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Completion Report

Angler Creel Survey of a 110 Mile Segment of the Minnesota River
1 May 1998 - 31 October 1998

by
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Abstract

A stratified-random creel survey was conducted on 110.5 miles of the Minnesota River between 1 May and 31 October 1998. The total estimated angling pressure was 49,311 hours (448 hours/mile). Species most sought were channel catfish *Ictalurus punctatus* and flathead catfish *Pylodictis olivaris*. The most frequently caught fish of 19 species were channel catfish, common carp *Cyprinus carpio* and freshwater drum *Aplodinotus grunniens*. While most fish were released (69%), an estimated 53 pounds of fish/mile were harvested. Channel catfish were harvested at an estimated rate of 25 fish/mile and flathead catfish at 6 fish/mile. An estimated \$15,807 was spent by anglers at an average of \$18.00/trip for residents and \$82.00/trip for non-residents. Mean angler satisfaction with number and size of fish caught was low ≤ 3 on a 1 (low) to 10 (high) scale.

Introduction

The Minnesota River is one of the most important aquatic resources in the southern part of the state, providing among other things a notable sport fishery for trophy flathead catfish *Pylodictis olivaris*. It is considered highly polluted, but numerous organizations have focused on watershed efforts to improve water quality. Fish populations and communities can reflect changes in water quality; therefore, regular surveys and assessments should be conducted to document improvements. The primary objective of this creel survey was to estimate base-line rates of angling pressure, catch and harvest during daylight hours for an angling season on the river. Secondary objectives included collecting information on the economic value of the fisheries resources, angler demographics and angler satisfaction.

Study Area

The Minnesota River begins at the outlet of Big Stone Lake and meanders through an oversized valley excavated by Glacial River Warren (Ojakangas and Matsch 1982). The 44,000 km² watershed lies primary in Minnesota (88%) within the Northern Glaciated Plains, Western Corn Belt Plains and Northern Central Hardwood Forest ecoregions (Fandrei et al. 1988). Agriculture is the dominant land use and the loss of wetlands to drainage have impacted the natural hydrology of the river and its tributaries (Quade and Nielsen 1993). The study segment was somewhat larger than the Hutchinson management area extending from the confluence of the Cottonwood River RM 144.0 to Minnesota Falls at river mile (RM) 254.5.

Methods

A stratified-random creel survey with uniform probabilities was conducted between 1 May and 31 October 1998 on 110.5 miles of the Minnesota River between the Cottonwood River and Minnesota Falls. Stratification was by calendar month, day type (weekday vs. weekend and holiday) and river sector. Three repetitions of each day type-river sector-day period combination were randomly selected each month. Surveys were conducted only during daylight for safety.

The study segment was divided into four sectors based on availability of public access and round-trip motoring distance (Table 1; Kirsch et al. 1985). Start location and interview/count direction were randomly selected within each sector. Shifts were 10 hours in length with one hour at the beginning and end of the shift for preparation and transportation (Table 2). Day length permitted two shifts from May through August, but only one in September and October that began nine hours prior to sunset.

The survey was initially conducted by boat because of the prevalence of shore fishing and scattered private access. It was suspended in August when low flows made the river unnavigable. August data; therefore, was not included in analysis. A land-based design was implemented in September and October based on sites previously identified by boat. Strata and interview/count protocols remained the same.

Interviews and counts were progressive. Data collected included angler type, species of fish sought and caught, number of fish caught and released, lengths of fish, trip start time, number in party, distance traveled, age, gender, trip expenses, and trip satisfaction. Angler estimates of lengths of released fish were recorded. Angler trip satisfaction was determined by responses to

the following: “Based on the number and size of fish you caught today, please rate your fishing satisfaction from 1 (low) to 10 (high)”. Counts of non-angling water activity were also recorded.

Only interviews from anglers that had fished at least 30 minutes were used to estimate catch (GenCreel Version 2, Bindman 1997) and angler satisfaction (Excel 2000). Angler ages, distances traveled and expenses per trip were analyzed with Excel 2000 for all interviews. Standard error estimates that were incalculable by GenCreel are presented as dashes.

Results and Discussion

A total of 578 interviews were conducted of which 424 interviews had fished for at least 30 minutes (Table 2). Completed trips accounted for only 19% of total trips analyzed. Angling constituted the majority of recreational use on the river at 95% of total estimated user-hours (Table 3). Other uses were canoeing, pleasure boating, tubing, and wading.

Angling Pressure

The total estimated angling pressure was 49,311 hours or 448 angler-hours per mile (Table 4). Shore angling constituted a much larger segment of anglers on the Minnesota River at 77% of total estimated hours. This supports the need for increased public access areas for shore angling that has been suggested frequently by anglers.

Catch

Fish sought or caught are listed in Table 5. Anglers identified 9 species of fish sought (Table 6). Catfish, either individual species or combined, were identified 72% of the time.

Anglers caught 19 species of which the most frequently caught were channel catfish *Ictalurus punctatus*, common carp *Cyprinus carpio* and freshwater drum *Aplodinotus grunniens* (Table 7). Most fish were released (69%), but almost all sauger *Stizostedion canadense* (91.8%) were harvested. An estimated total of 5,853 fish weighing approximately 19,119 pounds were harvested during the survey (Tables 7-8). This was an estimated average of 53 fish/mile at 174 pounds/mile. Channel catfish were harvested at an estimated rate of 25 fish/mile (67 pounds/mile). Flathead catfish were harvested at an estimated rate of 6 fish/mile (61 pounds/mile). No anglers had caught a limit of fish by the time they were interviewed.

Length frequencies of fish caught are presented in Table 9. Monthly estimates of number and pounds of fish caught, harvested and released are presented in appendices 1-10. Boat and shore angler estimates of number and pounds of fish caught, harvested and released are presented in appendices 11-14.

Angler Demographics, Expenses and Mileage

Male anglers comprised 85% and females anglers 15% of the 1421 total. The largest age group was 35 - 44 years at 26 % (Table 10). Residents drove an average of 25 miles to access the river and spent an average of \$18.00 per trip or \$0.74/mile (Table 11). Non-residents drove an average of 290 miles and spent an average of \$82.00 per trip or \$0.28 per mile. A total of \$15,807 was spent on trips to the river by anglers. Angler satisfaction with number and size of fish caught was low from 3.1 in July to 1.5 in October on a 1 (low) to 10 (high) scale (Table 12).

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Table 1. Selected descriptive characteristics of sectors for the 1998 Minnesota River creel survey.

DOW number		M55			
Ecological Classification		Class IIE (warmwater gamefish, cosmopolitan)			
Sector	1	2	3	4	
River Miles	144-171	171-198.5	198.5-230.5	230.5-254.5	
Distance (miles)	27	27.5	32	24	
Number of Public Accesses	4	4	2	5	

Table 2. Strata summary statistics for the 1998 Minnesota River creel survey.

	May	June	July	September	October	Total
Dates of Stratum	1-31 May	1-30 June	1-31 July	1-30 Sep	1-31 Oct	NA
Times of Day Shift	0500-1400	0500-1400	0500-1400	1100-2100 (1 st -15 th) 1030-2030 (16 th -29 th) 1000-2000 (30 th)	1000-2000 (1 st -13 th) 0930-1930 (14 th -24 th) 0800-1800 (25 th -31 st)	NA
Times of Evening Shift (May-July)	1200-2200	1200-2200	1200-2200	NA	NA	NA
Number of Weekday Day Shifts	12	12	12	12	12	60
Number of Weekend/Holiday Day Shifts	12	12	12	12	12	60
Number of Weekday Evening Shifts	12	12	12	NA	NA	36
Number of Weekend/Holiday Evening Shifts	11	11	11	NA	NA	33
Number of Boat Interviews (>30minutes)	38	25	43	3	0	109
Number of Boat Anglers	91	68	110	8	NA	277
Average Number of Anglers/Boat	2.0	2.4	2.5	2.7	NA	2.3
Number of Shore Interviews (>30minutes)	72	80	122	34	7	315
Number of Shore Anglers	178	232	277	92	12	791
Average Number of Anglers/Party	2.0	3.1	2.2	2.4	1.5	2.3
Number of Completed Trips (% of Monthly Total)	10 (9.2%)	5 (4.8%)	10 (6.1%)	9 (24.3%)	1 (14.3%)	35 (18.5%)
Average Length of Completed Boat Trip (h)	11.4 (—)	7.4 (—)	9.8 (—)	3.9 (—)	0.0 (—)	9.5 (—)
Average Length of Completed Shore Trip (h)	2.2 (—)	2.0 (—)	3.9 (—)	2.1 (—)	0.7 (0.0)	2.3 (—)
Average Length of All Completed Trips (h)	6.8 (—)	3.4 (—)	7.7 (—)	2.3 (—)	0.7 (0.0)	5.0 (—)

Table 3. Recreational water surface activity user-hours and user-hours/mile for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Activity	May	June	July	September	October	Total
User-Hours						
Canoes/Rowboats	82.0 (71.6)	360.8 (169.0)	309.8 (141.4)	0.0 (—)	33.0 (33.0)	785.6 (234.1)
Pontoons	0.0 (—)	31.9 (31.9)	12.8 (16.3)	0.0 (—)	0.0 (—)	44.7 (35.8)
Runabouts	320.5 (193.7)	31.9 (31.9)	0.0 (—)	0.0 (—)	0.0 (—)	352.5 (196.3)
Other ¹	421.0 (254.8)	181.0 (122.8)	652.0 (300.1)	0.0 (—)	0.0 (—)	1,253.9 (412.4)
Total Non-Angling	823.5 (431.4)	605.7 (247.6)	974.5 (331.4)	0.0 (—)	33.0 (33.0)	2,436.6 (599.2)
Total Angling	13,370.5 (2,210.6)	13,488.2 (2,149.1)	15,678.1 (1,761.8)	5,412.0 (1,132.7)	1,362.2 (412.5)	49,311.0 (3,750.0)
Total Use	14,194.0 (2,478.2)	14,093.8 (2,208.3)	16,652.6 (1,790.3)	5,412.0 (1,132.7)	1,395.2 (421.6)	51,747.6 (3,960.4)
Angling Percentage of Total Use	94.2%	95.7%	94.2%	100.0%	97.6%	95.3%
User-Hours/Mile						
Canoes/Rowboats	0.8 (0.7)	3.3 (1.5)	2.8 (1.3)	0.0 (—)	0.3 (0.3)	7.1 (2.1)
Pontoons	0.0 (—)	0.3 (0.3)	0.1 (0.2)	0.0 (—)	0.0 (—)	0.4 (0.3)
Runabouts	2.9 (1.8)	0.3 (0.3)	0.0 (—)	0.0 (—)	0.0 (—)	3.2 (1.8)
Other ¹	3.8 (2.3)	1.7 (1.1)	5.9 (2.7)	0.0 (—)	0.0 (—)	11.4 (3.8)
Total Non-Angling	7.5 (3.9)	5.5 (2.3)	8.9 (3.0)	0.0 (—)	0.3 (0.3)	22.2 (5.5)
Total Angling	121.6 (20.1)	122.6 (19.5)	142.5 (16.0)	49.2 (10.3)	12.4 (3.8)	448.3 (34.1)
Total Use	129.0 (22.5)	128.1 (20.1)	151.4 (16.3)	49.2 (10.3)	12.7 (3.8)	470.4 (36.0)

¹ airboats, tubing, and wading

Table 4. Estimated total angler hours and angler hours per mile for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Angler Type	May	June	July	September	October	Total
	Angler-Hours					
Boat	4,274.4 (1,129.2)	2,498.9 (550.4)	4,124.1 (818.0)	264.0 (264.0)	0.0 (0.0)	11,161.4 (1,522.1)
Shore	9,096.1 (1,585.5)	10,989.3 (2,132.8)	11,554.0 (1,344.3)	5,148.0 (1,101.5)	1,362.2 (412.5)	38,149.6 (3,202.1)
All	13,370.5 (2,210.6)	13,488.2 (2,149.1)	15,678.1 (1,761.8)	5,412.0 (1,132.7)	1,362.2 (412.5)	49,311.0 (3,750.0)
	Angler-Hours/Mile					
Boat	38.9 (10.3)	22.7 (5.0)	37.5 (7.4)	2.4 (2.4)	0.0 (—)	101.5 (13.8)
Shore	82.7 (14.4)	99.9 (19.4)	105.0 (12.2)	46.8 (10.0)	12.4 (3.8)	346.8 (29.1)
All	121.6 (20.1)	122.6 (19.5)	142.5 (16.0)	49.2 (10.3)	12.4 (3.8)	448.3 (34.1)

Table 5. Fish species sought or caught during the 1998 Minnesota River creel survey.

Species		sought (s) / caught (c)
bigmouth buffalo	<i>Ictiobus cyprinellus</i>	c
black bullhead	<i>Ameiurus melas</i>	c
bluegill	<i>Lepomis macrochirus</i>	c
blue sucker	<i>Cycleptus elongatus</i>	c
brown bullhead	<i>Ameiurus nebulosus</i>	c
common carp	<i>Cyprinus carpio</i>	s/c
channel catfish	<i>Ictalurus punctatus</i>	s/c
flathead catfish	<i>Pylodictis olivaris</i>	s/c
freshwater drum	<i>Aplodinotus grunniens</i>	s/c
goldeye	<i>Hiodon alosoides</i>	c
largemouth bass	<i>Micropterus salmoides</i>	c
mooneye	<i>Hiodon tergisus</i>	c
northern pike	<i>Esox lucius</i>	s/c
sauger	<i>Stizostedion canadense</i>	c
shorthead redhorse	<i>Moxostoma macrolepidotum</i>	c
shovelnose sturgeon	<i>Scaphirhynchus platyrhynchus</i>	c
shortnose gar	<i>Lepisosteus platostomus</i>	s/c
smallmouth bass	<i>Micropterus dolomieu</i>	c
walleye	<i>Stizostedion vitreum</i>	s/c
white bass	<i>Morone chrysops</i>	c
white sucker	<i>Catostomus commersoni</i>	c

Table 6. Fish species sought by party and angler during the 1998 Minnesota River creel survey.

Species	Number of Parties (%)	Number of Anglers (%)
anything	53 (12.5)	157 (14.7)
shortnose gar	1 (0.2)	1 (0.1)
northern pike	1 (0.2)	1 (0.1)
common carp	4 (0.9)	10 (0.9)
channel catfish	35 (8.3)	85 (7.9)
flathead catfish	34 (8.0)	80 (7.5)
walleye	48 (11.3)	105 (9.8)
northern pike & walleye	11 (2.6)	19 (1.8)
common carp & channel catfish	1 (0.2)	2 (0.2)
common carp & flathead catfish	3 (0.7)	7 (0.7)
common carp & walleye	1 (0.2)	3 (0.3)
common carp & freshwater drum	1 (0.2)	1 (0.1)
channel catfish & flathead catfish	178 (42.0)	452 (42.2)
channel catfish & walleye	25 (5.9)	71 (6.6)
channel catfish & freshwater drum	1 (0.2)	2 (0.2)
flathead catfish & walleye	3 (0.7)	9 (0.8)
largemouth bass & smallmouth bass	1 (0.2)	2 (0.2)
walleye & freshwater drum	1 (0.2)	2 (0.2)
common carp, channel catfish & flathead catfish	2 (0.5)	4 (0.4)
channel catfish, northern pike & walleye	1 (0.2)	1 (0.1)
channel catfish, flathead catfish & walleye	17 (4.0)	46 (4.3)
channel catfish, flathead catfish & freshwater drum	2 (0.5)	10 (0.9)
Total	424 (100%)	1,070 (100%)

Table 7. Estimated total catch, harvest and release number and number per mile by species for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bighorn buffalo	32.6 (42.6)	0.2	0.0 (—)	0.0	32.6 (42.6)	0.3	100.0
black bullhead	238.2 (236.8)	1.3	0.0 (—)	0.0	238.2 (236.8)	1.9	100.0
bluegill	18.6 (12.0)	0.1	0.0 (—)	0.0	18.6 (12.0)	0.1	100.0
blue sucker	20.3 (10.8)	0.1	0.0 (—)	0.0	20.3 (10.8)	0.2	100.0
brown bullhead	59.0 (63.3)	0.3	0.0 (—)	0.0	59.0 (63.3)	0.5	100.0
carp	3,406.0 (—)	18.2	379.5 (—)	6.5	3,026.5 (—)	23.6	88.8
channel catfish	7,229.5 (—)	38.7	2,737.1 (—)	46.8	4,492.4 (—)	35.0	62.1
flathead catfish	1,374.8 (—)	7.4	675.2 (—)	11.5	699.6 (—)	5.5	50.9
freshwater drum	3,386.8 (—)	18.1	855.6 (—)	14.6	2,531.1 (—)	19.7	74.7
goldeye	78.0 (35.4)	0.4	47.3 (22.5)	0.8	30.7 (27.3)	0.2	39.4
mooneye	5.8 (6.5)	<0.1	5.8 (6.5)	0.1	0.0 (—)	0.0	0.0
northern pike	190.5 (—)	1.0	95.1 (—)	1.6	95.4 (—)	0.7	50.1
sauger	215.9 (—)	1.2	198.2 (—)	3.4	17.7 (—)	0.1	8.2
shorthead redhorse	54.4 (52.4)	0.3	0.0 (—)	0.0	54.4 (52.4)	0.4	100.0
shovelnose sturgeon	19.2 (13.2)	0.1	0.0 (—)	0.0	19.2 (13.2)	0.2	100.0
shortnose gar	474.8 (—)	2.5	105.6 (—)	1.8	369.2 (—)	2.9	77.8
walleye	1,719.9 (—)	9.2	688.0 (—)	11.8	1,031.9 (—)	8.0	60.0
white bass	117.5 (—)	0.6	66.1 (—)	1.1	51.4 (—)	0.4	43.7
white sucker	42.6 (33.3)	0.2	0.0 (—)	0.0	42.6 (33.3)	0.3	100.0
Total	18,684.2 (—)	100.0	5,853.4 (—)	100.0	12,830.8 (—)	100.0	68.7

Table 8. Estimated total catch, harvest and release pounds and pounds per mile by species for 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	162.6 (—)	0.4	0.0 (—)	0.0	162.6 (—)	0.6
black bullhead	26.2 (—)	<0.1	0.0 (—)	0.0	26.2 (—)	0.1
bluegill	11.0 (—)	<0.1	0.0 (—)	0.0	11.0 (—)	<0.1
blue sucker	30.4 (—)	0.1	0.0 (—)	0.0	30.4 (—)	0.1
brown bullhead	3.0 (—)	<0.1	0.0 (—)	0.0	3.0 (—)	<0.1
carp	11,962.7 (—)	26.0	1,641.1 (—)	8.6	10,321.6 (—)	38.5
channel catfish	11,657.4 (—)	25.3	7,412.6 (—)	38.8	4,244.7 (—)	15.9
flathead catfish	13,578.8 (—)	29.5	6,711.2 (—)	35.0	6,712.3 (—)	25.1
freshwater drum	3,646.1 (—)	7.9	767.0 (—)	4.0	2,879.2 (—)	10.8
goldeye	92.6 (46.7)	0.2	74.5 (37.6)	0.4	18.1 (—)	0.1
mooneye	4.9 (—)	<0.1	4.9 (—)	<0.1	0.0 (—)	0.0
northern pike	1,150.1 (—)	2.5	509.0 (—)	2.7	641.1 (—)	2.4
sauger	460.6 (—)	1.0	432.1 (—)	2.3	28.5 (—)	0.1
shorthead redhorse	251.4 (275.0)	0.6	0.0 (—)	0.0	251.4 (—)	0.9
shovelnose sturgeon	34.4 (35.1)	0.1	0.0 (—)	0.0	34.4 (—)	0.1
shortnose gar	513.8 (—)	1.1	197.7 (—)	1.0	316.2 (—)	1.2
walleye	2,322.7 (—)	5.0	1,294.7 (—)	6.8	1,028.0 (—)	3.8
white bass	124.4 (—)	0.3	73.9 (—)	0.4	50.5 (—)	0.2
white sucker	23.3 (19.1)	0.1	0.0 (—)	0.0	23.3 (—)	0.1
Total	46,056.5 (—)	100.0	19,118.7 (—)	100.0	26,782.5 (—)	100.0

Table 9. Length frequency distribution of harvested and released fish for the 1998 Minnesota River creel survey.

Length Inches	Bigmouth Buffalo		Black Bullhead		Bluegill		Blue Sucker		Brown Bullhead	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
4.0 - 4.9										
5.0 - 5.9										1
6.0 - 6.9				13						
7.0 - 7.9										
8.0 - 8.9										
9.0 - 9.9						1				
10.0 - 10.9										
11.0 - 11.9										
12.0 - 12.9										
13.0 - 13.9										
14.0 - 14.9										
15.0 - 15.9										
16.0 - 16.9										
17.0 - 17.9										
18.0 - 18.9								1		
19.0 - 19.9										
20.0 - 20.9		2								
21.0 - 21.9										
22.0 - 22.9										
23.0 - 23.9										
24.0 - 24.9										
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9										
30.0 - 30.9										
31.0 - 31.9										
32.0 - 32.9										
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9										
37.0 - 37.9										
38.0 - 38.9										
39.0 - 39.9										
40.0 and up										
Total	0	2	0	13	0	1	0	1	0	1
Mean Length (in)	—	20.0	—	6.0	—	9.0	—	18.1	—	5.0
STD	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0
Minimum Length (in)	—	20.0	—	6.0	—	9.0	—	18.1	—	5.0
Maximum Length (in)	—	20.0	—	6.0	—	9.0	—	18.1	—	5.0
Mean Weight (lbs)	—	5.0	—	0.1	—	0.6	—	1.5	—	0.1
STD	—	0.0	—	0.0	—	0.0	—	0.0	—	0.0

Table 9 continued.

Length Inches	Common Carp		Channel Catfish		Flathead Catfish		Freshwater Drum		Goldeye	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
4.0 - 4.9				3				2		
5.0 - 5.9		1	1	41				1		
6.0 - 6.9		3	1	25			5	2		
7.0 - 7.9				5				2		
8.0 - 8.9				40		1	2	9		
9.0 - 9.9			2	11				6		
10.0 - 10.9		3	6	24			9	21		
11.0 - 11.9			1	3			6	3		
12.0 - 12.9		6	8	41		1	11	15		2
13.0 - 13.9			7	3			4	13		
14.0 - 14.9		6	11	10			1	27		
15.0 - 15.9	1	9	17	12		10	8	8		
16.0 - 16.9	1	14	13	4	1	1		7	2	
17.0 - 17.9	1	5	9	2			1	1		
18.0 - 18.9	5	32	11	15	2			7	1	
19.0 - 19.9	1	4	9	1	2	1				
20.0 - 20.9	6	18	22	15	5	4	2	3		
21.0 - 21.9		2	13	3	4			2		
22.0 - 22.9	8	8	14	10	8	5		2		
23.0 - 23.9			6	4	1					
24.0 - 24.9	4	16	13	10	11	3				
25.0 - 25.9	1	5	5	3	1	8		1		
26.0 - 26.9		10	5	1	3					
27.0 - 27.9			5	1	2					
28.0 - 28.9	1		1	2	1	3				
29.0 - 29.9			2		1	2				
30.0 - 30.9		2	5	1	3	1				
31.0 - 31.9					1					
32.0 - 32.9			2		2	1				
33.0 - 33.9					3	1				
34.0 - 34.9					3	2				
35.0 - 35.9										
36.0 - 36.9					1	2				
37.0 - 37.9					3					
38.0 - 38.9					2	1				
39.0 - 39.9										
40.0 and up					1	4				
Total	29	144	189	290	61	51	49	132	3	2
Mean Length (in)	20.8	19.0	19.2	12.0	26.5	24.8	12.0	12.9	16.7	12.0
STD	2.9	4.7	5.1	6.1	6.2	8.7	3.2	3.8	0.9	0.0
Minimum Length (in)	15.0	5.0	5.0	4.0	16.0	8.0	6.0	4.0	16.0	12.0
Maximum Length (in)	28.0	30.0	32.5	30.0	44.0	45.0	20.4	25.0	18.0	12.0
Mean Weight (lbs)	4.4	3.7	2.8	1.1	9.6	9.4	1.0	1.3	1.6	0.6
STD	1.7	2.3	2.2	1.5	7.4	10.0	0.8	1.2	0.3	0.0

Table 9 continued.

Length Inches	Mooneye		Northern Pike		Sauger		Shorthead Redhorse		Shovelnose Sturgeon	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
4.0 - 4.9										
5.0 - 5.9										
6.0 - 6.9										
7.0 - 7.9										
8.0 - 8.9										
9.0 - 9.9										
10.0 - 10.9										
11.0 - 11.9										
12.0 - 12.9										
13.0 - 13.9										
14.0 - 14.9					2					
15.0 - 15.9				1				1		
16.0 - 16.9	1				1	1				
17.0 - 17.9						1				
18.0 - 18.9						1				
19.0 - 19.9					1					
20.0 - 20.9				1						
21.0 - 21.9										
22.0 - 22.9			1							
23.0 - 23.9			1					1		
24.0 - 24.9				1						1
25.0 - 25.9										
26.0 - 26.9										
27.0 - 27.9										
28.0 - 28.9										
29.0 - 29.9			1							
30.0 - 30.9										1
31.0 - 31.9			1							
32.0 - 32.9			1							
33.0 - 33.9										
34.0 - 34.9										
35.0 - 35.9										
36.0 - 36.9				1						
37.0 - 37.9										
38.0 - 38.9										
39.0 - 39.9										
40.0 and up										
Total	1	0	5	4	4	2	0	2	0	2
Mean Length (in)	16.0	—	27.8	23.8	16.0	17.0	—	19.3	—	27.0
STD	0.0	—	4.0	7.8	2.3	1.0	—	4.3	—	3.0
Minimum Length (in)	16.0	—	22.7	15.0	14.0	16.0	—	15.0	—	24.0
Maximum Length (in)	16.0	—	32.5	36.0	19.5	18.0	—	23.5	—	30.0
Mean Weight (lbs)	0.9	—	5.1	4.0	1.4	1.6	—	3.2	—	0.9
STD	0.0	—	2.0	3.8	0.6	0.3	—	1.9	—	1.9

Table 9 continued.

Length Inches	Shortnose Gar		Walleye		White Bass		White Sucker	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
4.0 - 4.9				1				
5.0 - 5.9				1				
6.0 - 6.9				5				
7.0 - 7.4				1				
8.0 - 8.9		3				1		
9.0 - 9.9								
10.0 - 10.9			3	10		1		1
11.0 - 11.9				1	1	1		
12.0 - 12.9		5	4	10		2		
13.0 - 13.9			1	4	1			1
14.0 - 14.9		1	6	8	2			
15.0 - 15.9			5	6				
16.0 - 16.9			5	3		1		
17.0 - 17.9			1	1				
18.0 - 18.9			6	1				
19.0 - 19.9			2					
20.0 - 20.9		3						
21.0 - 21.9		1		1				
22.0 - 22.9	2							
23.0 - 23.9	2							
24.0 - 24.9		3						
25.0 - 25.9				1				
26.0 - 26.9	1							
27.0 - 27.9			2					
28.0 - 28.9	1			1				
29.0 - 29.9								
30.0 - 30.9		2						
31.0 - 31.9	1							
32.0 - 32.9								
33.0 - 33.9								
34.0 - 34.9								
35.0 - 35.9								
36.0 - 36.9								
37.0 - 37.9								
38.0 - 38.9								
39.0 - 39.9								
40.0 and up								
Total	7	18	37	55	4	6	0	2
Mean Length (in)	25.2	17.3	16.0	12.5	13.1	11.5	—	11.7
STD	6.4	6.9	3.8	4.4	1.3	2.4	—	1.7
Minimum Length (in)	22.0	8.0	10.0	4.0	11.0	8.0	—	10.0
Maximum Length (in)	31.0	30.0	27.4	28.0	14.5	16.0	—	13.3
Mean Weight (lbs)	2.3	1.0	1.7	1.0	1.1	0.9	—	0.6
STD	1.4	1.0	1.6	1.3	0.3	0.6	—	0.2

Table 10. Angler ages for the 1998 Minnesota River creel survey.

0-15	16 - 24	25 - 34	35 - 44	45 - 54	55 - 64	65 +	Total
49	82	111	138	73	52	29	534
9.2%	15.4%	20.8%	25.8%	13.7%	9.7%	5.4%	100%

Table 11. Resident and non-resident angler expenses and distance traveled for the 1998 Minnesota River creel survey.

	Residents	Non-Residents	Total
Interviews	510 ¹	81 ²	578
Total Anglers	1,237	184	1,421
Mean Number/Party	2.5	2.5	2.5
STD	1.4	0.8	1.3
Mean Expenses/Trip	\$17.96	\$82.06	\$27.35
STD	\$33.47	\$94.04	\$52.46
Mean Miles/Trip	24.5	289.8	62.1
STD	36.7	455.8	203.5
Total Expenses	\$9,161.00	\$6,647.00	\$15,807.00
Expenses/Mile	\$0.74	\$0.28	\$0.44

¹ interviews with residents only

² interviews with non-residents or included residents

Table 12. Angler satisfaction response to the statement “based on the number and size of fish you caught today, please rate your fishing satisfaction from 1 (low) to 10 (high)” for the 1998 Minnesota River creel survey.

	Mean	STD
May	3.0	2.7
June	2.7	2.6
July	3.1	2.8
September	2.0	1.7
October	1.5	1.3
Total	3.1	2.7

Appendix 1. Estimated catch, harvest and release number and number per mile by species for May of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released	
	Number	%	Number	%	Number	%	Number/Mile	Number/Mile
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	—
black bullhead	216.2 (234.2)	3.1	0.0 (—)	0.0	0.0 (—)	4.1	2.0 (2.1)	100.0
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	—
blue sucker	20.3 (10.8)	0.3	0.0 (—)	0.0	0.0 (—)	0.4	0.2 (0.1)	100.0
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	—
carp	1,720.3 (528.7)	24.6	195.1 (101.7)	11.3	1.8 (0.9)	29.0	13.9 (4.7)	88.7
channel catfish	2,224.8 (—)	31.8	627.8 (—)	18.9	5.7 (—)	30.4	14.5 (—)	71.8
flathead catfish	329.5 (—)	4.7	111.8 (—)	6.5	1.0 (—)	4.1	2.0 (—)	66.1
freshwater drum	668.4 (—)	9.6	89.2 (—)	5.2	0.8 (—)	11.0	5.3 (—)	86.7
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	—
mooneye	5.8 (6.5)	0.1	5.8 (6.5)	0.3	0.1 (0.1)	0.0	0.0 (—)	0.0
northern pike	156.2 (70.1)	2.2	87.6 (54.8)	5.1	0.8 (0.5)	1.3	0.6 (0.4)	43.9
sauger	24.5 (13.7)	0.4	24.5 (13.7)	1.4	0.2 (0.1)	0.0	0.0 (—)	0.0
shorthead redhorse	54.4 (52.4)	0.8	0.0 (—)	0.0	0.0 (—)	1.0	0.5 (0.5)	100.0
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	—
shortnose gar	22.6 (—)	0.3	0.0 (—)	0.0	0.0 (—)	0.4	0.2 (—)	100.0
walleye	1,422.4 (545.6)	20.4	524.6 (205.3)	30.3	4.8 (1.9)	17.1	8.2 (3.5)	63.1
white bass	79.4 (31.8)	1.1	66.1 (26.2)	3.8	0.6 (0.2)	0.3	0.1 (0.1)	16.8
white sucker	42.6 (33.3)	0.6	0.0 (—)	0.0	0.0 (—)	0.8	0.4 (0.3)	100.0
Total	6,987.4 (—)	100.0	1,732.4 (—)	100.0	15.8 (—)	100.0	47.8 (—)	75.2

Appendix 2. Estimated catch, harvest and release number and number per mile by species for June of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
carp	593.0 (—)	18.8	40.2 (—)	4.4	552.9 (—)	24.6	93.2
channel catfish	961.0 (—)	30.4	455.5 (—)	50.0	505.6 (—)	22.5	52.6
flathead catfish	224.1 (—)	7.1	144.6 (—)	15.9	79.5 (—)	3.5	35.5
freshwater drum	1,216.0 (—)	38.5	218.6 (—)	24.0	997.5 (—)	44.4	82.0
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
northern pike	17.9 (11.7)	0.6	7.4 (5.0)	0.8	10.5 (10.5)	0.5	58.7
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shovelnose sturgeon	10.5 (10.5)	0.3	0.0 (—)	0.0	10.5 (10.5)	0.5	100.0
shortnose gar	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
walleye	115.3 (—)	3.7	45.7 (—)	5.0	69.7 (—)	3.1	60.5
white bass	20.3 (—)	0.6	0.0 (—)	0.0	20.3 (—)	0.9	100.0
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
Total	3,158.3 (—)	100.0	911.8 (—)	100.0	2,246.4 (—)	100.0	71.1

Appendix 3. Estimated catch, harvest and release number and number per mile by species for July of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	32.6 (42.6)	0.5	0.0 (—)	0.0	32.6 (42.6)	0.8	100.0
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
brown bullhead	59.0 (63.3)	0.9	0.0 (—)	0.0	59.0 (63.3)	1.5	100.0
carp	562.6 (242.6)	8.9	41.6 (22.5)	1.7	521.0 (239.3)	13.3	92.6
channel catfish	3,087.5 (—)	48.9	1,270.9 (—)	53.2	1,816.6 (—)	46.3	58.8
flathead catfish	821.2 (—)	13.0	418.8 (—)	17.5	402.4 (—)	10.3	49.0
freshwater drum	1,009.8 (371.4)	16.0	394.0 (211.8)	16.5	615.9 (298.2)	15.7	61.0
goldeye	63.3 (33.9)	1.0	32.6 (20.2)	1.4	30.7 (27.3)	0.8	48.5
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
northern pike	16.3 (21.3)	0.3	0.0 (—)	0.0	16.3 (21.3)	0.4	100.0
sauger	26.4 (22.9)	0.4	8.7 (8.2)	0.4	17.7 (21.4)	0.5	67.1
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shovelnose sturgeon	8.7 (8.0)	0.1	0.0 (—)	0.0	8.7 (8.0)	0.2	100.0
shorthose gar	430.2 (300.5)	6.8	105.6 (78.6)	4.4	324.6 (227.9)	8.3	75.5
walleye	182.1 (149.5)	2.9	117.8 (146.2)	4.9	64.3 (48.1)	1.6	35.3
white bass	17.7 (21.4)	0.3	0.0 (—)	0.0	17.7 (21.4)	0.5	100.0
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
Total	6,317.5 (—)	100.0	2,389.9 (—)	100.0	3,927.6 (—)	100.0	62.2

Appendix 4. Estimated catch, harvest and release number and number per mile by species for September of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
black bullhead	22.0 (35.1)	1.2	0.0 (—)	0.0	22.0 (35.1)	1.8	100.0
bluegill	18.6 (12.0)	1.0	0.0 (—)	0.0	18.6 (12.0)	1.6	100.0
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
carp	332.0 (139.6)	18.2	102.6 (132.6)	16.6	229.4 (43.6)	19.1	69.1
channel catfish	920.7 (—)	50.5	347.4 (—)	56.2	573.2 (—)	47.6	62.3
flathead catfish	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
freshwater drum	492.5 (—)	27.0	153.9 (—)	24.9	338.5 (—)	28.1	68.7
goldeye	14.7 (10.0)	0.8	14.7 (10.0)	2.4	0.0 (—)	0.0	0.0
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
northern pike	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shortnose gar	22.0 (34.0)	1.2	0.0 (—)	0.0	22.0 (34.0)	1.8	100.0
walleye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
white bass	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
Total	1,822.5 (—)	100.0	618.7 (—)	100.0	1,203.8 (—)	100.0	66.1

Appendix 5. Estimated catch, harvest and release number and number per mile by species for October of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
carp	198.0 (—)	49.7	0.0 (—)	0.0	198.0 (—)	100.0	100.0
channel catfish	35.5 (—)	8.9	35.5 (—)	17.7	0.0 (—)	0.0	0.0
flathead catfish	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
freshwater drum	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
northern pike	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
sauger	165.0 (—)	41.4	165.0 (—)	82.3	0.0 (—)	0.0	0.0
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shortnose gar	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
walleye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
white bass	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
Total	398.5 (—)	100.0	200.5 (—)	100.0	198.0 (—)	100.0	49.7

Appendix 6. Estimated catch, harvest and release pounds and pounds per mile by species for May of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
black bullhead	23.8 (—)	0.1	0.0 (—)	0.0	23.8 (—)	0.2
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
blue sucker	30.4 (—)	0.2	0.0 (—)	0.0	30.4 (—)	0.3
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
carp	4,976.4 (2,040.4)	29.9	634.9 (582.9)	9.6	4,341.5 (1,919.6)	43.4
channel catfish	3,810.5 (—)	22.9	2,230.8 (—)	33.7	1,579.7 (—)	15.8
flathead catfish	3,844.2 (—)	23.1	2,108.7 (—)	31.8	1,735.4 (—)	17.3
freshwater drum	676.3 (—)	4.1	75.8 (—)	1.1	600.5 (—)	6.0
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
mooneye	4.9 (—)	<0.1	4.9 (—)	0.1	0.0 (—)	0.0
northern pike	1,087.8 (777.0)	6.5	490.1 (611.1)	7.4	597.7 (493.4)	6.0
sauger	21.8 (12.2)	0.1	21.8 (12.2)	0.3	0.0 (—)	0.0
shorthead redhorse	251.4 (275.0)	1.5	0.0 (—)	0.0	251.4 (275.0)	2.5
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shortnose gar	40.8 (—)	0.3	0.0 (—)	0.0	40.8 (—)	0.4
walleye	1,742.8 (—)	10.5	983.0 (771.8)	14.8	759.9 (704.2)	7.6
white bass	100.9 (51.0)	0.6	73.9 (32.5)	1.1	27.0 (22.5)	0.3
white sucker	23.3 (19.1)	0.1	0.0 (—)	0.0	23.3 (19.1)	0.2
Total	16,635.4 (—)	100.0	6,624.0 (—)	100.0	10,011.4 (—)	100.0

Appendix 7. Estimated catch, harvest and release pounds and pounds per mile by species for June of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
carp	2,193.7 (—)	31.0	215.0 (—)	8.3	1,978.6 (—)	44.0
channel catfish	1,491.2 (—)	21.1	970.7 (—)	37.6	520.5 (—)	11.6
flathead catfish	1,937.9 (—)	27.4	1,147.8 (—)	44.5	790.1 (—)	17.6
freshwater drum	1,223.0 (—)	17.3	127.3 (—)	4.9	1,095.6 (—)	24.4
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
northern pike	50.6 (51.5)	0.7	18.9 (19.7)	0.7	31.7 (51.7)	0.7
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shovelnose sturgeon	12.6 (23.7)	0.2	0.0 (—)	0.0	12.6 (23.7)	0.3
shortnose gar	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
walleye	154.4 (—)	2.2	101.3 (—)	3.9	53.0 (—)	1.2
white bass	10.3 (—)	0.2	0.0 (—)	0.0	10.3 (—)	0.2
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
Total	7,073.6 (—)	100.0	2,581.1 (—)	100.0	4,492.5 (—)	100.0

Appendix 8. Estimated catch, harvest and release pounds and pounds per mile by species for July of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	162.6 (—)	0.9	0.0 (—)	0.0	162.6 (—)	1.6
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
brown bullhead	3.0 (—)	<0.1	0.0 (—)	0.0	3.0 (—)	<0.1
carp	2,901.5 (—)	16.0	221.6 (131.2)	2.8	2,679.9 (2,314.5)	26.2
channel catfish	5,278.9 (—)	29.0	3,360.7 (—)	43.0	1,918.2 (—)	18.8
flathead catfish	7,796.8 (—)	42.9	3,454.7 (—)	44.2	4,186.8 (—)	41.0
freshwater drum	1,015.4 (—)	5.6	307.2 (—)	3.9	708.1 (—)	6.9
goldeye	72.4 (43.9)	0.4	54.3 (34.7)	0.7	18.1 (—)	0.2
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
northern pike	11.7 (51.1)	0.1	0.0 (—)	0.0	11.7 (65.1)	0.1
sauger	41.2 (37.9)	0.2	12.7 (13.1)	0.2	28.5 (34.8)	0.3
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shovelnose sturgeon	21.8 (26.0)	0.1	0.0 (—)	0.0	21.8 (26.0)	0.2
shortnose gar	451.2 (350.5)	2.5	197.7 (230.1)	2.5	253.6 (195.5)	2.5
walleye	425.5 (302.9)	2.3	210.4 (308.2)	2.7	215.1 (190.9)	2.1
white bass	13.2 (18.3)	0.1	0.0 (—)	0.0	13.2 (18.9)	0.1
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
Total	18,195.1 (—)	100.0	7,819.2 (—)	100.0	10,220.7 (—)	100.0

Appendix 9. Estimated catch, harvest and release pounds and pounds per mile by species for September of the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
black bullhead	2.4 (—)	0.1	0.0 (—)	0.0	2.4 (—)	0.1
bluegill	11.0 (—)	0.3	0.0 (—)	0.0	11.0 (—)	0.5
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
carp	1,867.4 (—)	50.5	569.6 (2,232.4)	34.3	1,297.8 (—)	63.8
channel catfish	1,042.0 (—)	28.2	815.6 (—)	49.1	226.3 (—)	11.1
flathead catfish	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
freshwater drum	731.5 (—)	19.8	256.6 (—)	15.4	474.9 (—)	23.3
goldeye	20.2 (15.8)	0.6	20.2 (15.8)	1.2	0.0 (—)	0.0
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
northern pike	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shorthead redhorse	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shortnose gar	21.8 (43.4)	0.6	0.0 (—)	0.0	21.8 (43.4)	1.1
walleye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
white bass	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
Total	3,696.3 (—)	100.0	1,662.0 (—)	100.0	2,034.3 (—)	100.0

Appendix 11. Estimated catch, harvest and release number and number per mile by species for boat anglers for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
carp	633.7 (—)	16.1	23.5 (—)	1.4	610.3 (—)	26.6	96.3
channel catfish	1,821.8 (—)	46.4	1,006.7 (—)	61.7	815.1 (—)	35.5	44.7
flathead catfish	683.2 (—)	17.4	375.8 (—)	23.0	307.3 (—)	13.4	45.0
freshwater drum	133.1 (—)	3.4	18.0 (—)	1.1	115.0 (—)	5.0	86.4
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
mooneye	5.8 (6.5)	0.2	5.8 (6.5)	0.4	0.0 (—)	0.0	0.0
northern pike	13.3 (10.4)	0.3	0.0 (—)	0.0	13.3 (10.4)	0.6	100.0
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shorthead redhorse	5.5 (7.7)	0.1	0.0 (—)	0.0	5.5 (7.7)	0.2	100.0
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
shortnose gar	64.7 (—)	1.7	0.0 (—)	0.0	64.7 (—)	2.8	100.0
walleye	527.0 (—)	13.4	187.6 (—)	11.5	339.3 (—)	14.8	64.4
white bass	39.5 (—)	1.0	13.3 (—)	0.8	26.2 (—)	1.1	66.3
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
Total	3,927.6 (—)	100.0	1,630.8 (—)	100.0	2,296.8 (—)	100.0	8.5

Appendix 12. Estimated angling catch, harvest and release number and number per mile by species for shore anglers for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release		% of Fish Released
	Number	%	Number	%	Number	%	
bigmouth buffalo	32.6 (42.6)	0.2	0.0 (—)	0.0	32.6 (42.6)	0.3	100.0
black bullhead	238.2 (236.8)	1.6	0.0 (—)	0.0	238.2 (236.8)	2.3	100.0
bluegill	18.6 (12.0)	0.1	0.0 (—)	0.0	18.6 (12.0)	0.2	100.0
blue sucker	20.3 (10.8)	0.1	0.0 (—)	0.0	20.3 (10.8)	0.2	100.0
brown bullhead	59.0 (63.3)	0.4	0.0 (—)	0.0	59.0 (63.3)	0.6	100.0
carp	2,772.3 (—)	18.8	356.0 (—)	8.4	2,416.3 (—)	22.9	87.2
channel catfish	5,407.7 (—)	36.7	1,730.4 (—)	41.0	3,677.4 (—)	34.9	68.0
flathead catfish	691.6 (—)	4.7	299.4 (—)	7.1	392.3 (—)	3.7	56.7
freshwater drum	3,253.7 (—)	22.1	837.6 (—)	19.8	2,416.1 (—)	22.9	74.3
goldeye	78.0 (35.4)	0.5	47.3 (22.5)	1.1	30.7 (27.3)	0.3	39.4
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0	—
northern pike	177.1 (—)	1.2	95.1 (—)	2.3	82.1 (—)	0.8	46.4
sauger	215.9 (—)	1.5	198.2 (—)	4.7	17.7 (—)	0.2	8.2
shorthead redhorse	48.8 (51.8)	0.3	0.0 (—)	0.0	48.8 (51.8)	0.5	100.0
shovelnose sturgeon	19.2 (13.2)	0.1	0.0 (—)	0.0	19.2 (13.2)	0.2	100.0
shortnose gar	410.0 (301.8)	2.8	105.6 (78.6)	2.5	304.5 (229.6)	2.9	74.3
walleye	1,192.9 (—)	8.1	500.4 (—)	11.8	692.5 (—)	6.6	58.1
white bass	77.9 (33.8)	0.5	52.8 (24.0)	1.3	25.1 (23.8)	0.2	32.2
white sucker	42.6 (33.3)	0.3	0.0 (—)	0.0	42.6 (33.3)	0.4	100.0
Total	14,756.6 (—)	100.0	4,222.6 (—)	100.0	10,534.0 (—)	100.0	71.4

Appendix 13. Estimated catch, harvest and release pounds and pounds per mile by species for boat anglers for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
black bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
bluegill	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
blue sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
brown bullhead	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
carp	2,387.1 (—)	16.1	107.4 (—)	1.6	2,279.6 (—)	29.3
channel catfish	4,553.2 (—)	30.7	3,132.1 (—)	45.3	1,421.1 (—)	18.3
flathead catfish	6,661.3 (—)	44.9	3,434.6 (—)	49.6	3,071.3 (—)	39.5
freshwater drum	213.4 (—)	1.4	14.0 (—)	0.2	199.5 (—)	2.6
goldeye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
mooneye	4.9 (—)	<0.1	4.9 (—)	0.1	0.0 (—)	0.0
northern pike	23.2 (43.7)	0.2	0.0 (—)	0.0	23.2 (43.7)	0.3
sauger	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shorthead redhorse	7.2 (14.4)	0.1	0.0 (—)	0.0	7.2 (14.4)	0.1
shovelnose sturgeon	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
shortnose gar	189.5 (—)	1.3	0.0 (—)	0.0	189.5 (—)	2.4
walleye	757.2 (—)	5.1	206.4 (—)	3.0	550.8 (—)	7.1
white bass	55.6 (—)	0.4	20.1 (—)	0.3	35.5 (—)	0.5
white sucker	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
Total	14,852.6 (—)	100.0	6,919.6 (—)	100.0	7,777.7 (—)	100.0

Appendix 14. Estimated catch, harvest and release pounds and pounds per mile by species for shore anglers for the 1998 Minnesota River creel survey. Standard errors are presented in parentheses.

Species	Catch		Harvest		Release	
	Pounds	%	Pounds	%	Pounds	%
bigmouth buffalo	162.6 (—)	0.5	0.0 (—)	0.0	162.6 (—)	0.9
black bullhead	26.2 (—)	0.1	0.0 (—)	0.0	26.2 (—)	0.1
bluegill	11.0 (—)	<0.1	0.0 (—)	0.0	11.0 (—)	0.1
blue sucker	30.4 (—)	0.1	0.0 (—)	0.0	30.4 (—)	0.2
brown bullhead	3.0 (—)	<0.1	0.0 (—)	0.0	3.0 (—)	<0.1
carp	9,575.7 (—)	30.7	1,533.7 (—)	12.6	8,042.0 (—)	42.2
channel catfish	7,104.2 (—)	22.8	4,280.6 (—)	35.1	2,823.6 (—)	14.9
flathead catfish	6,917.5 (—)	22.2	3,276.6 (—)	26.9	3,641.0 (—)	19.2
freshwater drum	3,432.7 (—)	11.0	753.0 (—)	6.2	2,679.7 (—)	14.1
goldeye	92.6 (46.7)	0.3	74.5 (37.6)	0.6	18.1 (—)	0.1
mooneye	0.0 (—)	0.0	0.0 (—)	0.0	0.0 (—)	0.0
northern pike	1,127.0 (—)	3.6	509.0 (—)	4.2	617.9 (—)	3.3
sauger	460.6 (—)	1.5	432.1 (—)	3.5	28.5 (—)	0.2
shorthead redhorse	244.1 (274.6)	0.8	0.0 (—)	0.0	244.1 (274.6)	1.3
shovelnose sturgeon	34.4 (35.1)	0.1	0.0 (—)	0.0	34.4 (35.1)	0.2
shortnose gar	324.4 (342.8)	1.0	197.7 (230.1)	1.6	126.7 (182.2)	0.7
walleye	1,565.5 (—)	5.0	1,088.3 (—)	8.9	477.2 (—)	2.5
white bass	68.7 (37.7)	0.2	53.8 (28.1)	0.4	15.0 (19.5)	0.1
white sucker	23.3 (19.1)	0.1	0.0 (—)	0.0	23.3 (19.1)	0.1
Total	31,203.9 (—)	100.0	12,199.2 (—)	100.0	19,004.8 (—)	100.0

Minnesota
F29-R(P)-18
Area 410
Job 466
8 May 2001

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISHERIES

Completion Report

Angler Creel Survey of a 110 Mile Segment of the Minnesota River
1 May 1998 - 31 October 1998

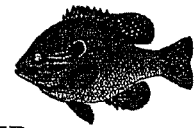
by
Bobbi Chapman
Fisheries Specialist
Hutchinson, Minnesota

Approved by: _____ Date: _____
(Area Fisheries Supervisor)

Approved by: _____ Date: _____
(Regional Fisheries Manager)



MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISHERIES
CREEL SURVEY HARVEST SUMMARY FOR MINNESOTA RIVER



DOW number: M55	Ecological Class: IIE, cosmopolitan	Fish Management Area: Hutchinson	Miles: 110.5	Year Surveyed: 1998
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	MAY	JUNE	JULY	SEPTEMBER	OCTOBER	TOTAL
Angler-Hours	13,370.50	13,488.20	15,678.10	5,412.00	1,362.20	4,9311.00
Angler-Hours per Mile	121.55	122.62	142.53	49.20	12.38	448.28
Ave. Party Size	1.97	2.87	2.30	2.47	1.46	2.26
Ave. Trip Length (h)	6.84	3.44	7.70	2.34	0.67	4.95

Harvest by Species for All Anglers:	MAY		JUNE		JULY		SEPTEMBER		OCTOBER		TOTAL	
	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds	Number	Pounds
carp	195.1	634.9	40.2	215.0	41.6	221.6	102.6	569.6	0.0	0.0	379.5	1,641.1
channel catfish	627.8	2,230.8	455.5	970.7	1,270.9	3,360.7	347.4	815.6	35.5	34.8	2,737.1	7,412.6
flathead catfish	111.8	2,108.7	144.6	1,147.8	418.8	3,454.7	0.0	0.0	0.0	0.0	675.2	6,711.2
freshwater drum	89.2	75.8	218.6	127.3	394.0	307.2	153.9	256.6	0.0	0.0	855.6	767.0
goldeye	0.0	0.0	0.0	0.0	32.6	54.3	14.7	20.2	0.0	0.0	47.3	74.5
mooneye	5.8	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.8	4.9
northern pike	87.6	490.1	7.4	18.9	0.0	0.0	0.0	0.0	0.0	0.0	95.1	509.0
sauger	24.5	21.8	0.0	0.0	8.7	12.7	0.0	0.0	165.0	397.7	198.2	432.1
shortnose gar	0.0	0.0	0.0	0.0	105.6	197.7	0.0	0.0	0.0	0.0	105.6	197.7
walleye	524.6	983.0	45.7	101.3	117.8	210.4	0.0	0.0	0.0	0.0	688.0	1,294.7
white bass	66.1	73.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	66.1	73.9
All Species	1,732.4	6,624.0	911.8	2,581.1	2,389.9	7,819.2	618.7	1,662.0	200.5	432.5	5,853.4	19,118.7

Harvest by Species for All Anglers:	MAY		JUNE		JULY		SEPTEMBER		OCTOBER		TOTAL	
	Number/ Hour	Pounds/ Mile	Number/ Hour	Pounds/ Mile	Number/ Hour	Pounds/ Mile	Number/ Hour	Pounds/ Mile	Number/ Hour	Pounds/ Mile	Number/ Hour	Pounds/ Mile
carp	0.01	5.77	<0.01	1.95	<0.01	2.01	0.02	5.18	0.00	0.00	0.01	14.92
channel catfish	0.05	20.28	0.03	8.82	0.08	30.55	0.06	7.41	0.03	0.32	0.06	67.39
flathead catfish	0.01	19.17	0.01	10.43	0.03	31.41	0.00	0.00	0.00	0.00	0.01	61.01
freshwater drum	0.01	0.69	0.02	1.16	0.03	2.79	0.03	2.33	0.00	0.00	0.02	6.97
goldeye	0.00	0.00	0.00	0.00	<0.01	0.49	<0.01	0.18	0.00	0.00	<0.01	0.68
mooneye	<0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.04
northern pike	0.01	4.46	<0.01	0.17	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	4.63
sauger	<0.01	0.20	0.00	0.00	<0.01	0.12	0.00	0.00	0.12	3.62	<0.01	3.93
shortnose gar	0.00	0.00	0.00	0.00	0.01	1.80	0.00	0.00	0.00	0.00	<0.01	1.80
walleye	0.04	8.94	<0.01	0.92	0.01	1.91	0.00	0.00	0.00	0.00	0.01	11.77
white bass	<0.01	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	<0.01	0.67
All Species	0.13	60.22	0.07	23.46	0.15	71.08	0.11	15.11	0.15	3.93	0.12	173.81

Creel Survey Harvest Summary for Minnesota River

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Harvest by Species for Targeting Anglers:	MAY		JUNE		JULY		SEPTEMBER		OCTOBER		TOTAL	
	Number/ Hour	Mean Weight	Number/ Hour	Mean Weight	Number/ Hour	Mean Weight	Number/ Hour	Mean Weight	Number/ Hour	Mean Weight	Number/ Hour	Mean Weight
carp	0.07	3.98	0.00	0.00	0.00	0.00	—	—	—	—	0.03	3.98
channel catfish	0.04	4.72	0.04	2.84	0.10	2.85	0.06	2.23	0.05	0.98	0.06	3.08
flathead catfish	0.01	13.85	0.02	5.74	0.03	7.08	0.00	0.00	0.00	0.00	0.01	7.91
freshwater drum	0.00	0.00	0.19	0.78	1.06	0.97	0.25	1.07	—	—	0.34	0.95
largemouth bass	0.00	0.00	—	—	—	—	—	—	—	—	0.00	0.00
northern pike	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
smallmouth bass	0.00	0.00	—	—	—	—	—	—	—	—	0.00	0.00
shortnose gar	—	—	—	—	2.00	1.36	—	—	—	—	2.00	1.36
walleye	0.13	1.46	0.01	2.02	0.06	1.97	0.00	0.00	0.00	0.00	0.04	1.65

Comments:

Citation:

Creel Survey Harvest Summary for Minnesota River

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Length Frequency Summary for Harvested Fish (Inch Groups)

Strata / Species	0 - 4	5 - 8	9 - 12	13 - 16	17 - 20	21 - 24	25 - 29	30 +
MAY								
carp				2	11	1		
channel catfish			7	3	6	13	5	2
flathead catfish					1		2	5
freshwater drum			3	1				
mooneye				1				
northern pike						1	1	2
sauger				2				
walleye			7	14	5		2	
white bass			1	3				
JUNE								
carp						4		
channel catfish			4	18	5	5	1	1
flathead catfish					1	7	2	3
freshwater drum			5	2				
northern pike						1		
walleye				2	4			
JULY								
carp					2	1	1	
channel catfish			2	21	32	25	12	3
flathead catfish				1	7	17	4	11
freshwater drum		5	10	12	1			
goldeye				1	1			
sauger				1				
shortnose gar						4	2	1
walleye				1	2			
SEPTEMBER								
carp						6	1	
channel catfish		2		9	8		3	1
freshwater drum		1	3	4	2			
goldeye				1				
OCTOBER								
channel catfish				1				
sauger					1			


Minnesota
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Area 410
Job 466
8 May 2001

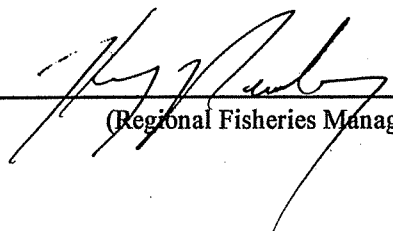
MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISHERIES

Completion Report

Angler Creel Survey of a 110 Mile Segment of the Minnesota River
1 May 1998 - 31 October 1998

by
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Approved by:  Date: 5/7/01
(Area Fisheries Supervisor)

Approved by:  Date: 05/15/01
(Regional Fisheries Manager)