

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-5

Study No.: 230494

Title: Continued monitoring of yellow perch and walleye populations in Michigan waters of Green Bay, Lake Michigan

Period Covered: October 1, 2003 to September 30, 2004

Study Objectives: (1) Continue monitoring population dynamics of yellow perch and walleye populations through creel surveys, netting, and tagging. (2) Intensify efforts to sample age-0 walleye using trawls and seines. (3) Obtain walleye diet information throughout the year from different areas in the Michigan waters of Green Bay. (4) Align yellow perch tagging and early-life history sampling efforts with lake wide programs.

Summary: Fish communities in Michigan waters of Green Bay (Big and Little bays de Noc and open waters south to the Menominee River) were assessed through creel surveys, assessment netting, and a tagging program. Creel surveys have been conducted annually for 1985-2004. Assessment netting and tagging have been done annually, 1988-2004. Sampling during 2004 was completed according to schedule, and data from these surveys and assessments will be presented in future reports.

Creel surveys were conducted during 2003 at Little Bay de Noc, Big Bay de Noc, Cedar River, and Menominee River sites. All sites were surveyed during the open-water season, but only Little Bay de Noc and Menominee River were surveyed during the ice season. Combining estimates from all sites and seasons, sport anglers harvested 75,049 yellow perch and 23,313 walleyes during 2003.

Assessment netting for 2003 in Big and Little bays de Noc consisted of 37 10-minute trawl hauls and 32 overnight gill net sets. Data from these collections have not yet been entered into computer files for analysis.

A total of 3,184 walleyes were tagged in spring of 2003. Incidence of lymphocystis on tagged fish ranged from 11% to 19% depending upon tagging location. Tag-return data were used to update estimates of exploitation and survival rates, and to further document fish movements. Exploitation rates for walleye, unadjusted for non-reporting, were 4.0% in Little Bay de Noc, 2.6% in Big Bay de Noc, 2.7% in Cedar River, and 4.6% in Menominee River. Walleye survival was 57.8% in Little Bay de Noc, 60.3% in Big Bay de Noc, 60.1% in Cedar River, and 44.7% in Menominee River. Yellow perch have not been tagged since 1993, and anglers have not reported the catch of a tagged yellow perch since 1996.

A sampling program employing night boom shocking and gill nets was established for assessing the contribution of hatchery-reared walleye to walleye stocks in Little and Big bays de Noc and near the mouths of the Menominee and Cedar rivers. Walleye were stocked in Little Bay de Noc and the Cedar River in 2004. Fall samples of walleye were collected in these locations as well as in Big Bay de Noc.

Findings: Jobs 1, 2, 3, and 5 were scheduled for 2003-04, and progress is reported below.

Job 1. Title: Continue monitoring yellow perch and walleye populations.—Creel survey data have been collected for the Michigan waters of Green Bay (statistical district MM-1) by Michigan Department of Natural Resources (MDNR) personnel since 1985 (Table 1). Creel survey methods and results were summarized under F-81-R Study 427 by Rakoczy and Rogers (1987, 1988, 1990), Rakoczy and Lockwood (1988), Rakoczy (1992a, 1992b), and Rakoczy and Svoboda (1994). Creel estimates for 1994-2003 have been calculated (G.P. Rakoczy and S. Thayer, personal communication, Charlevoix Fisheries Station, Charlevoix, Michigan), but are as yet unpublished. Sites and seasons covered during the 2003 creel survey were consistent with those since 1999 and roughly comparable to those since 1993. Compared to 1993-2002 averages, the 2003 catch was 45% and 47% lower, respectively for walleye and yellow perch. Angling effort during 2002 was 6% below the 1993-2002 average.

Marquette Fisheries Research Station personnel collected samples of adult and juvenile fish in June, July, August, and October in both Big and Little bays de Noc. Samples were obtained from 37 10-min bottom trawl hauls (17 in Little Bay de Noc and 20 in Big Bay de Noc) and 32 overnight gill net sets (16 in each bay). Gear dimensions and configurations were identical to those described by Schneeberger (2000). Data from these collections have not yet been entered into computer files.

In Michigan waters of Green Bay, individually-numbered monel bird leg bands have been used to jaw tag 53,120 walleyes between 1988 and 2003, and 19,572 yellow perch between 1989 and 1993. Virtually all tagged walleye were of legal size, and 99.8% of the tagged yellow perch were 7 inches or larger. During spring of 2003, 3,184 walleyes were tagged in Michigan waters of Green Bay (Tables 2 - 5). Walleyes were tagged at four locations: Little Bay de Noc (N=894), Big Bay de Noc (N=617), Cedar River (N=714), and Menominee River (N=959). Walleyes were tagged coincident with egg-take operations in Little Bay de Noc where fish were collected in fyke nets. Boom shocking boats were used to catch walleye for tagging at other locations.

Lymphocystis is an endemic viral skin disease common to walleye, especially during spawning (Scott and Crossman 1973). Presence or absence of lymphocystis was noted for fish at each tagging location. Compared to 2002, incidence of lymphocystis in spawning populations during 2003 rose from 11 to 14% in Little Bay de Noc, inched up from 10 to 11% in Big Bay de Noc, remained at 16% in Cedar River, and increased from 17 to 19% in Menominee River.

Solicitations for the return of tags have appeared in local newspapers, sport-club information bulletins, and notices at launch sites. In addition, the creel clerk surveying Cedar and Menominee river fisheries solicited tag-return data on his personal fishing information web site and some returns were reported on a form available through the Department of Natural Resources web site. Anglers catching tagged fish were asked to contact a creel clerk or an MDNR office to report species, tag number, fish length, date, time of catch, location of catch, fate of the fish (kept or released), and their name, address, and phone number. These data were entered into database files, and a computer-generated letter was sent to cooperating anglers, informing them of the number of days between the tag and capture dates, the distance between the tag and capture sites, and the estimated age and growth of the fish they caught.

A total of 276 walleye tag returns was reported between May 2003 and April 2004 (Tables 2 - 5). Returns from fish tagged in Little Bay de Noc included fish that had been tagged in 1989 and 1998-2003. Big Bay de Noc returns came from fish tagged in 1991, 1995-1997, 1999, and 2001-2003. Returns were reported for fish tagged in the Cedar River during 1996-2003. Tag returns of Menominee River walleye came from fish that had been tagged in 1995 and 1997-2003.

Exploitation (unadjusted for non-reporting) and survival rates were estimated from tag-return data using formulae provided by Brownie et al. (1985). Based on cumulative tag returns through 2004, walleye exploitation rates were 4.0% in Little Bay de Noc, 2.6% in Big Bay de Noc, 2.7% in Cedar River, and 4.6% in Menominee River. Thomas and Haas (2000) examined reward versus non-reward walleye tag returns in Lake Erie to determine an adjustment factor of 2.7 for non-reporting. Using this factor to adjust for non-reporting in Michigan waters of Green Bay, estimated exploitation for walleye was 10.8% in Little Bay de Noc, 7.0% in Big Bay de Noc, 7.3% in Cedar River, and 12.4% in Menominee River. Walleye survival was 57.8% in Little Bay de Noc, 60.3% in Big Bay de Noc, 60.1% in Cedar River, and 44.7% in Menominee River.

No tagged yellow perch were caught between May 2003 and April 2004. Yellow perch have not been tagged in Big and Little bays de Noc since 1993, and no tagged yellow perch have been reported since 1996.

Job 2. Title: Intensify efforts to obtain an index of walleye recruitment.—All walleye stocked into Michigan waters of Green Bay from 2004 to 2009 will be marked with oxytetracycline to allow assessment of the level of natural reproduction. This evaluation necessitates additional sampling to collect YOY and juvenile walleye for examination (which will be part of an upcoming Sport Fish Restoration study). A standardized sampling program was developed for collecting young walleye that uses night boom shocking and gill netting. Ten and 9 electrofishing zones were defined in Big Bay de Noc and Little Bay de Noc respectively, and 19 and 15 gill netting zones were established in Big and Little bays de Noc respectively. Four electrofishing and 12 netting zones in Big Bay de Noc and 8 electrofishing and 4 netting zones in Little Bay de Noc were randomly selected for sampling each year. This should provide adequate numbers of walleye for describing the contribution of hatchery walleye to fall populations. It will also enable estimation of the percent contribution of hatchery fish for each bay, and comparison of electrofishing and gill net catch rates between bays. Walleye will be collected by Marquette Fisheries Research Station and Northern Lake Michigan Management Unit personnel. Alpena Fisheries Research Station personnel will be examining otoliths from these fish for oxytetracycline marks.

Oxytetracycline-marked walleye were stocked into Little Bay de Noc and the Cedar River in 2004. In addition to sampling scheduled to occur in the bays de Noc, night electrofishing will occur in the Cedar River and along the shoreline about 5 miles north and south of the river mouth. Examination of samples from this additional sampling will provide some indication of the contribution of hatchery fish to walleye stocks in nearshore areas.

Job 3. Title: Obtain year-round walleye diet from different areas.—In previous years, an effort was made to obtain supplementary walleye diet data by providing containers and labels to cooperating proprietors of a resort located at the head of Little Bay de Noc. This program was discontinued after the 2000 fishing season due to the limited quality and amount of diet data obtained (and the fact that such data had been collected previously).

Job 5. Title: Evaluate results and write report.—This 2003-04 Study Performance Report was prepared during this study segment.

References:

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Table 1.—Estimated sport catch (number and kilograms) and effort (angling hours) of walleye and yellow perch in Michigan waters of Green Bay, Lake Michigan (Statistical District MM-1), 1985-2001. Data from G. Rakoczy and S. Thayer, Michigan DNR, Charlevoix.

Year	Effort (hours)	Walleye		Yellow perch	
		Number	Kilograms	Number	Kilograms
1985 ^{a,b}	523,167	18,738	18,699	459,089	52,060
1986 ^{a,b}	486,339	21,682	20,653	432,646	41,212
1987 ^{a,b}	303,077	12,005	17,425	210,872	26,782
1988 ^{a,c}	551,750	25,535	35,906	323,294	33,729
1989 ^{a,c}	656,462	42,029	40,035	291,003	35,640
1990 ^{a,b}	736,599	43,144	43,054	372,402	38,851
1991 ^{a,b}	948,456	50,009	56,710	564,597	76,830
1992 ^{a,b}	692,284	23,374	28,627	399,671	36,258
1993 ^{a,b,d,e}	734,400	25,425	29,985	104,902	9,516
1994 ^{a,b,d,e}	609,360	32,508	39,813	139,409	12,647
1995 ^{a,b,d,e}	666,976	80,323	87,442	156,720	14,218
1996 ^{a,b,d,e}	627,900	62,752	74,007	323,789	29,374
1997 ^{b,d,e,f}	452,044	30,016	~34,492	43,908	~4,595
1998 ^{a,b,d,e}	532,829	27,863	~32,015	151,310	~15,844
1999 ^{a,b,d,g}	575,561	28,348	~32,572	158,297	~16,576
2000 ^{a,b,d,g}	672,377	33,884	~38,267	143,671	~15,044
2001 ^{a,b,d,g}	634,628	53,314	~60,210	105,467	~11,044
2002 ^{a,b,d,g}	546,875	46,204	~51,994	75,641	~8,150
2003 ^{a,b,d,g}	566,543	23,313	~26,234	75,049	~8,086

^a Little Bay de Noc open water and ice seasons

^b Big Bay de Noc open water season

^c Big Bay de Noc open water and ice seasons

^d Cedar River open water season

^e Menominee River open water season

^f Little Bay de Noc open water season

^g Menominee River open water and ice seasons

Table 2.—Number of walleyes tagged and tag returns by year from Little Bay de Noc, Lake Michigan, 1988-2003. (Recovery year = May-April).

Tag year	Number tagged	Recovery year																Total
		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
1988	2,496	167	141	72	42	12	21	14	5	2	1	0	0	0	2	0	0	479
1989	2,486	-	150	58	25	20	7	7	8	1	3	1	1	0	0	0	3	284
1990	1,744	-	-	94	33	13	15	3	0	0	0	0	0	0	0	0	0	159
1991	1,886	-	-	-	79	30	10	5	2	1	1	0	0	0	0	0	0	128
1992	1,690	-	-	-	-	50	18	14	5	4	3	1	2	0	0	0	0	97
1993	1,563	-	-	-	-	-	69	22	10	5	1	3	3	0	1	1	0	115
1994	1,246	-	-	-	-	-	-	69	23	7	7	2	0	0	1	0	0	109
1995	711	-	-	-	-	-	-	-	33	18	6	3	1	0	0	0	0	61
1996	700	-	-	-	-	-	-	-	-	25	19	6	0	0	0	0	0	50
1997	700	-	-	-	-	-	-	-	-	-	17	9	6	4	0	2	0	38
1998	470	-	-	-	-	-	-	-	-	-	-	19	6	10	0	4	2	41
1999	530	-	-	-	-	-	-	-	-	-	-	-	16	12	9	3	1	41
2000	500	-	-	-	-	-	-	-	-	-	-	-	-	24	16	4	1	45
2001	500	-	-	-	-	-	-	-	-	-	-	-	-	-	18	6	12	36
2002	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	6	20
2003	894																46	46

Table 3.--Number of walleyes tagged and tag returns by year from Big Bay de Noc, Lake Michigan, 1990-2003. (Recovery year = May-April).

Tag year	Number tagged	Recovery year														Total
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
1990	867	22	19	1	2	1	0	1	1	0	0	0	0	0	0	47
1991	354	-	6	3	3	1	2	1	0	0	0	0	0	0	1	17
1993	617	-	-	-	20	13	11	1	1	1	1	0	0	0	0	48
1994	1,458	-	-	-	-	37	15	5	3	0	0	0	0	0	0	60
1995	1,993	-	-	-	-	-	67	29	20	9	0	2	3	0	3	133
1996	1,324	-	-	-	-	-	-	36	26	12	6	4	0	0	4	92
1997	868	-	-	-	-	-	-	-	21	17	3	3	1	4	1	50
1998	77	-	-	-	-	-	-	-	-	0	0	2	0	1	0	3
1999	609	-	-	-	-	-	-	-	-	-	3	7	1	4	5	20
2000	110	-	-	-	-	-	-	-	-	-	-	2	2	1	0	5
2001	55	-	-	-	-	-	-	-	-	-	-	-	1	0	1	2
2002	20	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2
2003	617	-	-	-	-	-	-	-	-	-	-	-	-	-	27	27

Table 4.—Number of walleyes tagged and tag returns by year from Cedar River, Lake Michigan, 1993-2003.
(Recovery year = May-April).

Tag year	Number tagged	Recovery year											Total
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
1993	1,312	50	27	9	1	1	1	0	0	0	0	0	89
1994	1,500	-	73	17	6	2	0	0	1	1	0	0	100
1995	1,677	-	-	36	23	9	3	3	4	1	3	0	82
1996	445	-	-	-	7	11	0	0	4	1	1	2	26
1997	925	-	-	-	-	26	9	3	8	4	5	2	57
1998	1,290	-	-	-	-	-	31	14	10	6	9	10	80
1999	1,203	-	-	-	-	-	-	31	19	7	11	3	71
2000	948	-	-	-	-	-	-	-	15	8	12	7	42
2001	840	-	-	-	-	-	-	-	-	22	15	18	55
2002	1,057	-	-	-	-	-	-	-	-	-	16	17	33
2003	714	-	-	-	-	-	-	-	-	-	-	21	21

Table 5.—Number of walleyes tagged and tag returns by year from Menominee River, Lake Michigan, 1993-2003. (Recovery year = May-April).

Tag year	Number tagged	Recovery year											Total
		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	
1993	1,280	94	19	7	2	0	0	0	0	0	0	0	122
1994	1,500	-	119	15	4	1	0	0	1	0	1	0	141
1995	1,879	-	-	98	28	14	1	4	1	0	1	1	148
1996	544	-	-	-	23	6	4	1	2	1	1	0	38
1997	1,758	-	-	-	-	81	25	6	5	3	1	1	122
1998	1,155	-	-	-	-	-	49	16	13	5	1	1	85
1999	1,503	-	-	-	-	-	-	47	21	13	11	5	97
2000	1,059	-	-	-	-	-	-	-	38	23	12	6	79
2001	976	-	-	-	-	-	-	-	-	42	13	17	72
2002	942	-	-	-	-	-	-	-	-	-	26	23	49
2003	959	-	-	-	-	-	-	-	-	-	-	28	28