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LAKE ZUMBRO AND LOWER ZUMBRO RIVER CREEL SURVEY

MAY – AUGUST 2007

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INTRODUCTION

This report summarizes an open water creel survey of Lake Zumbro and a 24-mile reach of the Zumbro River, Olmsted and Wabasha Counties, during the summer of 2007 by the Minnesota Department of Natural Resources (MNDNR), Section of Fisheries. The surveys were conducted to provide additional information regarding the special regulations and fishery on the Zumbro River and to provide baseline data on the open water angling effort, catch and harvest for Lake Zumbro. A secondary goal was to obtain angling information on the muskellunge fishery. The creel survey was originally scheduled to run through the Labor Day weekend (Sept. 1, 2007), but due to heavy rainfall and extensive flooding on the lake and river, the survey was terminated early, on August 21, 2007.

STUDY AREA

Lake Zumbro

Lake Zumbro is a 606-acre impoundment on the South Fork of the Zumbro River in Wabasha and Olmsted counties (Figure 1). The Lake Zumbro dam was built in 1919 and is a hydroelectric generating facility operated by Rochester Public Utilities. The Middle Fork Zumbro River is a tributary, entering the lake near the upper end. The lake is located within 15 miles of Rochester, MN, a large urban area with very little surface water available for recreation. Lake Zumbro is one of the few bodies of water in the area large enough to offer recreational boating and fishing, so it receives high levels of recreational use for boating and angling. Dense residential development on the lake adds to high recreational surface use.

Lake Zumbro provides a quality fishery for black crappie and bluegill, as well as largemouth and smallmouth bass. Northern pike are available in fair numbers with some quality size fish present. Walleye and sauger are not present in the lake. Muskellunge have been stocked on a regular basis since 1994. Very little is known about the existing muskellunge population, as standard fisheries techniques have not been effective in sampling them. Angling pressure and success for muskellunge was believed to be low.

Zumbro River

The study area included approximately 24 miles of the Zumbro River, beginning immediately downstream of the Lake Zumbro dam and continuing downstream to Millville, MN. The river reach immediately below the dam is commonly referred to as the "Plunge Pool." The study area is popular for angling, canoeing and tubing. A wide variety of game and non-game fish are available for anglers, but smallmouth bass are the primary gamefish species sought by anglers. A catch-and-release regulation for smallmouth bass is in effect from the Lake Zumbro dam downstream to the State Highway 63 road crossing in Zumbro Falls (approx. 12 miles). Muskellunge are also present in the river, having moved downstream after being stocked in Lake Zumbro. Most of the shoreline is privately owned. Public access sites are available at the CSAH 7 bridge crossing, and in Zumbro Falls, Hammond, and Millville. Private access sites are located at the Plunge Pool and a campground near Zumbro Falls. Canoe and tube rental is available at several private campgrounds within the study area.

METHODS

The creel survey began on May 11, 2007, just prior to the opening of walleye/northern pike season and two weeks prior to open season for bass species. The creel design was a stratified random type that included a portion of each sampling day spent on the river and the lake with differences in how each was sampled. Only one seasonal strata (summer), was defined. Strata were further defined by day type (Weekday or Weekend/Holiday). All Weekend days were sampled, but only one of two Holidays during the survey period was sampled (Memorial Day). Fourth of July was not sampled due to scheduling problems. The creel survey ended before the Labor Day holiday. The weekdays sampled were randomly selected, usually two days per week.

The fishing day was based on hours of daylight available and was defined as a 14-hour period. One of two time periods was sampled each selected day. Creel shift times were 7 hours long and were either Early (7:00 a.m. to 2 p.m.) or Late (2 p.m. to 9 p.m.). Early or late shift times were randomly selected. One 3-hour period during each sampling day was spent on the lake doing counts and interviews and the other 4 hours were spent on the river. The time period spent at each site was determined by a random start location and travel pattern (up or downstream). All sites were given an equal probability for start times. The clerk measured total length (TL) of harvested fish to the nearest 0.1 inch during interviews. Fish lengths were converted to millimeters (mm) for data entry and analysis with the Creel Analysis Software (CAS; Soupir and Brown, 2002).

Lake Zumbro

The lake was treated as a roving type survey, with interviews and counts conducted by boat. Counts and interviews included "boat" and "bank" anglers. Interviews could be conducted for either incomplete or complete trips. On the lake, the clerk completed a count in either an up or down lake pattern during each sampling day. Counts were conducted either at the beginning or end of the shift, determined by either a late or early shift start. Each count took approximately 20 minutes to complete. A summary of strata statistics for the lake is presented in Table 2. Data from the lake creel survey were entered into the CAS program and analyzed as a "Roving" type survey.

Zumbro River

The river portion of the creel utilized an access-based design. Five access sites, or "stations" were identified, including the plunge pool below the dam. All stations were sampled each sampling day. The plunge pool has historically been a very high use fishing area but recent changes in ownership significantly curtailed public fishing access. Because of the limited public access, no sampling time was assigned for conducting interviews at the plunge pool. However, angling use was observed from an overlook owned by Rochester Public Utilities property at the dams' electrical generating station. Therefore, the only information collected from the plunge pool was counts of angler use (bank and boat anglers). Ten minutes each day were allotted to conduct counts at the plunge pool. The creel clerk spent approximately 50 minutes at each of the other four stations each day and counted and interviewed boat and bank anglers at each site. Boat anglers were counted if they started or ended their trip at that station or passed by it during the time spent at each site. Bank anglers were only counted if they were within

sight of the access point during the time period. This creel design likely underestimated bank angling pressure compared to previous creel surveys that included bank anglers anywhere they were observed along the river (Hayes 1988, Schmidt 2000). Interviews were conducted for either incomplete or complete trips. All anglers observed during the time spent at each site were included in the count, and the counts at each site were considered "instantaneous counts" for analysis purposes. Pressure estimates were calculated for each individual sampling site and summed for total pressure estimates. The river survey data was entered in the CAS program and analyzed as an "Aerial" type survey.

RESULTS AND DISCUSSION – Lake Zumbro

Angling Effort

Angling effort on Lake Zumbro was estimated for "boat" and "bank" angling (Table 3). Total estimated boat angling pressure (angler hours) during the creel survey period was 25,158 hours and estimated bank angling pressure was 5,312 hours. Total estimated fishing pressure per acre (boat and bank) on Lake Zumbro for the creel season was 50.3 hours/acre. For comparison, the statewide mean on similar lakes (Lake Class 25, 1951 - 2003) for the "summer" period is 33.1 hours/acre (Cook and Younk 1994). Bank anglers were not separated by type (i.e. residential docks versus public fishing areas). The lake has a high number of homes with docks and only a few public shore-angling areas, so it is assumed most bank angling pressure was from homeowner's docks.

Anglers targeting "Any species" accounted for most of the fishing pressure (28%), followed by anglers targeting bluegill and black crappie specifically (22% and 19%, respectively). Anglers targeting "panfish" collectively accounted for an additional 12%

of pressure. Anglers targeting "bass" (smallmouth and largemouth combined) accounted for an additional 12% of the targeted pressure. Only one angler was targeting muskellunge at the time of the interview, although other anglers indicated they have fished for them in the lake. One party of anglers indicated they were targeting walleye, which are not present in the lake. Primary and secondary species sought are presented in Tables 4 and 5.

Catch and Harvest

Catch rates of all anglers for bluegill and black crappie were 0.61 and 0.25 fish per hour, respectively. Catch rates for anglers specifically targeting bluegill were 3.77/hr and 1.48/hr for anglers targeting black crappie. Anglers often lumped smallmouth and largemouth bass species together during interviews and catch rates of all anglers for "bass spp." was 0.13 fish per hour. Catch rates of all anglers for smallmouth and largemouth individually were 0.12 and 0.05 fish per hour, respectively. Catch rates of anglers targeting "bass spp." were 1.41 fish per hour. Catch rates of anglers specifically targeting bass were higher for smallmouth bass (1.24/hr) than for largemouth bass (0.61/hr). Catch rates were generally higher for boat anglers than bank anglers. Angler catch, harvest and release rates and comparison to the Lake Class 25 "summer" mean are presented in Tables 6 - 8.

Bluegill and black crappie accounted for the largest portion of the harvest during the summer creel season (Tables 9, 10). Anglers caught an estimated 18,329 bluegill during the creel season, of which an estimated 9,275 (51%) were harvested. Mean length of harvested bluegill was 186 mm (7.3 inches). An estimated 6,980 black crappie were caught and the harvest estimate was 3,717 fish (53%). Mean length of harvested black

crappie was 250 mm (9.8 inches). Length distribution and mean lengths and weights of harvested fish are presented in Tables 11 and 12.

Angler Demographics

Information was collected regarding angler age, gender and distance traveled (Appendix A). Males comprised 80% of anglers and nearly 70% of the anglers were between the ages of 21 and 50. Nearly 50% of the anglers were from Rochester, MN.

Angling Questions

Anglers were asked a series of questions regarding the muskellunge fishery in Lake Zumbro (Appendix B). Question 1 asked if the anglers knew muskellunge were present/stocked in Lake Zumbro. A "No" response resulted in no further questions. If anglers responded "Yes", they were then asked if they had ever fished for muskellunge in Lake Zumbro. Approximately 2/3 of the anglers interviewed knew that muskellunge had been stocked. Of the anglers who knew they were present, approximately 10% had fished for muskellunge. Anglers that indicated they had fished for muskellunge were then asked if they had ever caught a muskellunge in Lake Zumbro. Nine percent of anglers who said they had specifically fished for muskellunge indicated they had caught at least one muskellunge in Lake Zumbro.

RESULTS AND DISCUSSION – Zumbro River

Angling Effort

Angling effort by "boat" and "bank" anglers was estimated for each station on the surveyed reach of the Zumbro River. Total estimated fishing pressure (all stations)

during the creel survey period was 2,625 angler-hours from boat anglers and 2,789 angler-hours from bank anglers. Bank angling estimates only included anglers in the immediate vicinity of each sampling station. Since the clerk was unable to contact anglers in the plunge pool the only information available from that site were angler counts. To calculate a pressure estimate for boat angling in the plunge pool, we used the mean number of anglers per boat calculated from a 1999 creel survey of that area (Schmidt 2000). Total fishing pressure estimated in the plunge pool station was 1,948 angler-hours, which was higher than estimates at all other creel stations (Table 14). However, the estimated fishing pressure in the plunge pool station was substantially lower than observed in previous creel surveys. Hayes (1988), estimated fishing pressure in the plunge pool station during the late 1980's ranging from 6,000 to 9,000 angler-hours for the creel season. A creel survey in 1999 estimated total fishing pressure in the plunge pool of 5,247 angler-hours (Schmidt 2000). The reduction in fishing pressure in the plunge pool is the result of ownership changes and operating procedures at the private campground bordering this area. The total fishing pressure estimate for the entire surveyed reach for the season was 5,414 hours.

Anglers targeting smallmouth bass accounted for most of the fishing pressure (52%), and anglers fishing for "Any species" accounted for an additional 25%. Of the anglers that indicated they were fishing for a secondary species, 67% indicated they were targeting channel catfish. Angler's species preferences are presented in Table 15.

Catch and Harvest

Catch, harvest, and release rates were calculated for all stations except the plunge pool (Table 16). Overall catch rates for all fish ranged from 0.17 to 1.33 fish per hour.

Catch rates of smallmouth bass for all anglers ranged from 0.17 to 1.15 fish per hour. Catch rates of anglers specifically targeting smallmouth bass ranged from 2.17 to 4.72 fish per hour. Anglers caught an estimated 1,917 smallmouth bass during the survey, with another 450 "bass spp." reported (Table 17). Largemouth bass are present in low numbers in the river, but it's likely that most of the "bass spp." reported were smallmouth bass. An estimated 31 muskellunge were caught during the survey period. Of the anglers interviewed, only sucker species were reported harvested during the creel survey.

Angler Demographics

Information was collected regarding angler age, gender and distance traveled (Appendix D). Angler demographics were similar to those on the lake. Males comprised 86% of the anglers, 81% of the anglers were between the ages of 21 and 50, and a high number were from the local area. Over 40% of the anglers were from Rochester, MN.

Angling Questions

Anglers were asked a series of questions regarding the fishery in the Zumbro River (Appendix E). Question #1 asked if the anglers were aware of the catch and release regulation for smallmouth bass from the dam downstream to Zumbro Falls. If anglers responded "Yes", they were then asked their opinion of the regulation (Like, Dislike, Don't care). In response to Question 1, 76% of the anglers surveyed were aware of the regulation. Of the anglers that were asked Question 2 (only anglers that were aware of the regulation), 95% responded that they "Liked" the regulation. No anglers "Disliked" it and 5% "Didn't Care". Question 3 asked anglers if they have ever fished for muskellunge in the Zumbro River. Nearly one-third of the anglers indicated they had fished for muskellunge.

Figure 1. Map of Study Area. Lake Zumbro and Zumbro River Creel Survey.

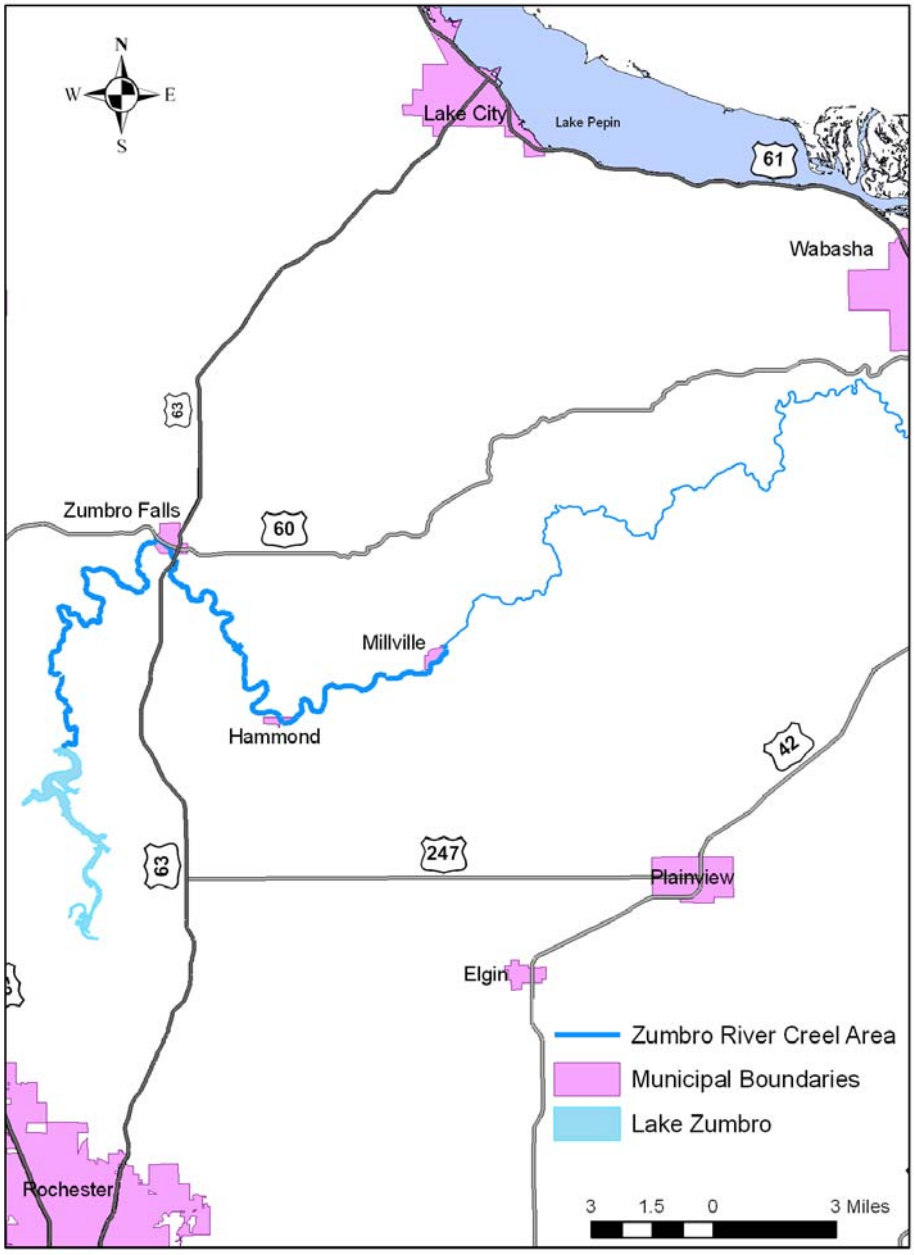

Figure 2. Lake Zumbro.

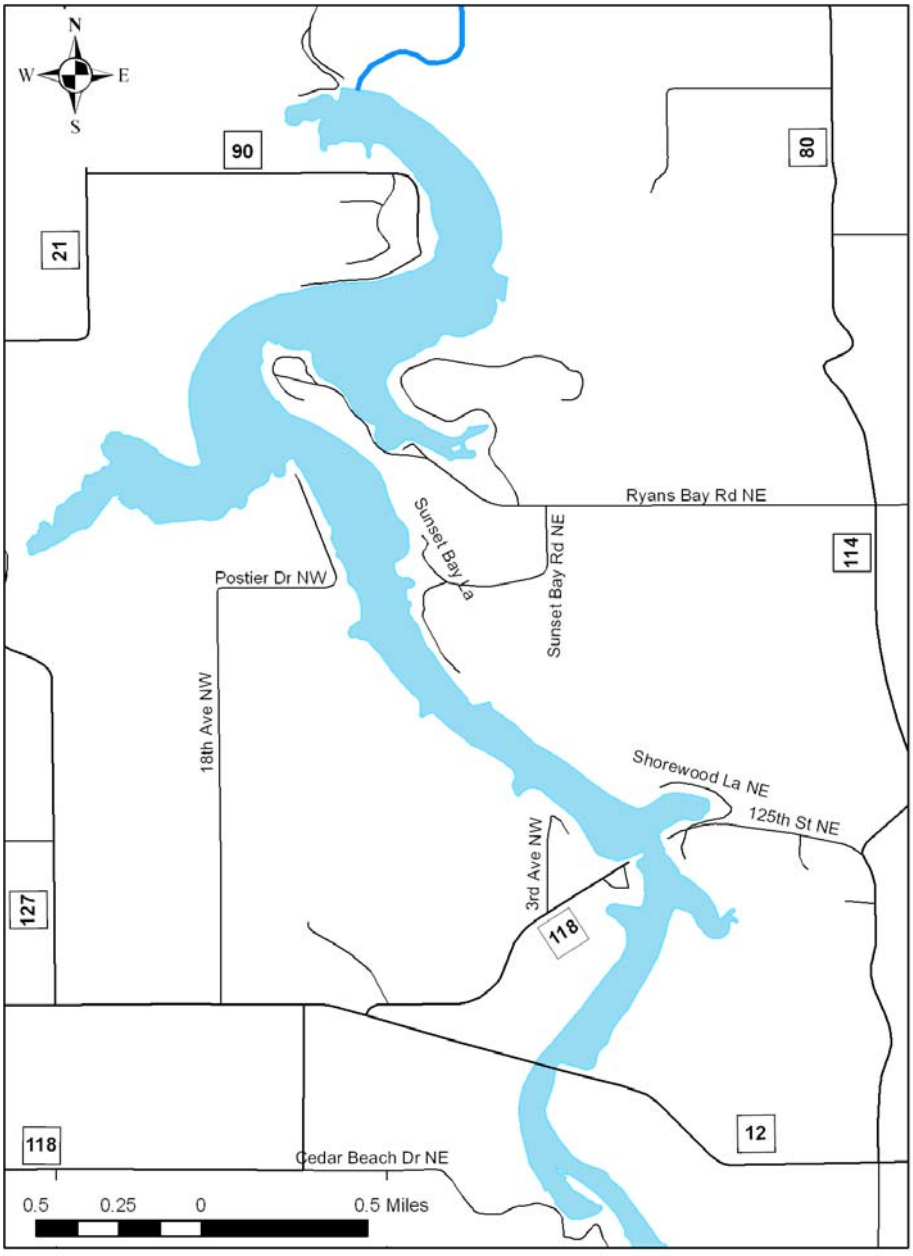

Figure 3. Zumbro River Creel Area and Station Locations

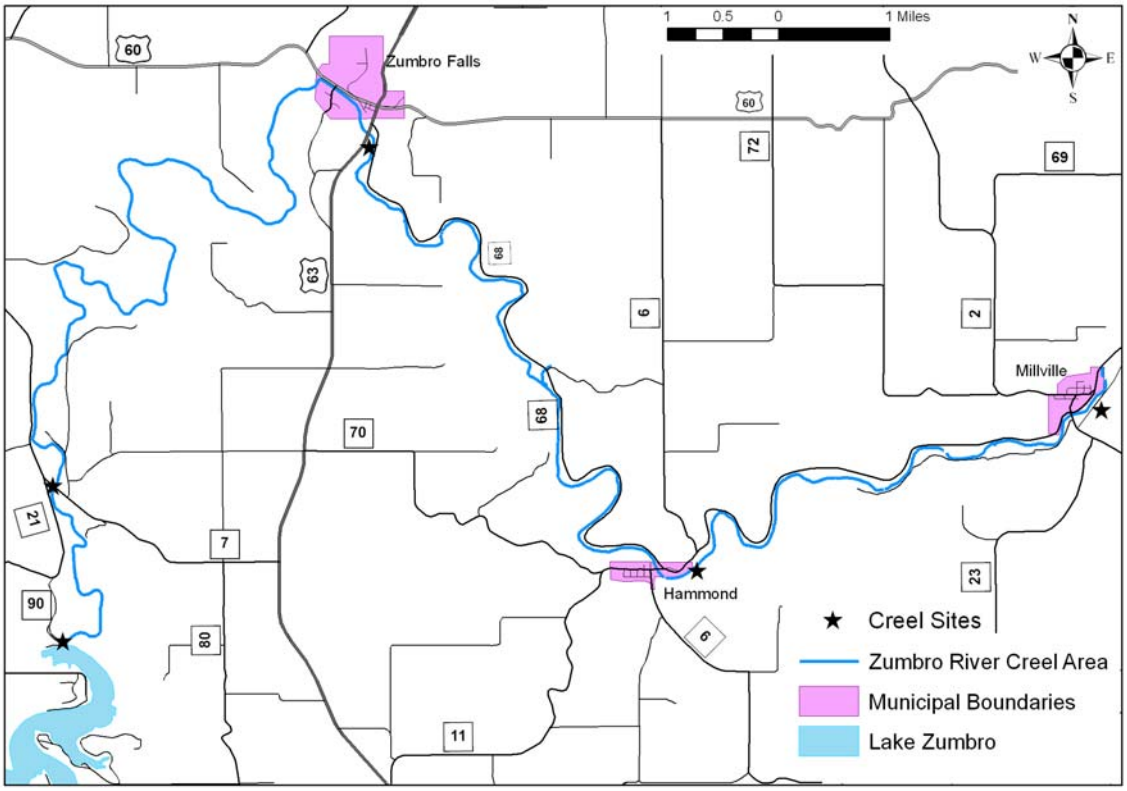

Table 1. Selected characteristics of Lake Zumbro, MN.

Characteristic	
DOW #	55-0004-00
Lake class	25
Total surface area (acres)	606
Maximum depth (ft)	43
Percent littoral area	43

Table 2. Summary of strata statistics for the summer creel survey of Lake Zumbro, MN. May 11 – August 21, 2007. Standard errors are in parentheses.

	Stratum (Season)
Start date of stratum	05/11/07
End date of stratum	08/21/07
Length of fishing day (hr)	14
Number days in stratum	103
Number Weekdays sampled	41
Number Weekend/Holidays sampled	30
Number of counts	71
Boat anglers	
Angler hours	25,158 (2,735)
Mean party size	2.3 (0.2)
Number of interviews	260
Number of completed trips	3
Mean completed trip length (hrs)	4.69 (0.60)
Bank anglers	
Anglers hours	5,312 (710)
Mean party size	1.8 (0.4)
Number of interviews	17
Number of completed trips	0 (---)
Mean completed trip length (hrs)	---

Table 3. Creel season fishing pressure estimates for Lake Zumbro, MN. May 11 – August 21, 2007.

Season		
Angler Type	Angler-hours	SE
Boat anglers	25,158	2,735
Bank anglers	5,312	710
All anglers	30,470	3,005

	Agler-hours per acre	SE
Boat anglers	41.5	4.5
Bank anglers	8.8	1.2
All anglers	50.3	5.0

Table 4. Primary and secondary species sought by anglers (%) in Lake Zumbro, MN. May 11 – August 21, 2007.

	Percent (%)	
Species	**Primary**	**Secondary**
Any species	28	4
Bass spp.	12	10
Black crappie	19	34
Bluegill	22	30
Channel catfish	1	1
Common carp	0	1
Largemouth bass	1	1
Muskie	<1	0
Northern pike	2	7
Panfish	12	6
Smallmouth bass	2	1
Sucker spp.	1	5
Walleye	<1	0
Interviews (n)		682
Secondary Responses		217
Total Responses		899

Table 5. Primary and secondary species sought (%) by angler type (boat and bank) in Lake Zumbro, MN. May 11 – August 21, 2007.

Boat anglers			Bank anglers		
Species	**Primary**	**Secondary**	**Species**	**Primary**	**Secondary**
Any spp.	28	4	Any spp.	18	-
Bass spp.	13	10	Bass spp.	5	-
Black crappie	19	34	Black crappie	15	29
Bluegill	23	30	Bluegill	5	42
Channel catfish	<1	1	Channel catfish	8	-
Common carp	-	<1	Northern pike	3	29
Largemouth bass	1	1	Panfish	31	-
Muskie	<1	0	Walleye	15	-
Northern pike	2	6			
Panfish	10	6			
Smallmouth bass	2	1			
Sucker spp.	1	5			
Interviews (n)	643		Interviews (n)	39	
Secondary Responses	210		Secondary Responses	7	
Total Responses	853		Total Responses	46	

Table 6. Angler catch, harvest and release rates (fish/hour) for Lake Zumbro, MN. May 11 – August 21, 2007.

		Catch		Harvest		Release	
Estimate Type	**Species**	**Catch/hour**	**SE**	**Harvest/hour**	**SE**	**Release/hour**	**SE**
All Anglers	Bass spp.	0.135	0.045	0.002	0.001	0.133	0.045
	Black bullhead	0.013	0.009	0.001	0.002	0.012	0.005
	Black crappie	0.229	0.108	0.122	0.053	0.107	0.076
	Bluegill	0.602	0.160	0.304	0.094	0.297	0.066
	Channel catfish	0.033	0.013	0.002	0.001	0.031	0.013
	Largemouth bass	0.043	0.018	0.002	0.002	0.041	0.017
	Northern pike	0.013	0.008	0.003	0.002	0.010	0.006
	Panfish	0.032	0.032	0.000	0.000	0.032	0.032
	Smallmouth bass	0.119	0.031	0.002	0.001	0.117	0.031
	Sucker spp.	0.018	0.011	0.000	0.000	0.018	0.011
	Overall	1.238	0.295	0.438	0.127	0.801	0.175
Targeting anglers	Bass spp.	1.408	2.831	0.000	0.000	1.408	2.831
	Black crappie	1.463	1.362	0.798	1.137	0.665	0.722
	Bluegill	3.770	3.881	2.083	3.049	1.687	2.269
	Channel catfish	0.401	0.711	0.134	0.237	0.267	0.474
	Largemouth bass	0.611	1.303	0.000	0.000	0.611	1.303
	Northern pike	0.127	0.231	0.016	0.012	0.111	0.230
	Smallmouth bass	1.242	1.988	0.031	0.046	1.212	2.022
	Sucker spp.	0.064	0.076	0.000	0.000	0.064	0.076

Table 7. Catch, harvest and release rates (fish/hour) by angler type for Lake Zumbro, MN. May 11- August 21, 2007.

		Catch		Harvest		Release	
Type of Fishing	**Species**	**Catch/hour**	**SE**	**Harvest/hour**	**SE**	**Release/hour**	**SE**
Boat anglers	Bass spp.	0.16	0.06	0.00	0.00	0.16	0.06
	Black bullhead	0.02	0.01	0.00	0.00	0.01	0.01
	Black crappie	0.27	0.10	0.14	0.06	0.12	0.05
	Bluegill	0.72	0.23	0.37	0.12	0.36	0.12
	Channel catfish	0.02	0.01	0.00	0.00	0.02	0.01
	Largemouth bass	0.05	0.02	0.00	0.00	0.05	0.02
	Northern pike	0.01	0.01	0.00	0.00	0.01	0.01
	Panfish	0.04	0.04	0.00	0.00	0.04	0.04
	Smallmouth bass	0.14	0.04	0.00	0.00	0.14	0.04
	Sucker spp.	0.02	0.02	0.00	0.00	0.02	0.02
	Overall	1.46	0.38	0.52	0.15	0.94	0.25
Bank anglers	Black crappie	0.04	---	0.02	0.01	0.02	0.01
	Bluegill	0.02	0.01	0.01	0.02	0.01	0.00
	Channel catfish	0.08	0.06	0.00	0.00	0.08	0.06
	Largemouth bass	0.01	0.02	0.00	0.00	0.01	0.02
	Northern pike	0.01	0.01	0.00	0.00	0.01	0.01
	Smallmouth bass	0.01	0.01	0.00	0.00	0.01	0.01
	Overall	0.18	0.07	0.04	0.02	0.14	0.06

Table 8. Comparison of angler catch and harvest rates (fish/hour) for Lake Zumbro, MN. May 11 – August 21, 2007, to Statewide Lake Class 25 Summer Mean.

		Lake Zumbro mean		Lake class mean	
Estimate type	**Species**	**Catch/hour**	**Harvest/hour**	**Catch/hour**	**Harvest/hour**
All Anglers	Black bullhead	0.013	0.001	0.001	0.012
	Black crappie	0.229	0.122	0.257	0.102
	Bluegill	0.602	0.304	0.872	0.345
	Channel catfish	0.033	0.002	0.081	0.024
	Largemouth bass	0.043	0.002	0.122	0.026
	Northern pike	0.013	0.003	0.140	0.091
	Smallmouth bass	0.119	0.002	0.012	0.002
Targeting Anglers	Black crappie	1.463	0.798	0.941	0.547
	Bluegill	3.770	2.083	2.059	1.324
	Channel catfish	0.401	0.134	0.365	0.305
	Largemouth bass	0.611	0.000	0.387	0.102
	Northern pike	0.127	0.016	0.323	0.129
	Smallmouth bass	1.242	0.031	0.172	0.004

Table 9. Estimated numbers of fish caught, harvested and released for creel season, Lake Zumbro, MN. May 11 – August 21, 2007.

		Catch		Harvest		Release	
Estimate Type	**Species**	**N**	**SE**	**N**	**SE**	**N**	**SE**
All Anglers	Bass spp.	4,109	1,146	49	36	4,060	1,144
	Black bullhead	386	215	21	21	365	214
	Black crappie	6,980	1,906	3,717	1,085	3,263	1,807
	Bluegill	18,329	3,568	9,275	2,254	9,055	1,315
	Channel catfish	1,014	346	74	38	940	340
	Largemouth bass	1,297	419	53	30	1,244	412
	Northern pike	398	118	91	47	307	92
	Panfish	985	983	0	0	985	983
	Smallmouth bass	3,622	813	53	31	3,569	809
	Sucker spp.	547	176	0	0	547	176
	White bass	21	21	0	0	21	21
	Yellow perch	37	27	0	0	37	27
	Overall	37,726	5,256	13,333	2,819	24,393	2,679

Table 10. Estimated numbers of fish caught, harvested and released by angler type for creel season, Lake Zumbro, MN. May 11 – August 21, 2007.

		Catch		Harvest		Release	
Type of Fishing	**Species**	**N**	**SE**	**N**	**SE**	**N**	**SE**
Boat anglers	Bass spp.	4,109	1,146	49	36	4,060	1,144
	Black bullhead	386	215	21	21	365	214
	Black crappie	6,741	1,377	3,597	975	3,144	778
	Bluegill	18,210	3,751	9,195	2,312	9,015	1,857
	Channel catfish	571	169	74	38	497	157
	Largemouth bass	1,218	410	53	30	1,164	404
	Northern pike	358	117	91	47	267	91
	Panfish	985	983	0	0	985	983
	Smallmouth bass	3,582	811	53	31	3,529	807
	Sucker spp.	547	176	0	0	547	176
	White bass	21	21	0	0	21	21
	Yellow perch	37	27	0	0	37	27
	Overall	36,765	5,626	13,134	2,739	23,631	3,653
Bank anglers	Black crappie	239	218	119	73	119	155
	Bluegill	119	50	80	31	40	54
	Channel catfish	443	302	0	0	443	302
	Largemouth bass	80	83	0	0	80	83
	Northern pike	40	16	0	0	40	16
	Smallmouth bass	40	52	0	0	40	52
	Overall	960	419	199	62	761	391

Table 11. Length frequency distribution of fish harvested and measured, Lake Zumbro, MN. May 11 – August 21, 2007.

Length Group (mm)	Black crappie	Bluegill	Channel catfish	Largemouth bass	Northern pike	Smallmouth bass
110 - 119						
120 - 129						
130 - 139		1				
140 - 149		4				
150 - 159		5				
160 - 169		7				
170 - 179		15				
180 - 189		15				
190 - 199	1	35				
200 - 209	6	17				
210 - 219	5	2				
220 - 229	6	2				
230 - 239	9					
240 - 249	8					
250 - 259	10					
260 - 269	14		1			
270 - 279	7					
280 - 289	3					
290 - 299	4					
300 - 324	1			1		1
325 - 349						
350 - 374				1		1
375 - 399			1			1
400 - 424						
425 - 449						
450 - 474			1	1		
475 - 499						
500 - 524						
525 - 549					1	
550 - 574					1	
575 - 599						
600 - 624					1	
625 - 649						
Total (N)	74	103	3	3	3	3
Mean length (mm)	250	186	372	377	568	352
Standard Error (SE)	3.1	1.8	55.7	43.2	22.6	18.3
Minimum length (mm)	196	130	267	315	533	318
Maximum length (mm)	305	229	457	460	610	381
Mean length (inches)	9.8	7.3	14.6	14.8	22.4	13.9

Table 12. Mean length and estimated mean weight of harvested fish, Lake Zumbro, MN. May 11 – August 21, 2007.

	Length		Estimated Weight	
Species	mm	inches	grams	pounds
Black crappie	250	9.8	277	0.61
Bluegill	186	7.3	175	0.39
Channel catfish	372	14.6	509	1.12
Largemouth bass	377	14.8	1,058	2.33
Northern pike	568	22.4	1,267	2.79
Smallmouth bass	352	13.9	689	1.52

Table 13. Summary of strata statistics for the summer creel survey of the Zumbro River, MN. May 11 – August 21, 2007. Standard errors are in parentheses.

Parameter	Stratum (Season)
Start date of stratum	05/11/07
End date of stratum	08/21/07
Length of fishing day (hr)	14
Number days in stratum	103
Number Weekdays sampled	41
Number Weekend/Holidays sampled	30
Number of counts	71
Boat anglers	
Angler hours	2625 (1055)
Mean party size	2.9 (0.3)
Number of interviews	8
Number of completed trips	8
Mean completed trip length (hrs)	3.9 (---)
Bank anglers	
Anglers hours	2789 (724)
Mean party size	1.6 (0.3)
Number of interviews	8
Number of completed trips	8
Mean completed trip length (hrs)	1.5 (---)

Table 14. Creel season fishing pressure estimates by site for Zumbro River, MN. May 11 – August 21, 2007.

	Angler hours	SE
Plunge Pool	1948	364
Green bridge	1673	355
Zumbro Falls	762	309
Hammond	656	197
Millville	375	216
Total	5414	1441

Table 15. Primary and secondary species sought by anglers (%) in Zumbro River, MN. May 11 – August 21, 2007.

	Percent (%)	
Species	**Primary**	**Secondary**
Anything	25	
Bass spp.	6	
Musky	3	
Sauger	8	
Smallmouth bass	52	
Sucker spp.	6	
Channel Catfish		67
Trout		33
Interviews (n)		36
Secondary responses		3
Total responses		39

Table 16. Angler catch, harvest and release rates (fish/hour) for Zumbro River, MN. May 11 – August 21, 2007.

Station		**Catch**		**Harvest**		**Release**	
Green Bridge	**Species**	**Catch/hour**	**SE**	**Harvest/hour**	**SE**	**Release/hour**	**SE**
All Anglers	Bass spp.	0.08	0.09	0.00	0.00	0.08	0.09
	Muskellunge	0.01	---	0.00	---	0.01	---
	Smallmouth bass	0.39	0.56	0.00	0.00	0.39	0.56
	White bass	0.05	---	0.00	---	0.05	---
Overall		0.53	---	0.00	0.00	0.53	---
Targeting anglers	Bass spp.	1.82	---	0.00	---	1.82	---
	Smallmouth bass	2.17	0.32	0.00	0.00	2.17	0.32
Zumbro Fall							
All Anglers	Bass spp.	0.42	---	0.00	---	0.42	---
	Muskellunge	0.01	---	0.00	---	0.01	---
	Smallmouth bass	0.59	---	0.00	---	0.59	---
Overall		1.02	---	0.00	---	1.02	---
Targeting anglers	Smallmouth bass	4.72	---	0.00	---	4.72	---
Hammond							
All Anglers	Bluegill	0.07	0.06	0.00	0.00	0.07	0.06
	Smallmouth bass	1.15	4.28	0.00	0.00	1.15	4.28
	Sucker spp.	0.12	---	0.12	---	0.00	---
Overall		1.34	3.05	0.12	0.04	1.22	2.90
Targeting anglers	Sucker spp	1.33	---	1.33	---	0.00	---
	Smallmouth bass	3.63	3.26	0.00	0.00	3.63	3.26
Millville							
All Anglers	Smallmouth bass	0.17	---	0.00	---	0.17	---
Overall		0.17	---	0.00	---	0.17	---
Targeting anglers	Smallmouth bass	4.15	---	0.00	---	4.15	---

Table 17. Estimated numbers of fish caught, harvested and released for creel season, Zumbro River, MN. May 11 – August 21, 2007.

		Catch		Harvest		Release	
Location	**Species**	**N**	**SE**	**N**	**SE**	**N**	**SE**
Green Bridge	Bass spp.	130	146	0	0	130	146
	Muskellunge	22	---	0	---	22	---
	Smallmouth bass	653	385	0	0	653	385
	White bass	89	---	0	---	89	---
Total		894	404	0	0	893	404
Zumbro Fall	Bass spp.	320	---	0	---	320	---
	Muskellunge	9	---	0	---	9	---
	Smallmouth bass	446	---	0	---	446	---
Total		775	---	0	---	775	---
Hammond	Bluegill	44	39	0	0	44	39
	Smallmouth bass	754	313	0	0	754	313
	Sucker spp.	82	---	82	---	0	---
Total		880	339	82	0	798	339
Millville	Smallmouth bass	64	---	0	---	64	---
Total		64	---	0	---	64	---
Total All Sites	Bass spp.	450	---	0	---	450	---
	Bluegill	44	---	0	---	44	---
	Muskellunge	31	---	0	---	31	---
	Smallmouth bass	1917	---	0	---	1917	---
	White bass	89	---	0	---	89	---
	Sucker spp.	82	---	82	---	0	---
Total		2613	---	82	---	2531	---

APPENDICES

Appendix A. Angler demographics: Angler Gender (%) and % per Age Group, Lake Zumbro, MN. May 11 – August 21, 2007.

Male	Female
80	20

Age group	% of Total
0 - 10	8
11 - 20	12
21 - 30	31
31 - 40	21
41 - 50	17
51 - 60	10
61 +	1

Appendix B. Questions/responses (% of Total) to muskellunge angling questions, Lake Zumbro, MN. May 11 – August 21, 2007. N = 381.

Q. 1). Are you aware that muskellunge have been stocked into Lake Zumbro?
Yes – 67%
No – 33%

Q. 2). If yes, have you ever fished for muskellunge in Lake Zumbro?
Yes – 10%
No – 90%

Q. 3). If yes, have you ever caught a muskellunge in Lake Zumbro?
Yes – 9%
No – 91%

Appendix C. Regression parameters for length-weight regression equations used to estimate fish weight from total length measurements. Equation takes the form: $\log_{10} W = a + b \log_{10} TL$, where W is weight (gm) and TL is total length (mm).

Species	Factor a	Factor b
Black crappie *	-5.1776	3.1708
Bluegill *	-5.4755	3.3934
Channel catfish	-5.9664	3.3485
Largemouth bass	-5.2814	3.1966
Northern pike	-4.9535	2.9241
Smallmouth bass	-5.2390	3.1549

* Bluegill and black crappie parameters were calculated from fish captured in Lake Zumbro during a survey in summer 2007. Regression parameters for other species are from Lake Pepin, MN. Sample size from Lake Zumbro was considered to low for other species.

Appendix D. Angler demographics: Angler Gender (%) and % per Age Group, Zumbro River, MN. May 11 – August 21, 2007.

Male	Female
86	14

Age group	% of Total
0 - 10	5
11 - 20	11
21 - 30	31
31 - 40	39
41 - 50	11
51 - 60	3
61 +	-

Appendix E. Responses to angling questions on the Zumbro River, MN. May 11 – August 21, 2007

Q. 1) Are you aware of the catch and release regulation for smallmouth bass on the Zumbro River from the dam downstream to Zumbro Falls? (Yes or No)

Q. 2) If Yes, What do you think of the regulation? (Like, Dislike, Don't Care)

Q. 3) Have you ever fished for muskellunge in the Zumbro River? (Yes or No)

		% (n)	% (n)	% (n)
	N	**Yes**	**No**	**Don't Care**
Question #1	25	76 (19)	24 (6)	
Question #2	19	95 (18)	0	5 (1)
Question #3	25	32 (8)	68 (17)	

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MINNESOTA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF FISH AND WILDLIFE

LAKE ZUMBRO AND LOWER ZUMBRO RIVER CREEL SURVEY

MAY – AUGUST 2007

Prepared by: Randy Binder — Fisheries Specialist — 5-28-08 — Date

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