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Ages and Lengths of Yellow Perch *Perca flavescens*, White Perch *Morone americana*, and Lake Whitefish *Coregonus clupeaformis* in Commercial Trap Nets in Western Lake Erie*

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Abstract.–We collected samples of yellow perch (*Perca flavescens*) and white perch (*Morone americana*) in spring, and of lake whitefish (*Coregonus clupeaformis*) in autumn, from commercial trap nets set in western Lake Erie in 2008. The yellow perch sample (N = 153) was dominated (72%, of the total sample) by the 2003 year class, followed by the 2005 year class (12%). The white perch sample (N = 201) was dominated by the 2005 year class (39% of the total sample), followed by the 2003 year class (23%). The lake whitefish (N = 99) sample was dominated by the 2003 year class (75%) followed by the 2001 year class (10%). For yellow perch (both sexes in spring, analyzed separately) and lake whitefish (males in autumn), mean total length at age 5 was the same for the 2001 year class (calculated from historical data) and the 2003 year class.

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Introduction

The U.S. Geological Survey Lake Erie Biological Station (LEBS) has collected fish samples from commercial trap nets in the western basin of Lake Erie since the 1960s (Bur *et al.* 2006). The objectives of this activity are to estimate growth rates and population age structures of commercially harvested species. These data are critical for estimating abundances and determining harvest limits. In this report we summarize age structure and mean total length-at-age for yellow perch *Perca flavescens*, white perch *Morone americana*, and lake whitefish *Coregonus clupeaformis* collected from commercial trap nets in western Lake Erie during 2008. We also compare mean total length at age 5 for two large year classes of yellow perch and lake whitefish (2001 and 2003). The results are intended to provide insights into changes in age structure and growth rates for both species.

Methods

Samples from landed catches of yellow perch were collected from commercial trap nets set offshore of Cedar Point in western Lake Erie on 1 May 2008. Unlike previous years (Bur *et al*. 2008) no commercial yellow perch samples were collected during autumn 2008. Samples of white perch were collected on 29 April and 7 May near West Harbor, Ohio and on 1 May and 20 May near Cedar Point, Ohio. Samples of lake whitefish were collected from commercial trap nets set offshore of Turtle Island, Ohio on 4 December 2008.

For all three species, total length (nearest mm) of each specimen was measured. Weight (nearest g) of nearly all specimens was also measured. Sex and maturity of each specimen were determined by inspecting the gonads. Sagittal otoliths were removed, and ages of specimens were estimated by examining whole and sectioned otoliths in the laboratory.

Prior to 2003, ages of specimens were estimated by examining scales. Due to the low number of years in which otoliths were examined and low sample sizes for most age classes, we were not able to compare length-at-age for fish collected in 2008 with those collected in most years. We calculated 95% confidence intervals for mean total length at age 5 for yellow perch in spring and lake whitefish in autumn for the 2003 year class (this report) and the 2001 year class (Stapanian *et al.* 2007). For yellow perch, separate confidence intervals were calculated for each sex. For lake whitefish, this analysis was restricted to males, due to a lack of age-5 females collected.

Results and Discussion

All individuals collected were sexually mature. Five year classes (2001-2005) were represented in the yellow perch sample (Table 1, N = 153). The 2003 year class (72%) dominated the sample. This result was similar to yellow perch samples collected from commercial trap nets during spring 2007 (Stapanian *et al.* 2008). Although the 2005 year class accounted for 12.4% of the sample, age-3 yellow perch may not be fully recruited to the commercial gear in spring samples (Stapanian *et al.* 2008). The 2001 year class declined from 27% in 2007 (Stapanian *et al*. 2008) to 5% in 2008. Mean total length at age 5 was not significantly different for males of the 2003 year class (95% confidence interval 217.5 $\pm$ 2.7 mm) than for males of the 2001 year class (from Stapanian *et al*. 2007: 224.0 mm $\pm$ 6.9 mm; n = 29). Similarly, mean total length at age 5 was not different for females of these two year classes (2003 year class: 229.8 $\pm$ 43.3 mm; 2001 year class [from Stapanian *et al*. 2007]: 258.0 $\pm$ 10.1 mm; n = 31). We suggest caution in interpreting these results, due to low sample size.

Ten year classes (1998-2007) were represented in the white perch sample (Table 2, N = 201). Females outnumbered males in the sample by a ratio of nearly two to one, and were collected from nine of the year classes. The 2005 year class dominated the sample (39.3%), followed by the 2003 year class (22.9%) and the 2002 year class (13.4%). This is the first year since 1996 in which LEBS collected white perch from commercial trap nets, and future reports may include analyses of size at age.

Nine year classes (2003, 2004, 1998-2001, and 1994-1996) were represented in the lake whitefish sample (Table 3, N = 99). Only five females, all age 5, were collected. The sample was dominated by the 2003 year class (75.8%), followed by the 2001 year class (10.1%). This result was similar to commercial lake whitefish collected during 2006 (Stapanian et al. 2007). Mean total length at age-5 for males of the 2003 year class (95% confidence interval: 493.8 $\pm$ 4.9 mm) was not different from the 2001 year class (508.0 $\pm$ 13.7 mm, n = 26 [from Stapanian *et al.* 2007]).

The absence of the 1997 and 2002 year classes during 2008 was consistent with low catches of these year classes in recent years (e.g., Stapanian *et al*. 2007).

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Table 1. Summary statistics for yellow perch (N = 153) collected from commercial trap net catches in western Lake Erie during spring 2008. All individuals were sexually mature. Sample size (n) for lengths and weights are as shown, except n = 12 weights for age-4 males. Abbreviations: F = female, M =male, SE = standard error.

		Year			Total length (mm)		Weight (g)	
Age	Sex	Class	n	%N	Mean	SE	Mean	SE
3	F	2005	6	3.9	189.3	46.1	188.8	53.8
	M	2005	13	8.5	205.8	17.8	102.8	23.6
4	F	2004	0	0.0	.	.	.	.
	M	2004	13	8.5	209.9	17.5	115.1	28.5
5	F	2003	11	7.2	229.8	64.5	267.5	139.8
	M	2003	99	64.7	217.5	13.5	125.0	26.6
6	F	2002	1	0.7	278.0	.	261.0	.
	M	2002	2	1.3	218.5	23.3	121.5	33.2
7	F	2001	1	0.7	374.0	.	320.0	.
	M	2001	7	4.6	233.4	21.4	168.9	53.3

Table 2. Summary statistics for white perch (N = 201) collected from commercial trap net catches in western Lake Erie during spring 2008. All individuals were sexually mature. Abbreviations: n = sample size, F = female, M =male, SE = standard error.

		Year			Total Length (mm)		Weight (g)	
Age	Sex	class	n	%N	Mean	SE	Mean	SE
1	M	2007	2	1.0	247.0	22.6	249.0	56.6
2	F	2006	2	1.0	285.0	22.6	420.0	75.0
3	F	2005	46	22.9	224.4	9.7	186.3	27.1
	M	2005	33	16.4	209.1	11.3	139.2	30.7
4	F	2004	11	5.5	237.3	9.7	224.8	33.3
	M	2004	5	2.5	218.6	11.2	169.0	25.1
5	F	2003	31	15.4	257.8	11.8	289.1	45.3
	M	2003	15	7.5	245.9	9.3	241.4	27.4
6	F	2002	17	8.5	275.5	11.3	362.3	64.9
	M	2002	10	5.0	256.1	31.1	273.8	31.1
7	F	2001	17	8.5	277.7	12.4	381.0	71.5
	M	2001	3	1.5	254.7	18.6	284.0	88.6
8	F	2000	3	1.5	290.7	1.5	438.3	25.5
9	F	1999	4	2.0	287.5	11.7	441.0	75.6
10	F	1998	2	1.0	302.5	9.2	474.5	19.1

Table 3. Summary statistics for lake whitefish (N = 99) collected from commercial trap net catches in western Lake Erie during autumn 2008. All individuals were sexually mature. Sample size (n) for lengths and weights are as shown, except n = 1 weights for age-10, -12, and -13 males. Abbreviations: F = female, M =male, SE = standard error.

		Year			Total length (mm)		Weight (g)	
Age	Sex	Class	n	%N	Mean	SE	Mean	SE
4	M	2004	1	1.0	470.0	.	984.0	.
5	F	2003	5	5.1	504.2	26.4	1238.2	197.8
	M	2003	70	70.7	493.8	20.6	1159.0	154.7
7	M	2001	10	10.1	538.4	20.6	1419.7	149.2
8	M	2000	2	2.0	571.0	11.3	1834.5	9.2
9	M	1999	1	1.0	522.0	.	1457.0	.
10	M	1998	3	3.0	595.7	5.9	2313.0	.
12	M	1996	2	2.0	614.5	7.8	2076.0	.
13	M	1995	2	2.0	610.0	36.8	2225.0	.
14	M	1994	3	3.0	592.3	30.6	2180.3	263.1