

STUDY PERFORMANCE REPORT

State: Michigan

Project No.: F-81-R-3

Study No.: 494

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

Period Covered: October 1, 2001 to September 30, 2002

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 lakewide 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 1985-2002. Assessment netting and tagging have been done annually, 1988-2002. Sampling during 2002 was completed according to schedule, and data from these surveys and assessments will be presented in future reports.

Creel surveys were conducted during 2001 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 105,467 yellow perch and 53,314 walleyes during 2001.

Assessment netting in 2001 captured 1,385 fish representing 19 species. Fish were identified and counted, and 20% were measured and examined to determine sex, maturity, and stomach contents. The most common species collected was yellow perch (36% of the total number), followed by round goby (24% of the total). Walleye ranked eighth (3% of the total). Diet information was summarized from 172 yellow perch, 38 walleyes, and 74 fish of other species.

Based on trawl catches of young-of-the-year (YOY) fish, the 2001 yellow perch year class was weak in both bays, but less so in Big Bay de Noc than in Little Bay de Noc. Trawl catches of age-1 and older yellow perch were moderate in Little Bay de Noc and very high in Big Bay de Noc for 2001. Overall, 2001 gill-net catches of yellow perch were low in both bays relative to other years. One YOY walleye was gillnetted in Little Bay de Noc during 2001 assessments. Based on date and location of capture, and the 2001 stocking schedule, this fish was clearly produced by natural reproduction.

In spring of 2001, 2,371 walleyes were tagged. Since 1988, 47,417 walleyes and 19,572 yellow perch have been tagged. 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 4.2% for Little Bay de Noc, 2.6% for Big Bay de Noc, 2.8% for Cedar River, and 5.0% for Menominee River. Walleye survival was 57.4% in Little Bay de Noc, 56.0% in Big Bay de Noc, 49.4% in Cedar River, and 43.2% in Menominee River. No

yellow perch have been tagged since 1993 and no tagged yellow perch have been reported caught by anglers since 1996.

Findings: Jobs 1, 2, 3, and 5 were scheduled for 2001-02, 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 1994-2001 have been calculated (G.P. Rakoczy, personal communication, Charlevoix Fisheries Station, Charlevoix, Michigan), but are as yet unpublished. Sites and seasons covered during the 2001 creel survey were consistent with those since 1999 and roughly comparable to those since 1993. Compared to 1993-2000 averages, the 2001 catch was 33% higher for walleye and 31% lower for yellow perch. Angling effort during 2001 increased 4% over the 1993-2000 average.

Marquette Fisheries Research Station personnel collected monthly samples of adult and juvenile fish from June through September, 2001 in both Big and Little bays de Noc. Samples were obtained from 42 10-min bottom trawl hauls (20 in Little Bay de Noc and 22 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).

Total length, sex, maturity, and diet data were recorded for 172 yellow perch and 38 walleyes during 2001 (Table 2). An additional 259 yellow perch were measured but not examined internally, and 75 were counted only. Scales and/or spines were collected from 40 walleyes and 113 yellow perch. Ages of these fish will be tabulated in future reports.

Besides walleye and yellow perch, 838 fish, representing 17 other species, were caught in 2001 assessment nets. Of these, 74 fish were measured and examined to determine sex, maturity, and stomach contents. The remainder were measured or counted only.

One YOY walleye was captured in a gill net in Little Bay de Noc on June 19, 2001. It was deduced that this fish was the result of natural reproduction because walleye were not stocked in Little Bay de Noc in 2001, and no stocking of walleye occurred until after the capture date.

Yellow perch was the most abundant species in 2001 assessment netting and walleye ranked eighth (Table 2). The round goby, an exotic first detected in the study area in 1998, ranked second in abundance and represented 24% of the fish captured during 2001 sampling, a large increase compared to 2000.

Catch per unit effort (CPUE) was calculated for yellow perch caught in standard monthly trawl hauls and gill net sets (Table 3). Trawl catches of young-of-the-year (YOY) yellow perch were used as an index of year-class strength, and gill-net catches of yellow perch 178-mm and larger (generally \geq 3-years old) were used as an index of abundance for sizes large enough to interest sport anglers. The 2001 yellow perch year class was weak in both bays, though somewhat higher in Big Bay de Noc compared to 2000. Gill net CPUEs for large, catchable yellow perch in 2001 were 48% lower in Little Bay de Noc and 28% higher in Big Bay de Noc compared to 2000.

In Michigan waters of Green Bay, individually-numbered monel bird leg bands have been used to jaw tag 47,417 walleyes between 1988 and 2001, 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 2001, 2,371 walleyes were tagged in Michigan waters of Green Bay (Tables 4 - 7). Walleyes were tagged at four locations: Little Bay de Noc (N=500), Big Bay de Noc (N=55), Cedar River (N=840), and Menominee River (N=976). Walleyes were tagged coincident with egg-take operations in Little Bay de Noc where fish were collected in fyke nets. Boomshocking boats were used to catch walleye for tagging at other locations but 317 walleyes were obtained from commercial pound nets set near the mouth of the Cedar 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.

Between May 2001 and April 2002, 206 walleye tag returns were reported (Tables 4 - 7). Returns from fish tagged in Little Bay de Noc included fish that had been tagged in 1988, 1993, 1994, and 1999-2001. Big Bay de Noc returns came from fish tagged in 1995, 1997, and 1999-2001. Returns were reported for fish tagged at Cedar River during 1994-2001. Tag returns of Menominee River walleye came from fish that had been tagged in 1995-2001.

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 2001, walleye exploitation rates were 4.2% in Little Bay de Noc, 2.6% in Big Bay de Noc, 2.8% in Cedar River, and 5.0% in Menominee River. Walleye survival was 57.4% in Little Bay de Noc, 51.0% in Big Bay de Noc, 49.4% in Cedar River, and 43.2% 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 11.3% in Little Bay de Noc, 7.0% in Big Bay de Noc, 7.6% in Cedar River, and 13.5% in Menominee River.

No tagged yellow perch were caught in 2001. Yellow perch have not been tagged in bays de Noc since 1993, and no tagged yellow perch have been reported since 1996.

Use of drop boxes, placed at 10 access sites throughout the study area, continued for the sixth year in 2001. Signs were posted asking walleye anglers to fill out brief catch summary forms that were available from a compartment in the drop boxes. Although this has proven to be an effective means by which to collect additional information during previous years, no forms were received from drop boxes during 2001.

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 2000, incidence of lymphocystis in spawning populations during 2001 dropped from 9 to 6% in Little Bay de Noc, increased from 12 to 15% in Big Bay de Noc, decreased from 20 to 10% in Cedar River, and fell from 26 to 18% in Menominee River. Lymphocystis was not observed on any of the 41 walleye caught in 2001 assessment netting.

Fish stomach contents were examined in the field during assessment netting, and food items were identified and counted. Fish prey were measured, weighed, and identified to species when possible, insects were identified to order or family, and zooplankton was considered a broad, inclusive category excepting *Bythotrephes cederstroemi* which was differentiated from other zooplankton. Predation by yellow perch on *Bythotrephes cederstroemi* during 2001 was low compared to years prior to 1999 (Schneeberger 1989, 1991, 2000). Zebra mussels *Dreissena polymorpha* were found in six round goby stomachs (average of 4.3 zebra mussels/stomach) and one common carp stomach (1 zebra mussel).

In Little Bay de Noc, diet data were obtained from 66 yellow perch and 33 walleyes. *Hexagenia*, *Bythotrephes*, and fish (mostly unidentified) were prominent in yellow perch stomachs (Table 8). Four walleye stomachs were empty, but 17 contained fish (alewife, unidentified, and spottail shiner) and 4 contained *Hexagenia* (Table 9).

Stomachs were examined from 106 yellow perch and 5 walleyes in Big Bay de Noc. Yellow perch ate *Hexagenia*, crayfish, amphipods, and fish (unidentified, brook stickleback, white sucker) for the most part (Table 10). The single walleye with identifiable stomach contents contained only an alewife (Table 11).

Job 2. Title: Intensify efforts to obtain an index of walleye recruitment.—No supplemental netting was performed during 2001 due to time and personnel constraints. One YOY walleye was captured in regular 2001 assessment netting, as mentioned under Job 1.

Job 3. Title: Obtain year-round walleye diet from different areas.—In a continuing effort to obtain supplemental walleye diet data, containers and labels were provided to cooperating proprietors of a resort located at the head of Little Bay de Noc. During past years, walleye stomachs were saved, labeled, and frozen for future collection and analysis. No stomachs were retrieved through this process during 2001 because I failed to remind the proprietors of our ongoing desire to collect data with their help.

Job 5. Title: Evaluate results and write report.—The 2001-02 Study Performance Report (F-81-R-1) was prepared during this study segment.

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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, 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

^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.—Numbers of each fish species captured in assessment nets in Little Bay de Noc (LBDN) and Big Bay de Noc (BBDN), Lake Michigan, June-September, 2001.

Common name	Measured and examined ^a		Measured or counted only		Totals			
	LBDN	BBDN	LBDN	BBDN	LBDN	BBDN	All	%
Yellow perch	66	106	102	232	168	338	506	36.53
Round goby	10	0	317	0	327	0	327	23.61
Brook stickleback	0	0	0	134	0	134	134	9.68
Smallmouth bass	3	4	0	81	3	85	88	6.35
Johnny darter	0	4	3	79	3	83	86	6.21
Trout-perch	2	0	76	0	78	0	78	5.63
Spottail shiner	0	4	44	12	44	16	60	4.33
Walleye	33	5	3	0	36	5	41	2.96
White sucker	12	3	3	3	15	6	21	1.52
White perch	9	7	0	0	9	7	16	1.16
Rock bass	2	0	6	1	8	1	9	0.65
Alewife	4	1	0	1	4	2	6	0.43
Northern pike	3	2	0	0	3	2	5	0.36
Common carp	0	1	1	1	1	2	3	0.22
Bluegill	0	0	1	0	1	0	1	0.07
Brown bullhead	0	1	0	0	0	1	1	0.07
Gizzard shad	0	0	1	0	1	0	1	0.07
Golden redhorse	1	0	0	0	1	0	1	0.07
Splake	1	0	0	0	1	0	1	0.07
Total	146	138	557	544	703	682	1,385	100.00

^a Stomach contents, sex, and maturity.

Table 3.—Catch-per-unit-effort for yellow perch in 10-min trawl hauls and 24-hr, 18-m experimental gill net sets in Little Bay de Noc and Big Bay de Noc, Lake Michigan, 1988-2001.

Bay	Year	Number of yellow perch per trawl haul			Number of yellow perch per gill-net lift		
		<90 mm	≥90 mm	All	<178 mm	≥178 mm	All
Little Bay de Noc	1988	35.3	43.1	71.8	15.1	4.8	16.8
	1989	17.7	10.7	21.3	11.0	2.7	12.5
	1990	10.3	18.0	24.0	9.4	1.8	9.8
	1991	33.1	11.3	36.7	6.4	4.3	9.6
	1992	4.3	11.0	13.2	12.6	5.9	16.1
	1993	64.1	17.6	67.1	9.9	1.8	10.5
	1994	9.7	3.2	12.9	14.4	3.2	17.5
	1995	34.3	3.8	28.6	10.8	4.0	12.7
	1996	5.4	0.9	4.2	7.9	0.7	8.6
	1997	20.0	1.8	15.9	9.3	2.3	10.7
	1998	81.0	7.1	58.3	6.8	5.2	8.5
	1999	12.0	1.7	3.4	4.6	4.7	6.3
	2000	9.6	2.2	8.4	4.4	4.2	6.2
2001	10.6	7.8	14.7	3.1	2.0	3.7	
Big Bay de Noc	1988	34.7	34.0	51.5	3.0	3.0	5.0
	1989	3.5	3.7	3.6	14.9	7.1	20.2
	1990	70.3	12.0	70.4	6.6	4.2	9.7
	1991	205.0	1.5	205.2	8.4	3.8	9.4
	1992	2.9	2.8	3.8	11.6	3.6	13.6
	1993	23.4	1.7	24.0	9.4	2.0	9.5
	1994	141.7	8.5	150.2	3.9	1.9	5.8
	1995	44.1	60.0	52.6	5.2	1.4	5.9
	1996	22.8	27.8	35.2	15.2	2.0	17.2
	1997	20.8	1.0	7.0	12.5	2.1	13.8
	1998	69.2	6.0	72.6	4.9	1.4	5.1
	1999	3.0	10.0	9.8	16.9	2.0	17.9
	2000	3.5	0	3.5	5.4	3.2	7.7
2001	28.8	73.0	41.0	5.4	4.1	6.3	

Table 4.-Number of walleyes tagged and tag returns by year from Little Bay de Noc, Lake Michigan, 1988-2001. (Recovery year = May-Apr).

Tag year	Number tagged	Recovery year										Total					
		1988	1989	1990	1991	1992	1993	1994	1995	1996	1997		1998	1999	2000	2001	
1988	2,496	167	141	72	42	12	21	14	5	2	1	0	0	0	0	2	479
1989	2,486	-	150	58	25	20	7	7	8	1	3	1	1	0	0	0	281
1990	1,744	-	-	94	33	13	15	3	0	0	0	0	0	0	0	0	159
1991	1,886	-	-	-	79	30	10	5	2	1	1	0	0	0	0	0	128
1992	1,690	-	-	-	-	50	18	14	5	4	3	1	2	0	0	0	97
1993	1,563	-	-	-	-	-	69	22	10	5	1	3	3	0	1	1	114
1994	1,246	-	-	-	-	-	-	69	23	7	7	2	0	0	1	1	109
1995	711	-	-	-	-	-	-	-	33	18	6	3	1	0	0	0	61
1996	700	-	-	-	-	-	-	-	-	25	19	6	0	0	0	0	50
1997	700	-	-	-	-	-	-	-	-	-	17	9	6	4	0	0	36
1998	470	-	-	-	-	-	-	-	-	-	-	19	6	10	0	0	35
1999	530	-	-	-	-	-	-	-	-	-	-	-	16	12	9	37	
2000	500	-	-	-	-	-	-	-	-	-	-	-	-	24	16	40	
2001	500	-	-	-	-	-	-	-	-	-	-	-	-	-	18	18	

Table 5.-Number of walleyes tagged and tag returns by year from Big Bay de Noc, Lake Michigan, 1990-2001. (Recovery year = May-Apr).

Tag year	Number tagged	Recovery year										Total				
		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999		2000	2001		
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	0	16
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	0	0	2	2	129
1996	1,324	-	-	-	-	-	-	36	26	12	6	4	0	0	0	88
1997	868	-	-	-	-	-	-	-	21	17	3	3	1	1	45	
1998	77	-	-	-	-	-	-	-	-	0	0	2	0	0	2	
1999	609	-	-	-	-	-	-	-	-	-	3	7	1	1	11	
2000	110	-	-	-	-	-	-	-	-	-	-	1	3	4	4	
2001	55	-	-	-	-	-	-	-	-	-	-	-	1	1	1	

Table 6.—Number of walleyes tagged and tag returns by year from Cedar River, Lake Michigan, 1993-2001. (Recovery year = May-Apr).

Tag year	Number tagged	Recovery year									Total
		1993	1994	1995	1996	1997	1998	1999	2000	2001	
1993	1,312	50	27	9	1	1	1	0	0	0	89
1994	1,500	-	73	17	6	2	0	0	1	1	100
1995	1,677	-	-	36	23	9	3	3	4	1	79
1996	445	-	-	-	7	11	0	0	4	1	23
1997	925	-	-	-	-	26	9	3	8	4	50
1998	1,290	-	-	-	-	-	31	14	10	6	61
1999	1,203	-	-	-	-	-	-	31	19	7	57
2000	948	-	-	-	-	-	-	-	15	8	23
2001	840	-	-	-	-	-	-	-	-	21	21

Table 7.—Number of walleyes tagged and tag returns by year from Menominee River, Lake Michigan, 1993-2001. (Recovery year = May-Apr).

Tag year	Number tagged	Recovery year									Total
		1993	1994	1995	1996	1997	1998	1999	2000	2001	
1993	1,280	100	24	6	4	0	0	0	0	0	134
1994	1,500	-	127	16	4	2	0	0	1	0	150
1995	1,879	-	-	103	25	15	6	0	4	1	154
1996	544	-	-	-	20	8	5	1	2	1	37
1997	1,758	-	-	-	-	77	28	14	3	4	126
1998	1,155	-	-	-	-	-	52	19	9	10	90
1999	1,503	-	-	-	-	-	-	47	21	19	87
2000	1,059	-	-	-	-	-	-	-	32	29	61
2001	976	-	-	-	-	-	-	-	-	38	38

Table 8.—Diet data from stomachs of 66 yellow perch collected in assessment nets in Little Bay de Noc, Jun-Sep, 2001. No. = number; TL = Total length.

Food category	Observed occurrence			TL (in) of yellow perch	
	Frequency	Mean no. per fish	Months	Min.	Max.
<i>Hexagenia</i>	13	3.3	6,7,8,9	3.4	11.1
Miscellaneous	12	-	6,8,9	4.3	6.9
<i>Bythotrephes</i> spines	12	23.1	9	2.8	8.2
Fish ^a	9	1.0	6,7,9	5.1	8.4
Zooplankton	7	12.1	8	2.1	2.5
<i>Bythotrephes</i>	6	6.2	9	4.0	8.2
Crayfish	2	1.0	6,9	7.3	9.4
Amphipods	1	5.0	9	4.3	4.3
Aquatic insects	1	1.0	8	2.2	2.2
Empty	12	-	6,7,8,9	1.9	11.8

^a Unidentified (6), alewife (3)

Table 9.—Diet data from stomachs of 33 walleyes collected in assessment nets in Little Bay de Noc, Jun-Sep, 2001. No. = number; TL = Total length.

Food category	Observed occurrence			TL (in) of walleye	
	Frequency	Mean no. per fish	Months	Min.	Max.
Fish ^a	17	1.2	7,8,9	10.5	21.1
Miscellaneous	9	-	6,7	5.8	20.5
<i>Hexagenia</i>	4	2.0	6,7	12.4	16.4
Empty	4	-	6,8,9	12.5	16.5

^a Alewife (15), unidentified fish (5), spottail shiner (1)

Table 10.—Diet data from stomachs of 106 yellow perch collected in assessment nets in Big Bay de Noc, Jun-Sep, 2001. No. = number; TL = Total length.

Food category	Observed occurrence			TL (in) of yellow perch	
	Frequency	Mean no. per fish	Months	Min.	Max.
<i>Hexagenia</i>	26	1.4	6,7,8,9	3.8	11.1
Crayfish	25	1.6	6,7,8	4.2	11.2
Amphipods	24	8.6	6,9	3.0	4.5
Fish ^a	6	1.0	6,7	4.1	10.9
Miscellaneous	4	-	6,9	3.9	10.4
Eggs	2	17.5	7	8.0	8.3
Diptera	1	3.0	8	3.9	3.9
Isopoda	1	2.0	7	8.7	8.7
Vascular plants	1	1.0	9	11.1	11.1
Empty	25	-	6,7,8	3.9	12.5

^a Unidentified (4), brook stickleback (1), white sucker (1)

Table 11.—Diet data from stomachs of 5 walleyes collected in assessment nets in Big Bay de Noc, Jun-Sep, 2001. No. = number; TL = Total length.

Food category	Observed occurrence			TL (in) of walleye	
	Frequency	Mean no. per fish	Months	Min.	Max.
Miscellaneous	2	-	8	18.9	20.4
Fish ^a	1	1.0	7	18.5	18.5
Empty	2	-	8	20.4	23.7

^a Alewife (1)