsucker	River Redhorse	Sauger	Shorthead Redhorse	Shortnose Gar	Shovelnose Sturgeon
0-24							
25-49	1	2					
50-74		1			1		
75-99		1			2		
100-124					1		
125-149		2			10		
150-174	1	1			12		
175-199	3				5		
200-224	2				1		
225-249	2	1			2		
250-274	1			1	6		
275-299	1	2		2	6		
300-324	1	1		2	5		
325-349	2	4		6	7		
350-374	3	2		4	5		
375-399	6	1		1	3		
400-424		9			5		
425-449	1	17	1	2	2		
450-474	1	24		4	1	5	
475-499		12		1			
500-524		4					
525-549						3	
550-574							
575-599						14	
600-624						7	1
625-649							1
650-674					1	5	2
675-699						2	2
700-724						1	1
725-749							2
750-774							4
775-799							1
800-824							1
825-849							
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	0	0	0	0	5	4	0
Total	25	84	1	23	80	41	15

Table 11 continued.

Length (mm)	Silver Redhorse	Smallmouth Buffalo	Walleye	White Bass	White Crappie
0-24					
25-49	1				
50-74				4	
75-99				2	
100-124			1		
125-149			1		2
150-174					2
175-199					
200-224					
225-249				1	
250-274				2	
275-299					
300-324		5		1	
325-349		6	1	2	
350-374		6	3	3	
375-399		7	2		
400-424		7	4	1	
425-449		13	3		
450-474		16	3		
475-499		17	2		
500-524		11	1		
525-549		12			
550-574		12	1		
575-599		6			
600-624					
625-649		1	3		
650-674			1		
675-699					
700-724					
725-749			1		
750-774					
775-799					
800-824					
825-849					
850-874					
875-899					
900-924					
925-949					
950-974					
975-999					
1000-1024					
1025-1049					
1050-1074					
1075-1099					
1100-1124					
1125-1149					
1150-1174					
1175-1199					
1200-1224					
1225-1249					
1250-1274					
Not Measured	0	0	0	0	0
Total	1	119	27	16	4

Table 12. Length frequency distribution of large fish sampled in Reach 3.

Length (mm)	Bigmouth Buffalo	Black Bullhead	Black Crappie	Bluegill	Brown Bullhead	Channel Catfish	Common Carp
0-24				16			
25-49	1		11	10		4	
50-74			48			1	25
75-99		1	1	5			13
100-124		39	2	19			1
125-149		45	7	5		4	
150-174		21	8			1	
175-199		15	1	4			
200-224		9	7			5	
225-249	1	3	13	1	1	12	
250-274			8			7	2
275-299			4			8	
300-324		2				20	3
325-349						14	9
350-374	1					14	5
375-399	6					17	5
400-424	1					19	9
425-449	4					12	9
450-474	1					12	6
475-499	1					8	13
500-524	2					10	17
525-549	3					8	16
550-574	5					9	16
575-599	4					9	15
600-624	5					7	12
625-649	2					8	22
650-674	3					3	12
675-699						2	9
700-724	1						8
725-749	4						10
750-774	1						1
775-799							2
800-824							1
825-849							1
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	21	134	35	5	0	57	400
Total	67	269	145	65	1	271	642

Table 12 continued.

Length (mm)	Freshwater Drum	Golden Redhorse	Green Sunfish	Large-mouth Bass	Northern Hog Sucker	Northern Pike	Pumpkinseed Sunfish
0-24			1				
25-49							
50-74	27			2			
75-99	20			1			
100-124			1				2
125-149		12					1
150-174		1					
175-199	1						
200-224	4					1	
225-249	1	2				1	
250-274	4	1					
275-299	2	1					
300-324	10	2			2		
325-349	3	3			3	1	
350-374	3	5				2	
375-399	4	7		1		2	
400-424	3	7				1	
425-449	2					1	
450-474		1				2	
475-499	2						
500-524	1					3	
525-549	2					1	
550-574						2	
575-599							
600-624						3	
625-649						2	
650-674						1	
675-699							
700-724							
725-749							
750-774							
775-799							
800-824						1	
825-849						1	
850-874							
875-899						1	
900-924						1	
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	228	2	0	0	0	0	0
Total	317	45	2	4	5	28	3

Table 12 continued.

Length (mm)	Quillback	Rock Bass	Shorthead Redhorse	Silver Redhorse	Walleye	White Bass	White Sucker
0-24							
25-49						1	
50-74						12	2
75-99		1				29	2
100-124		8			5		
125-149		5			3		
150-174		2	8				3
175-199		1	2				5
200-224			3				3
225-249			1				3
250-274			2		4	3	1
275-299			9				1
300-324			7		5		
325-349	1		7		6	1	1
350-374	1		16		13	4	3
375-399	1		27		7	1	1
400-424	1		49		5		3
425-449	1		38	2	3		1
450-474	1		16	4			
475-499	1		7	6	2		
500-524	3		4	8			
525-549	1						
550-574				1	1		
575-599							
600-624				1	1		
625-649							
650-674							
675-699							
700-724					2		
725-749							
750-774							
775-799							
800-824							
825-849							
850-874							
875-899							
900-924							
925-949							
950-974							
975-999							
1000-1024							
1025-1049							
1050-1074							
1075-1099							
1100-1124							
1125-1149							
1150-1174							
1175-1199							
1200-1224							
1225-1249							
1250-1274							
Not Measured	0	0	52	0	3	85	0
Total	11	17	248	22	63	136	29

Table 12 continued.

Length (mm)	Yellow Bullhead	Yellow Perch
0-24		
25-49		1
50-74		20
75-99		1
100-124		1
125-149		15
150-174	2	6
175-199	5	6
200-224	6	
225-249	11	1
250-274	3	1
275-299	1	
300-324	2	
325-349	1	
350-374		
375-399		
400-424		
425-449		
450-474		
475-499		
500-524		
525-549		
550-574		
575-599		
600-624		
625-649		
650-674		
675-699		
700-724		
725-749		
750-774		
775-799		
800-824		
825-849		
850-874		
875-899		
900-924		
925-949		
950-974		
975-999		
1000-1024		
1025-1049		
1050-1074		
1075-1099		
1100-1124		
1125-1149		
1150-1174		
1175-1199		
1200-1224		
1225-1249		
1250-1274		
Not Measured	0	4
Total	31	56

Table 13. Mercury levels in tested fish by reach.

Reach		Number of fish with mercury present				
		≤0.05 (ppm)	>0.05-0.2 (ppm)	>0.2-1.0 (ppm)	>1.0-2.8 (ppm)	>2.8 (ppm)
1	Channel Catfish		5			
	Common Carp	1	1			
	Flathead Catfish			4		
	Walleye		2			
2	Bluegill		5*			
	Channel Catfish	1	27	13		
	Common Carp	3	21			
	Flathead Catfish		14	25	2	
	Walleye		6	15		
3	Black Crappie	10*				
	Channel Catfish		2	16		
	Common Carp		5	5		
	Freshwater Drum		5	2		
	Walleye	1	15	5		

*composite sample

Table 14. Polychlorinated biphenyl (PCB) levels in tested fish by reach.

Reach		Number of fish with PCB present				
		≤0.05 (ppm)	>0.05-0.2 (ppm)	>0.2-1.0 (ppm)	>1.0-1.9 (ppm)	>1.9 (ppm)
1	Channel Catfish		4			
	Common Carp	2				
	Flathead Catfish		1	3		
2	Channel Catfish	16	14	8		
	Common Carp	14	5	3		
	Flathead Catfish	29	6	4		
	Walleye	6	4			
3	Black Crappie	10*				
	Channel Catfish	10				
	Common Carp	3				
	Freshwater Drum	2				
	Walleye	6				

*composite sample

Table 15. Standard water quality analysis.

Site	Date Sampled	Total Phosphorus ppm	Chlorophyll A ppb	Total Alkalinity ppm	pH	Total Dissolved Solids ppm	Conductivity µmho	Chloride ppm
Fort Snelling Downstream	3 Aug 04	0.227	73.9	235	8.31	552	810	38.2
Reach 1 Mean (STD)		0.227 (---)	73.9 (---)	235.0 (---)	8.31 (---)	552 (---)	810 (---)	38.2 (---)
Thompson Ferry	3 Aug 04	0.255	99.2	224	8.34	524	730	28.3
Henderson	3 Aug 04	0.253	108.0	232	8.42	572	765	28.3
Seven Mile Creek	30 Aug 04	0.209	141.0	236	8.56	576	720	29.3
Judson	30 Aug 04	0.252	187.0	248	8.62	652	890	35.2
Beussman Bridge	30 Aug 04	0.240	158.0	243	8.62	624	880	26.8
Franklin	17 Aug 04	0.258	93.8	244	8.56	604	890	28.8
North Redwood Access	17 Aug 04	0.224	100.0	239	8.61	580	880	28.8
Reach 2 Mean (STD)		0.242 (0.019)	126.7 (35.9)	238.0 (8.1)	8.53 (0.11)	590.3 (41.2)	822.1 (79.7)	29.4 (2.7)
Granite Falls Memorial Park	25 Aug 04	0.180	81.5	225	8.41	504	730	20.3
Priens Access	25 Aug 04	0.187	75.7	234	8.53	548	790	22.3
Camp Release Access	25 Aug 04	0.172	63.8	216	8.85	624	850	21.8
Twin Bridges	25 Aug 04	0.197	87.9	217	8.61	712	1,000	21.8
Louisburg Grade	25 Aug 04	0.112	47.2	200	8.36	1,050	1,390	30.8
Reach 3 Mean (STD)		0.170 (0.033)	71.2 (16.1)	218.4 (12.6)	8.55 (0.19)	687.6 (217.5)	952.0 (264.6)	23.4 (4.2)

Table 16. Mean monthly discharge (ft^3/s) for select months in 2004 for mainstem Minnesota River US Geological Survey (USGS) gauging stations.

USGS Gauging Stations	Discharge (ft^3/s)				
	May	June	July	August	September
Jordan					
2004	3,565	20,030	7,705	3,518	7,988
Mean (start-1934)	8,276	8,136	5,973	3,299	2,298
Mankato					
2004	3,385	15,950	6,163	3,029	8,105
Mean (start-1903)	6,048	6,418	4,623	2,368	1,681
Montevideo					
2004	562	1,811	772	358	386
Mean (start-1909)	1,646	1,346	1,151	589	342
Lac Qui Parle					
2004	390	1,265	522	216	226
Mean (start-1942)	1,429	1,167	985	523	262
Ortonville					
2004	6.2	96.9	20.9	13.6	22.0
Mean (start-1938)	272	187	151	73.1	34.2

Appendix 1. Number of fish sampled and catch per unit effort in Reach 1 by site.

Site[1]	I35	FSD	FSD	FSU	FSU	FSU
Sampling[2]	IBI Number CPUE	¼TN Number CPUE	¾TN Number CPUE	FTL Number CPUE	CTL Number CPUE	LF Number CPUE
Bigmouth Shiner	1 1.59/h					
Black Crappie	1 1.59/h	1 0.50/net	4 1.00/net			
Bluegill		1 0.50/net				
Brassy Minnow	1 1.59/h					
Channel Catfish	6 9.57/h		1 0.25/net		6 1.20/line	
Common Carp	30 47.83/h		4 1.00/net			
Emerald Shiner	1052 1677.30/h	37 18.50/net				
Flathead Catfish	3 4.78/h			12 2.40/line		62 34.78/h
Freshwater Drum	9 14.35/h		1 0.25/net		2 0.40/line	
Gizzard Shad	115 183.35/h	15 7.50/net				
Golden Redhorse	1 1.59/h					
Largemouth Bass		1 0.50/net				
River Carpsucker	1 1.59/h					
Sand Shiner	3 4.78/h					
Sauger	6 9.57/h					
Shorthead Redhorse	4 6.38/h					
Spotfin Shiner	11 17.54/h	1 0.50/net				
Walleye	3 4.78/h					
White Bass	16 25.51/h		3 0.75/net			
Total	1263 2013.71/h	56 28.00/net	13 3.25/net	12 2.40/line	8 1.60/line	62 34.78/h

[1]I35-Interstate 35, FSU-Fort Snelling Upstream, FSD-Fort Snelling Downstream

[2]IBI-Index of Biological Integrity Electrofishing, FTL-Flathead Catfish Trotlining, CTL-Channel Catfish Trotlining, ¼TN-1/4 Inch Mesh Trapnetting, ¾TN-3/4 Inch Mesh Trapnetting, LF-Low-Frequency Electrofishing

Appendix 2. Number of fish sampled and catch per unit effort for Index of Biological Integrity Electrofishing in Reach 2 by site.

Site*	101	CR	169	SMC	M	J	RF	NRA	HC
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Buffalo	6 10.73/h	8 13.62/h			4 5.64/h	8 8.97/h	5 6.11/h	1 1.48/h	2 2.45/h
Bigmouth Shiner	1 1.79/h	2 3.41/h	8 7.03/h	7 11.09/h	1 1.41/h	3 3.36/h	3 3.66/h		10 12.24/h
Black Crappie			1 0.88/h			1 1.12/h			
Blackside Darter							1 1.22/h		
Bluegill					2 2.82/h	1 1.12/h	1 1.22/h	1 1.48/h	
Blue Sucker			2 1.76/h		2 2.82/h		1 1.22/h		
Bluntnose Minnow				1 1.58/h	12 16.92/h	2 2.24/h	1 1.22/h	3 4.45/h	24 29.39/h
Brassy Minnow		1 1.70/h		1 1.58/h					17 20.82/h
Channel Catfish	2 3.58/h	8 13.62/h	10 8.79/h	13 20.60/h	7 9.87/h	19 21.30/h	13 15.88/h	14 20.77/h	10 12.24/h
Common Carp	32 57.22/h	26 44.28/h	128 112.56/h	12 19.01/h	37 52.17/h	50 56.04/h	23 28.10/h	22 32.65/h	26 31.84/h
Common Shiner									2 2.45/h
Creek Chub									1 1.22/h
Emerald Shiner	955 1707.80/h	237 403.61/h	202 177.63/h	56 88.73/h	61 86.01/h	33 36.99/h	99 120.94/h	8 11.87/h	21 25.71/h
Fathead Minnow		1 1.70/h							
Flathead Catfish			1 0.88/h		4 5.64/h	1 1.12/h	2 2.44/h		1 1.22/h
Freshwater Drum	7 12.52/h	32 54.50/h	39 34.29/h	3 4.75/h	7 9.87/h	18 20.17/h	26 31.76/h	18 26.71/h	12 14.69/h
Gizzard Shad	39 69.74/h	12 20.44/h	3 2.64/h		3 4.23/h	22 24.67/h	57 69.63/h	171 253.75	35 42.86/h
Golden Redhorse					3 4.23/h	2 2.24/h	1 1.22/h	3 4.45/h	10 12.24/h
Goldeye									1 1.22/h
Green Sunfish	1 1.79/h								
Highfin Sucker			1 0.88/h	2 3.17/h		6 6.72/h			

*101-Highway 101, CR-Carver Rapids, 169-Highway 169, SMC-Seven Mile Creek, M-Mankato, J-Judson, RF-Redwood Falls, NRA-North Redwood Access, HC-Hazel Creek

Appendix 2 continued.

Site	101	CR	169	SMC	M	J	RF	NRA	HC
	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)
Horneyhead Chub									2 2.45/h
Longnose Gar									1 1.22/h
Mooneye						1 1.12/h	1 1.22/h		
Northern Hog Sucker									1 1.22/h
Quillback	4 7.15/h		1 0.88/h			3 3.36/h	6 7.33/h	7 10.39/h	4 4.90/h
River Carpsucker	1 1.79/h	1 1.70/h	13 11.43/h	5 7.92/h	3 4.23/h	32 35.87/h	13 15.89/h	1 1.48/h	8 9.80/h
River Redhorse			1 0.88/h						
River Shiner						1 1.12/h			
Sand Shiner		4 6.81/h	2 1.76/h	23 36.44/h	46 64.86/h	2 2.24/h	2 2.44/h		46 56.32/h
Sauger	1 1.79/h		5 4.40/h	1 1.58/h	2 2.82/h	2 2.24/h	3 3.66/h	4 5.94/h	2 2.45/h
Shorthead Redhorse	1 1.79/h	1 1.70/h	10 8.79/h	11 17.43/h	14 19.74/h	8 8.97/h	7 8.55/h	11 16.32/h	13 15.92/h
Shortnose Gar	5 8.94/h	6 10.22/h	10 8.79/h	1 1.58/h	1 1.41/h	1 1.12/h	5 6.11/h	6 8.90/h	1 1.22/h
Shovelnose Sturgeon		3 5.11/h		1 1.58/h	1 1.41/h	9 10.09/h			
Silver Chub		2 3.41/h	1 0.88/h	3 4.75/h	3 4.23/h	3 3.36/h			
Silver Redhorse									1 1.22/h
Slenderhead Darter	1 1.79/h		1 0.88/h		2 2.82/h	2 2.24/h			2 2.45/h
Smallmouth Buffalo	3 5.36/h	6 10.22/h	15 13.19/h	11 17.43/h	8 11.28/h	27 30.26/h	20 24.43/h	12 17.81/h	10 12.24/h
Speckled Chub		1 1.70/h							
Spotfin Shiner	27 48.28/h	4 6.81/h	15 13.19/h	16 25.35/h	138 194.59/h	15 16.81/h	80 97.73/h	20 29.68/h	58 71.02/h
Walleye	4 7.15/h		7 6.16/h	3 4.75/h	1 1.41/h	4 4.48/h	3 3.66/h	3 4.45/h	
White Bass	7 12.52/h	1 1.70/h	2 1.76/h		1 1.41/h				1 1.22/h
Total	1097 1961.73/h	356 606.27/h	478 420.33/h	170 269.37/h	363 511.84/h	276 309.35/h	373 455.66/h	305 452.59/h	322 547.96/h

Appendix 3. Number of fish sampled and catch per unit effort for ¼ Inch Mesh Trapnetting in Reach 2 by site.

Site[1]	TF	H	SMC	J	BB	F	RCP2
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Shiner					2 2.00/net		
Black Bullhead			1 0.50/net				
Black Crappie			1 0.50/net				2 1.00/net
Bluegill					2 2.00/net		1 0.50/net
Bluntnose Minnow				1 0.50/net		1 0.50/net	5 2.50/net
Channel Catfish				1 0.50/net		6 3.00/net	10 5.00/net
Common Carp			12 6.00/net	1 0.50/net			
Emerald Shiner	60 30.00/net	10 5.00/net	14 7.00/net			14 7.00/net	9 4.50/net
Flathead Catfish				1 0.50/net			
Freshwater Drum				1 0.50/net	2 2.00/net	3 1.50/net	1 0.50/net
Gizzard Shad							7 3.50/net
Golden Shiner			1 0.50/net				
Johnny Darter				1 0.50/net			
Orangespotted Sunfish			2 1.00/net				
River Carpsucker			2 1.00/net				
River Shiner							1 0.50/net
Sauger				1 0.50/net			
Sand Shiner					1 1.00/net		1 0.50/net
Shorthead Redhorse				1 0.50/net		1 0.50/net	
Spotfin Shiner				3 1.50/net	1 1.00/net	105 52.50/net	43 21.50/net
Spottail Shiner			15 7.50/net				
Tadpole Madtom							1 0.50/net
White Bass							3 1.50/net
White Crappie		1 0.50/net		1 0.50/net			
Total	64[2] 32.00/net	11 5.50/net	48 24.00/net	12 6.00/net	8 8.00/net	130 65.00/net	84 42.00/net

[1]TF-Thompson Ferry, H-Henderson, SMC-Seven Mile Creek, J-Judson, BB-Beussman Bridge, F-Franklin, RCP2-Renville County Park 2

[2]2 unidentified buffalo specimens and 2 unidentified crappie specimens not included

Appendix 4. Number of fish sampled and catch per unit effort for ¾ Inch Mesh Trapnetting in Reach 2 by site.

Site*	TF	H	SMC	J	BB	F	RCP2
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Buffalo			1 0.25/net				
Black Crappie	2 0.50/net						
Bluegill			1 0.25/net			1 0.33/net	4 1.00/net
Channel Catfish					12 3.00/net	7 2.33/net	8 2.00/net
Common Carp	1 0.25/net		3 0.75/net	1 0.25/net			2 0.50/net
Flathead Catfish				1 0.25/net			
Freshwater Drum	1 0.25/net			3 0.75/net	2 0.50/net	3 1.00/net	4 1.00/net
Gizzard Shad			2 0.50/net		2 0.50/net		
Hybrid Sunfish			1 0.25/net				
Mooneye					1 0.25/net		1 0.25/net
Northern Pike			1 0.25/net				
River Carpsucker			3 0.75/net			1 0.33/net	1 0.25/net
Sauger			2 0.50/net				
Shorthead Redhorse							1 0.25/net
Shortnose Gar	1 0.25/net						
Silver Chub				1 0.25/net			
Smallmouth Buffalo	1 0.25/net				1 0.25/net	2 0.67/net	4 1.00/net
Spotfin Shiner					1 0.25/net		
White Bass			1 0.25/net				
White Crappie		1 0.25/net		1 0.25/net			
Total	6 1.50/net	1 0.25/net	15 3.75/net	7 1.75/net	19 4.75/net	14 4.67/net	25 6.25/net

*TF-Thompson Ferry, H-Henderson, SMC-Seven Mile Creek, J-Judson, BB-Beussman Bridge, F-Franklin, RCP2-Renville County Park 2

Appendix 5. Number of fish sampled and catch per unit effort for Flathead Catfish Trotlining in Reach 2 by site.

Site*	TF	H	SMC	J	BB	F	RCP2
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bowfin			1 0.20/line				
Channel Catfish	2 0.40/line		1 0.20/line		1 0.20/line		
Flathead Catfish	7 1.40/line	5 1.00/line	6 1.20/line	6 1.20/line	12 2.40/line	13 2.60/line	16 3.20/line
Shovelnose Sturgeon				1 0.20/line			
Walleye	1 0.20/line				1 0.20/line		
Total	10 2.0/line	5 1.00/line	8 1.60/line	7 1.40/line	14 2.8/line	13 2.60/line	16 3.20/line

*TF-Thompson Ferry, H-Henderson, SMC-Seven Mile Creek, J-Judson, BB-Beussman Bridge, F-Franklin, RCP2-Renville County Park 2

Appendix 6. Number of fish sampled and catch per unit effort for Channel Catfish Trotlining in Reach 2 by site.

Site*	TF	H	SMC	J	BB	F	RCP2
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Channel Catfish	5 1.00/line	3 0.60/line	3 0.60/line	9 1.80/line	5 1.00/line	2 0.40/line	5 1.00/line
Flathead Catfish			1 0.20/line		1 0.20/line	1 0.20/line	
Freshwater Drum						1 0.20/line	
Shortnose Gar	1 0.20/line		2 0.40/line		1 0.20/line		
Total	6 1.2/line	3 0.60/line	6 1.20/line	9 1.80/line	7 1.4/line	4 0.80/line	5 1.00/line

*TF-Thompson Ferry, H-Henderson, SMC-Seven Mile Creek, J-Judson, BB-Beussman Bridge, F-Franklin, RCP2-Renville County Park

Appendix 7. Number of fish sampled and catch per unit effort for Low-Frequency Electrofishing in Reach 2 by site.

Site*	TF	H	SMC	J	BB	F	RCP2
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Flathead Catfish	44 21.06/h	52 27.15/h	55 27.39/h	59 34.22/h	55 30.93/h	47 27.00/h	38 18.29/h

*TF-Thompson Ferry, H-Henderson, SMC-Seven Mile Creek, J-Judson, BB-Beussman Bridge, F-Franklin, RCP2-Renville County Park 2

Appendix 8. Number of fish sampled and catch per unit effort for Index of Biological Integrity Electrofishing in Reach 3 by site.

Site*	GFMP	RA	MD	MU	TB	LG	BS
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Buffalo	6 6.21/h	1 1.00/h	8 8.00/h	5 5.00/h	1 1.09/h	42 47.55/h	1 1.11/h
Black Bullhead						3 3.40/h	
Black Crappie	3 3.10/h					1 1.13/h	2 2.22/h
Blackside Darter		5 5.00/h					
Bluegill	1 1.03/h	1 1.00/h				3 3.40/h	7 7.78/h
Bluntnose Minnow					1 1.09/h		
Brassy Minnow					1 1.09/h		
Central Stoneroller				1 1.00/h			
Channel Catfish	10 10.34/h	62 62.00/h	14 14.00/h	56 56.00/h	4 4.36/h		
Common Carp	15 15.52/h	45 45.00/h	33 33.00/h	36 36.00/h	361 393.80/h	37 41.89/h	64 71.11/h
Common Shiner		3 3.00/h	1 1.00/h				
Emerald Shiner	1 1.03/h				3 3.27/h	7 7.92/h	
Fathead Minnow			1 1.00/h				
Freshwater Drum	14 14.48/h	15 15.00/h	9 9.00/h	6 6.00/h	260 283.63/h	3 3.40/h	8 8.89/h
Golden Redhorse		18 18.00/h	6 6.00/h	4 4.00/h	1 1.09/h		11 12.22/h
Green Sunfish				1 1.00/h			
Log Perch					1 1.09/h		
Largemouth Bass							4 4.44/h
Northern Hog Sucker		5 5.00/h					
Northern Pike	2 2.07/h		2 2.00/h			2 2.26/h	3 3.33/h
Orangespotted Sunfish	1 1.03/h	1 1.00/h	1 1.00/h		4 4.36/h	1 1.13/h	

*GFMP-Granite Falls Memorial Park, RA-Rowe Access, MD-Montevideo Downstream, MU-Montevideo Upstream, TB-Twin Bridges, LG-Louisburg Grade, BS-Big Stone

Appendix 8 continued.

Site	GFMP	RA	MD	MU	TB	LG	BS
	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)	Number (CPUE)
Quillback	1 1.03/h			1 1.00/h			
River Carpsucker	4 4.14/h		1 1.00/h	2 2.00/h			
Sand Shiner				1 1.00/h			
Shorthead Redhorse	9 9.31/h	30 30.00/h	50 50.00/h	37 37.00/h	14 15.27/h	2 2.26/h	4 4.44/h
Silver Redhorse	2 2.07/h	1 1.00/h	7 7.00/h	2 2.00/h			
Slenderhead Darter		14 14.00/h	2 2.00/h				
Spotfin Shiner	7 7.24/h	16 16.00/h	6 6.00/h	21 21.00/h	5 5.45/h	19 21.51/h	1 1.11/h
Stonecat		1 1.00/h		1 1.00/h			
Walleye	2 2.07/h	3 3.00/h	3 3.00/h	5 5.00/h	15 16.36/h	7 7.92/h	6 6.67/h
White Bass	1 1.03/h	4 4.00/h	1 1.00/h	3 3.00/h	115 125.45/h	2 2.26/h	
White Sucker		3 3.00/h	2 2.00/h	4 4.00/h	7 7.64/h	3 3.40/h	5 5.56/h
Yellow Bullhead						1 1.13/h	2 2.22/h
Yellow Perch	3 3.10/h				23 25.09/h	19 21.51/h	4 4.44/h
Total	82 84.82/h	228 228.00/h	147 147.00/h	186 186.00/h	816 890.15/h	152 172.08/h	122 135.56/h

Appendix 9. Number of fish sampled and catch per unit effort for ¼ Inch Mesh Trapnetting in Reach 3 by site.

Site*	GFMP	RA	MD	MU	TB	LG	BS	O
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Black Bullhead	1 0.50/net				11 5.50/net	11 5.50/net	55 27.50/net	87 43.50/net
Black Crappie	7 3.50/net	16 8.00/net	4 2.00/net	2 1.00/net	2 1.00/net	184 92.00/net	56 28.00/net	1 0.50/net
Bluegill	2 1.00/net	10 5.00/net	7 3.50/net	2 1.00/net			2 1.00/net	12 6.00/net
Bluntnose Minnow	2 1.00/net	2 1.00/net	1 0.50/net	1 0.50/net			2 1.00/net	
Channel Catfish	1 0.50/net	1 0.50/net	4 2.00/net	3 1.50/net	1 0.50/net			
Common Carp	4 2.00/net		4 2.00/net				3 1.50/net	
Freshwater Drum	1 0.50/net	4 2.00/net	1 0.50/net	2 1.00/net	7 3.50/net			1 0.50/net
Golden Redhorse		1 0.50/net						
Golden Shiner							2 1.00/net	
Green Sunfish								1 0.50/net
Hybrid Sunfish							1 0.50/net	
Northern Pike					1 0.50/net	1 0.50/net		1 0.50/net
Orangespotted Sunfish		2 1.00/net					1 0.50/net	2 1.00/net
River Carpsucker	2 1.00/net							
River Shiner								
Rock Bass								2 1.00/net
Shorthead Redhorse	17 8.50/net	1 0.50/net	10 5.00/net					
Silver Redhorse	1 0.50/net							
Spotfin Shiner		14 7.00/net		28 14.00/net	1 0.50/net	2 1.00/net		
Spottail Shiner			1 0.50/net		1 0.50/net	2 1.00/net	1 0.50/net	
Stonecat		1 0.50/net		1 0.50/net				
Walleye					1 0.50/net			
White Bass		1 0.50/net	1 0.50/net		3 1.50/net			
Yellow Bullhead	1 0.50/net				8 4.00/net	5 2.50/net		4 2.00/net
Yellow Perch						1 0.50/net	1 0.50/net	
Total	39 19.50/net	53 26.50/net	33 16.50/net	39 19.50/net	36 18.00/net	206 103.00/net	124 62.00/net	111 55.50/net

*GFMP-Granite Falls Memorial Park, RA-Rowe Access, MD-Montevideo Downstream, MU-Montevideo Upstream, TB-Twin Bridges, LG-Louisburg Grade, BS-Big Stone, O-Ortonville

Appendix 10. Number of fish sampled and catch per unit effort for ¾ Inch Mesh Trapnetting in Reach 3 by site.

Site*	GFMP	RA	MD	MU	TB	LG	BS	O
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Buffalo						1 0.25/net		
Black Bullhead					2 0.50/net	7 1.75/net	48 12.00/net	44 11.00/net
Black Crappie	6 3.00/net					21 5.25/net	4 1.00/net	
Bluegill							4 1.00/net	14 3.50/net
Brown Bullhead					1 0.25/net			
Channel Catfish	2 1.00/net	5 1.25/net	1 0.25/net	4 1.00/net	2 0.50/net			
Common Carp	2 1.00/net	9 4.50/net	1 0.25/net	1 0.25/net	3 0.75/net	15 3.75/net	4 1.00/net	
Freshwater Drum	15 7.50/net	9 4.50/net	3 0.75/net		11 2.75/net		4 1.00/net	1 0.25/net
Golden Redhorse	1 0.50/net	1 0.25/net						1 0.25/net
Hybrid Sunfish								1 0.25/net
Northern Pike	1 0.50/net	1 0.25/net	1 0.25/net	1 0.25/net	1 0.25/net	7 1.75/net	1 0.25/net	2 0.50/net
Pumpkinseed Sunfish								3 0.75/net
Quillback	4 2.00/net	5 1.25/net						
River Carpsucker	8 4.00/net							
Rock Bass								15 3.75/net
Shorthead Redhorse	21 10.50/net	29 7.25/net	7 1.75/net	2 0.50/net	5 1.25/net	8 2.00/net	2 0.50/net	
Silver Redhorse	6 3.00/net			2 0.50/net	1 0.25/net			
Shortnose Gar								
Walleye	2 1.00/net		1 0.25/net	2 0.50/net	9 2.25/net	1 0.25/net	1 0.25/net	4 1.00/net
White Bass					1 0.25/net	4 1.00/net		
White Sucker	1 0.50/net	2 0.50/net					1 0.25/net	
Yellow Bullhead						6 1.50/net	1 0.25/net	1 0.25/net
Yellow Perch						1 0.25/net	1 0.25/net	2 0.50/net
Total	69 34.50/net	61 15.25/net	14 3.50/net	12 3.00/net	36 9.00/net	71 17.75/net	71 17.75/net	88 22.00/net

*GFMP-Granite Falls Memorial Park, RA-Rowe Access, MD-Montevideo Downstream, MU-Montevideo Upstream, TB-Twin Bridges, LG-Louisburg Grade, BS-Big Stone, Ortonville

Appendix 11. Number of fish sampled and catch per unit effort for Flathead Catfish Trotlining in Reach 3 by site.

Site*	GFMP	RA	MD	MU	CD
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Channel Catfish		4 0.80/line	6 1.20/line	5 1.00/line	2 0.40/line
Common Carp		1 0.20/line			
Total	0	5 1.00/line	6 1.20/line	5 1.00/line	2 0.40/line

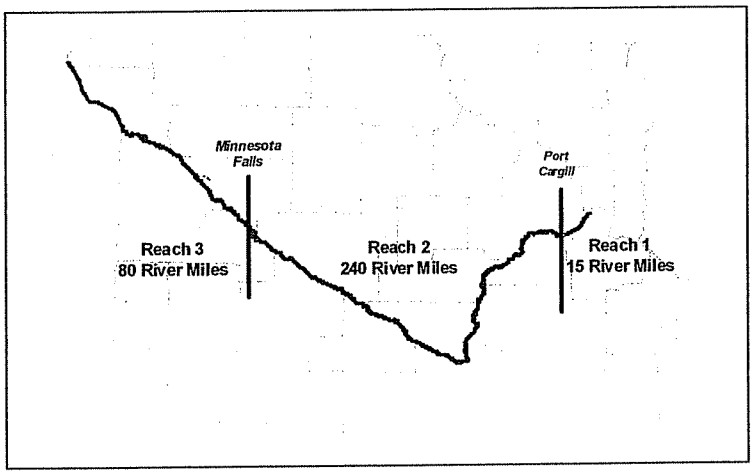
*GFMP-Granite Falls Memorial Park, RA-Rowe Access, MD-Montevideo Downstream, MU-Montevideo Upstream, CD-Churchill Dam

Appendix 12. Number of fish sampled and catch per unit effort for Channel Catfish Trotlining in Reach 3 by site.

Site*	GFMP	RA	MD	MU	CD	TB	LG	BS	O
	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE	Number CPUE
Bigmouth Buffalo	1 0.20/line			1 0.20/line					
Brown Bullhead							1 0.20/line		
Channel Catfish	7 1.40/line	18 3.60/line	20 4.00/line	11 2.20/line	14 2.80/line	6 1.20/line		4 0.80/line	
Common Carp		1 0.20/line	1 0.20/line			1 0.20/line			
Freshwater Drum								1 0.20/line	
Northern Pike								1 0.20/line	
Walleye		1 0.20/line							
Yellow Bullhead								2 0.40/line	
Total	8 1.6/line	20 4.0/line	21 4.20/line	12 2.40/line	14 2.8/line	7 1.40/line	1 0.20/line	8 1.60/line	0

*GFMP-Granite Falls Memorial Park, RA-Rowe Access, MD-Montevideo Downstream, MU-Montevideo Upstream, CD-Churchill Dam, TB-Twin Bridges, LG-Louisburg Grade, BS-Big Stone, O-Ortonville

2004 Minnesota River Summary
DNR Fisheries Population Assessment



Sport Fish Catch by Reach
Combining Electrofishing, Trapnetting and Trotlining
(*number, rate and largest fish*)

	Reach 3	Reach 2	Reach 1
Black Crappie	309 2/hour 11 inches	7 >1/hour 9 inches	6 2/hour 10 inches
Bluegill	65 19/hour 9 inches	14 1/hour 6.5 inches	1 >1/hour 5 inches
Channel Catfish	267 22/hour 27 inches	176 14/hour 33 inches	13 10/hour 29 inches
Flathead Catfish	0	428 28/hour 49 inches	77 6/hour 45 inches
Northern Pike	28 1/hour 36 inches	1 >1/hour 27 inches	0
Sauger	0	23 3/hour 19 inches	6 10/hour 20 inches
Walleye	63 6/hour 28 inches	27 4/hour 29 inches	3 5/hour 13 inches
White Bass	136 19/hour 15 inches	16 2/hour 16 inches	19 26/hour 13 inches

2004 Minnesota River Summary
DNR Fisheries Population Assessment

Fish Community Sampling by Reach
Index of Biological Integrity (IBI) Scores from Electrofishing
(site and score)

The catch is scored based factors such as the number and type of species, feeding and reproductive behavior, tolerance to turbid or polluted water, several age groups, and deformities. A healthy fish community means a healthy river.

Reach 3	Reach 2	Reach 1
Granite Falls Memorial Park 26	Hwy 101 38	Interstate 35 36
Rowe Access 34	Carver Rapids 38	
Montevideo Downstream 28	Hwy 169 34	
Montevideo Upstream 26	Seven Mile Creek 36	
Twin Bridges 24	Mankato 30	
Louisburg Grade 28	Judson 32	
Big Stone 26	Redwood Falls 40	
	North Redwood Access 34	
	Hazel Creek 28	
Average Reach Score 27.4	Average Reach Score 34.4	Average Reach Score 36.0

Scores	Classification	Explanation
50 - 60	Excellent	minimal human impacts comparable to natural, pre-settlement conditions
40 - 49	Good	
30 - 39	Fair	
20 - 29	Poor	
12 - 20	Very Poor	
0 - 11	No Fish	severe human impacts comparable to worst conditions of erosion, pollution or unstable flows