Ohio's
Lake Erie Fisheries
2009

Prepared
April, 2010
by:

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* Work was completed under Federal Aid in Sport Fish Restoration Project F-69-P, *Fish Management in Ohio.*

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Note: The data and management summaries contained in this report are provisional. Every effort has been made to insure their correctness. Contact the Division of Wildlife Lake Erie office nearest you prior to using this data or before citing research and management findings.

1.0 Overview

In 2009, sport anglers made over 700,000 trips to fish Lake Erie. Private sport fishing effort topped 3.4 million hours. This was a 5% increase compared to 2008, but was about 1.5 million hours lower than private sport fishing effort seen in 2007. Charter boat fishing effort was about 0.27 million hours; a 6% decrease from 2008 levels. Most of the private boat effort was directed toward walleye (55%), followed by yellow perch (36%) and smallmouth bass (5%). Largemouth bass (1.3%), white bass (1.1%) and steelhead (less than 1%) were minor components of the open water fishery. Private boat anglers seeking anything that bites made up 1.1% of the 2009 estimated angler effort. Charter boat anglers mainly sought walleye (86%), followed by yellow perch (13%), then smallmouth bass and steelhead (0.4% each). Total harvest of sport fish increased by 5% in 2009 relative to 2008, mostly due to increases in harvest of yellow perch, white bass, white perch, and other minor sport fish species like rock bass.

In 2009, the Ohio commercial fishery harvested a total of 5.01 million pounds of fish, a 20% increase from the 2008 harvest of 4.18 million pounds. Ohio's yellow perch commercial harvest (1.45 million pounds) was still above the long-term average, but 4% lower then 2008 harvest levels. Much of the commercial harvest in pounds was harvested by the end of June, but lake whitefish harvest was substantial in November and December. The dockside value of the Ohio commercial fishery increased to $4.0 million, up from $3.4 million the previous year. The Ohio 2009 commercial fishery harvest of commodity species increased for lake whitefish (248%), buffalo (64%), white bass (58%), suckers (53%), freshwater drum (28%), carp (26%), and white perch (25%) relative to 2008 (Table 4), while channel catfish (-9%) and yellow perch (-4%) experienced relatively small harvest declines compared to 2008.

Assessment surveys during 2009 were completed by the Ohio Division of Wildlife's two Lake Erie Research Units using bottom trawl, gillnet, hydroacoustic, and lower trophic sampling gears. Most of our fish assessment surveys tracked the continued persistence of the large 2003 year class that was produced by many fish species in Lake Erie. Growth and condition of Lake Erie fishes remains within acceptable ranges. Detailed trends in relative abundance, growth, maturity and diets are presented in the full annual report. From assessment surveys for juvenile fishes, abundance of the 2007 year classes of walleye and yellow perch were generally near the long-term average in the west basin, and well above average for yellow perch in the central basin. The 2009 year classes of walleye and yellow perch appear to be well below average in all surveys and in all Districts; similar to hatches in 2000 and 2002. The 2008 year classes of walleye and yellow perch, as yearlings, appear to be slightly below average in all surveys; however, their growth rates are average to above average, similar to those in the 2007 cohort. The fall assessment surveys also showed that the 2009 cohorts for forage species were generally below average across both basins, with a strong showing of young of year and yearling rainbow smelt in the western basin. Higher catches or slight increases in hatch strength were observed for white perch but not white bass. Declines in juvenile cohort strength were particularly evident in the central basin for emerald shiners, spottail shiners, trout-perch, gizzard shad and freshwater drum.

Walleye

In 2009, the walleye harvest was dominated by fish from the abundant 2003 year class (66%) followed by the 2007 (9%) and 2006 year classes (6%). The Ohio sport harvest of 0.967 million walleye was an 11% decline relative to 2008 (Table 3). Western basin sport harvest in Ohio, at just over 0.55 million fish, was slightly below the long-term average (2000-2008). Walleye harvest in the central basin exceeded the long-term average, particularly in District 3, indicating that the walleye population is aging and has a higher propensity to migrate. Total angler effort for walleye in Ohio waters of the western basin increased 3% (1.06 million hours) compared to 2008. Central basin walleye effort in Ohio waters decreased 9% over the previous year. Angler catch rates increased slightly over the previous year in District 1 but declined in Districts 2 and 3, relative to 2008. Angler release rates of walleye (0.05 fish per angler hour) were low in 2009 due to the fact that many fish from the 2007 year class fish exceeded the 15" minimum size limit.

The Maumee and Sandusky River sport fisheries for walleye were again evaluated in 2009. Walleye angler effort increased in both tributaries compared to 2008. Harvest rates for walleye declined slightly in the Sandusky River but increased for the second consecutive year in the Maumee River and both were near their long-term averages.

The abundance of walleye in Ohio waters of Lake Erie have been assessed annually with gill nets since 1978. Total walleye gill net catch rates in 2009 were higher than those seen in 2008 in all Districts, due to strong contributions from the 2007, 2003, 2005 and 2008 year classes.

As active participants of The Great Lakes Fishery Commission's Lake Erie Committee, we continue to participate in a review of the walleye population model and a review of our harvest assessment programs. We continue to implement research to examine the performance of individual walleye stocks spawning in both tributaries and the open lake reef complex and have initiated research to describe fine scale movement patterns of spawning walleye. Under a new process that was approved by the Wildlife Council this year, the daily bag limit for walleye is set following the determination of the Total Allowable Catch (TAC) for walleye at the Great Lakes Fishery Commission's Lake Erie Committee Meeting. Daily bag limits are determined based on Ohio's portion of the Walleye TAC and projected estimates of Ohio sport angler effort and harvest. The walleye daily bag limit regulations remain unchanged: 6 fish per angler from May 1, 2010, to February 28, 2011, and 4 fish per angler from March 1 to April 30, 2011.

Yellow Perch

In 2009, yellow perch sport and commercial fisheries remained strong in Ohio waters, particularly in the central basin. Total harvest, in pounds, from Ohio waters declined slightly (-6%) during 2009 relative to 2008. Harvest (by weight) increased by 13% in District 1, from 2008, which was restricted to sport harvest only, with anglers restricted to a 25-fish daily bag limit. In District 2, harvest by weight decreased slightly (-10%) for 2009 relative to 2008 due to a 26% decrease in the sport fishery harvest and a 3% decrease in commercial trap net harvest. District 3 yellow perch fisheries exhibited a 5% decrease in harvest (expressed as weight) due to minor decreases in both sport fishery (1%) and commercial fishery (19%) harvest. Angler effort for yellow perch increased in all districts for the private boat fishery, and for the charter boat fishery in District 3. Charter angler effort declined for yellow perch in Districts 1 and 2 and remains low. Angler catch rates for yellow perch declined in Districts 2 and 3, but increased in District 1. Catch rates remain below the long term average in District 1, at the long term average in District 2 and above the long term average in District 3. The strong 2003 year class dominated the harvest in the central basin, while younger cohorts from 2007 and 2006 contributed more to the District 1 fishery. Yellow perch up to 13 years of age were seen in the fishery samples.

Yellow perch in Ohio waters of Lake Erie are annually assessed with bottom trawls, with trawling sites located throughout the Ohio waters of Lake Erie. The bottom trawl survey was initiated in 1969. In 2009, the abundance of age-2 and older yellow perch in District 1 and 2 was lower than the 2008 abundance, while abundance of age-2 and older fish in District 3 was higher. Catches of younger fish (ages 1-3) dominated the catches in both basins.

Average or below average reproduction in the past four years will limit the population of yellow perch over the next several years. The strong 2003 year class should continue to contribute to the fisheries again in 2010. The future contributions of the 2005-2008 year classes are expected to be moderate, based on their average to below average abundance in most districts within our assessment surveys; however, the 2009 year class is not expected to contribute much to future fisheries.

Using the same process that is used to determine walleye regulations, Ohio's quotas for yellow perch are set following the determination of the Total Allowable Catch (TAC) by Lake Erie Committee at the annual meeting. Daily bag limits are determined based on Ohio's portion of the Yellow Perch TAC in each Management Unit, projected estimates of Ohio sport angler effort and harvest, and the sport and commercial sharing formula for Ohio yellow perch fisheries. The daily bag limit for yellow perch will remain at 30 per angler in Districts 2 and 3 and will increase from 25 to 30 on May 1, 2010, through April 30, 2011. Commercial fishing for yellow perch will resume in District 1 and continue in Districts 2 and 3 in May 2010. Commercial shares are determined in the manner developed with input from the Ohio Commercial Fishing Task Force in 2007 and was first implemented in 2008, based on conformity with ODNR Policy Number 2, on the commercial fishery's preference to fish in MU2 over MU3, and in consideration of future population trends in each Lake Erie Management Unit.

Smallmouth Bass

Smallmouth bass sport fisheries, increased 173% in 2009, compared to 2008, with 3,409 fish harvested. Targeted effort and harvest has remained low since the catch-and-immediate-release-only spring season was implemented in 2004. Private boat angler effort increased lakewide by 55% and in each basin as compared to 2008. Charter boat effort for smallmouth bass, at just over 1,000 angler hours, was up 32% over 2008 effort. Tournament effort may be a bigger factor than charter boat effort in smallmouth bass dynamics. The 2009 catch rates are dominated by released fish (0.39 fish per angler hour) compared to harvested fish (0.01 fish per angler hour). In 2009, catch rates of younger smallmouth bass did increase, with the 2005 and 2006 year classes combined comprising 54% of the harvest.

In 2006, we began a more robust smallmouth bass population assessment survey to track recruitment and biological parameters. The smallmouth bass assessment survey results indicated that younger fish are more numerous than earlier this decade. Catch rates for age 2 and older smallmouth bass in District 1 were comparable to those levels seen in 2008 and 2007. In 2009, catch rates were higher than 2008 in District 2, but lower in District 3. A five-fish daily bag limit and a 14-inch minimum length limit remain in effect to reduce exploitation of smaller fish. Fair to good numbers of cohorts appear to have been produced in 2005-2007. Again this year, the "catch-and-immediate-release" season is in effect from May 1 through the last Friday in June (June 25, 2010) to protect spawning bass.

Steelhead Trout

The open lake steelhead fishery in the central basin improved in 2009 relative to 2008. This fishery is reliant in part on "combo trips" of trolling anglers seeking walleye and steelhead. Lake harvest (7,662 fish) increased over two-fold from levels seen in 2008, but was well below the historic high seen in 2002. Catch rates of 0.25 steelhead per angler hour for private boat anglers were similar to those observed in recent years; however the charter boat catch rate of 1.04 steelhead per angler hour and overall catch rate of 0.95 steelhead per hour were the highest recorded. Low amounts of effort may make these estimates less reliable and highly variable. Tributary and lake fisheries will remain good with continued annual stocking of yearling Little Manistee River (Michigan) strain steelhead. Ohio Division of Wildlife personnel raised and stocked 458,823 Little Manistee River strain steelhead yearlings in 2009. Excellent returns to anglers have been seen in the five Ohio stocked streams: Vermilion, Rocky, Chagrin and Grand rivers and Conneaut Creek. Stray steelhead have been caught in many of Ohio's other Lake Erie tributaries. The first year of a two-year creel survey on Ohio's steelhead streams provided detailed results about the fishery and demographics about our steelhead anglers. A 12" minimum size limit remains in effect and the daily bag limit is 5 fish from May 16 to August 31, 2010 and 2 fish from September 1, 2010 to May 15, 2011.

The sea lamprey population and its predatory effect on steelhead and other Lake Erie coldwater species remains a concern. In 2007, U.S. Fish & Wildlife Service sea lamprey assessment surveys and interagency surveys of fish wounding rates have shown that sea lamprey populations are high enough to warrant an experimental two-year lampricide treatment program in Lake Erie tributaries. In 2009, lakewide wounding rates were some of the highest on record. The nine biggest sea lamprey producing streams in Lake Erie were treated in spring 2008 and in fall 2009 in an effort to significantly reduce the sea lamprey sub-adult population.

White Bass

In 2009, sub-adult and adult white bass populations were similar to 2008, but continue to be above long-term averages in Districts 1 and 2. The population is dominated by individuals from the 2005-2008 year classes. Sport harvest of white bass in 2009 increased 49% over the level observed in 2008. Targeted effort on the open lake for white bass increased 107% from 2008 effort levels. Targeted harvest rates for white bass declined in 2009 relative to 2008 and remain near the long term average. In 2009 reported commercial harvest of white bass was 671,151 pounds, up 58% from the previous year and was the highest reported harvest in the time series. The good 2005 and 2007 hatches will continue this moderating trend. Older adults (ages 3+) have begun to contribute more to fisheries in recent years.

The Maumee and Sandusky rivers' sport fisheries for white bass were again evaluated in 2009. White bass angler effort was about the same as that seen in both tributaries in 2008, with harvest rates increasing relative to 2008. Fisheries in both tributaries were well below the 1975-2008 average values in effort and harvest.

Forage and Lower Trophic Sampling

In 2009, District 1 August trawling indices for forage fishes increased for most species and age-groups except YOY white perch, spottail shiners, trout-perch and drum. Gizzard shad catch rates increased to the highest levels in seven years in District 1. In Districts 2 and 3, August 2009 trawling indices decreased for age-0 emerald shiner, spottail shiner and gizzard shad, were mixed for age-0 rainbow smelt, and generally increased for age-0 round goby as compared to 2008. Higher catch rates (CUEs) of yearling and older emerald shiner, rainbow smelt, white perch, and freshwater drum were seen in District 1 in August 2009 versus August 2008 trawls, while CUEs were lower there for spottail shiner and round goby. Comparisons for August in District 2 showed higher yearling and older CUEs for freshwater drum, round goby and rainbow smelt, but lower CUEs for emerald and spottail shiners, gizzard shad and trout perch. District 3 yearling and older August catches were higher for white perch, rainbow smelt, round goby, emerald shiner and freshwater drum, but were lower for trout perch.

Eighty-seven lower trophic level samples were collected from May 7-September 24, 2009, at eight sites in District 1. In District 2, 62 samples were collected at four sites from March 26-October 6, 2009. Forty-eight samples were collected from May 8-September 21, 2009, at four sites in District 3. Samples included turbidity, dissolved oxygen, water temperature, zooplankton, phytoplankton, and water samples for phosphorus and chlorophyll-*a* analysis. These samples are part of larger sampling programs through both the Ohio State University and the Forage Task Group of the Lake Erie Committee, and are used to monitor changes to the physical and chemical environment in Lake Erie and to explore changes in the biotic community.

ODW Research Projects

Staff from both research stations participated in a variety of research projects in 2009. Evaluation of the Sandusky walleye stock by radio telemetry continued in 2009; 65 locations from 12 different fish were collected in the bay and river during spawning. The project was completed in 2009, and the project completion report will be available for download on the Division of Wildlife website. A nearshore fish community sampling program in District 1 continued in 2009, and electrofishing was used to compare fish community health between different habitat types and levels of shoreline protection/armoring. Fish community health is highest in wetland and bedrock habitats, and in areas without shoreline alteration. Efforts continued in the development of the Lake Erie Shoreline Erosion Management Plan (LESEMP) and numerous education and outreach events.

In 2009, there were 15 Lake Erie sightings of lake sturgeon reported to the Ohio Department of Natural Resources, Division of Wildlife. Seven of the fifteen sightings were from commercial trap net fishermen, five were from recreational anglers, and three were reported by either landowners or public citizens. The three lake sturgeon reported by landowners or private citizens were found dead along the Lake Erie shoreline, two near the Consumers Power Plant, Monroe, Michigan and one was reported near Allen Cove near Luna Pier, Michigan. Total lengths for those fish measured ranged from 559 to 1,981 mm. Similar to past sturgeon sightings, the majority of fish were observed around the Bass Islands in the western basin (i.e., District 1).

We continued to research yellow perch spawning movements, VHS prevalence in yellow perch, and recruitment factors affecting yellow perch in the central basin of Lake Erie. This assessment project will also define critical fish habitat and spawning locations in the central basin of Lake Erie. Work continued in an interagency grant project assessing lake trout habitat in Lake Erie.

We completed the first year of a two-year comprehensive creel survey at steelhead access locations from Vermilion River east to the Pennsylvania border. Angling data, fisheries rates, and angler demographics data will be obtained from these surveys; the first time in several decades that this information has been updated. During the first year of the surveys, we collected names and addresses of over 1500 anglers who volunteered to complete a more thorough angler survey in cooperation with Dr. Jeremy Bruskotter at the Ohio State University School of Natural Resources. Results and analyses are currently underway.

2.0 List of Tables

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4.0 Sport Fishery Summary

4.1 Open Lake Sport Fisheries *(Project FFDR01)*

Ohio's private and charter boat fisheries were assessed by an access point direct contact creel survey during 2009. The creel survey was conducted from Toledo to Conneaut at 40 major boat departure sites along Ohio's portion of the Lake Erie shoreline. These sites were grouped into six areas (Figure 4.1.1). Areas 1-3 were surveyed from April 1 to October 30, area 4 was surveyed from May 2 to October 30, and areas 5 and 6 were surveyed from May 13 to October 31. Three weekdays and two weekend days were surveyed each week in each survey area. Survey dates and count and interview schedules were randomly selected. Each survey day included time interval counts of boats returning from Lake Erie at all major harbors and completed trip interviews of people on boats returning to marinas, docks, and ramps within the harbors.

Boat effort was estimated from counts of private and charter boats returning to major harbor areas during 20-minute count intervals at 36 access points. Boat counts were scheduled to include coverage of the busiest hours of the day: 1000-2000 hours (military time) for April, 1100-2100 hours for May, 1030-2130 hours for June and July, 1030-2030 hours for August, 1100-2000 hours for September, and 1100-1900 hours for October. Boat counts included all vessels except sailboats, commercial boats, and government boats that were assumed not to be involved in fishing. Boat count means and variances were expanded with monthly constants for count locations per area, count intervals per day, and days per month.

Completed trip interviews were obtained from boaters returning to harbor areas. Boat interviews identified the type of fishery (private or charter), number of anglers per boat, hours fished, the number of each species harvested and released, the grid location where the majority of time was spent fishing, and the primary target species. The duration of the fishing trip was defined as the time when actual fishing began until fishing was completed.

Calculations of angler hours and catch were computed following the procedures outlined in Table 4.1.1. Survey data were stratified by type of fishery, month, survey area, and weekday-weekend. The primary location fished was coded into one of 50 grids in each statistical catch district (Figure 4.1.2). Estimates for the private and charter boat fisheries were summarized by grid, district, and month.

Catch per unit effort (catch rate) was expressed as the number of fish harvested per angler hour. Catch rates were calculated for all targeted species. Significant differences in fishing methods, areas, and seasons for each target species did not allow effort to be comparable across target species. If more than one species was indicated as the primary target species, they were recorded to "anything that bites" and not included in species analyses.

Angler harvest was sampled weekly to obtain fish lengths. Mean weights, in grams, were obtained by using the length-weight regressions presented in Table 4.1.2. Otoliths were used for determining ages of walleye, yellow perch, smallmouth bass and white bass. Scales were used for determining ages of white perch. An age-length key computer program was used to assign ages to measured fish in predetermined increments (25 mm for walleye and smallmouth bass, 10 mm for all other species) based on age composition of aged fish. Age composition by percent, mean length, and mean weight were calculated for each district and month for walleye, yellow perch, smallmouth bass, white bass, and white perch. Mean length and weight were calculated for freshwater drum, channel catfish, and steelhead trout. A total of 4,950 boat interviews were collected during the angler survey for 2009. Interviews collected by the survey clerks in Sandusky Bay (private boat) and the major rivers (private and charter boat) were not included in the estimates. Private and charter boat estimates of harvest and effort were based on 4,667 boat interviews and 8,173 interval boat counts.

The 2009 total sport harvest, for the private (Table 4.1.3) and charter boat (Table 4.1.4) fisheries, was 5.6 million fish and 5.1 million pounds (Appendix A). Yellow perch (76%) and walleye (17%) represented the majority of the total harvest in numbers (Tables 4.1.3 and 4.1.4). The combined angler hours for the private and charter boat fisheries was 3.7 million angler hours (Tables 4.1.5 and 4.1.6). Angler hours were up 4% compared to 2008, but this effort was the second lowest since the survey began in 1975 (with the exception of 1978 when only District 1 was surveyed). The private boat fishery accounted for 94% of the harvest and 93% of the angler effort. The primary target species were walleye

(55%) and yellow perch (36%) for the private boat fishery and walleye (86%) and yellow perch (13%) for the charter fishery. Characteristics of private boat and charter boat angler trips, by target species, are presented in Tables 4.1.7 and 4.1.8, respectively. There were 799 Ohio licensed charter guides in 2009. This was slightly higher than 2008, but below the ten-year mean of 843 licensed charter guides (Figure 4.1.3).

Walleye

Private boat walleye harvest and targeted angler effort for 2009 decreased 8% and 3%, respectively, compared to 2008, and remain below the ten year average (Table 4.1.9). In District 1, walleye harvest was evenly distributed across the months May to August with the peak occurring in June (25%). In District 2, the walleye harvest also peaked in June (37%) but good fishing continued from July to September. In District 3, harvest peaked in August and September (73%; Table 4.1.3). The primary fishing method used on walleye trips differed among districts (Table 4.1.10). As in past years, casting as the primary fishing method decreased from west to east. Casting represented 46% of the fishing effort in District 1, but only 26% in District 2, and 2% in District 3. This is the first year that the combined percentage of the two trolling methods was greater than casting in District 1. In Districts 1 and 2, the percent casting was the lowest recorded since tracking fishing method began in 1989. In Districts 2 and 3, the percentage of fishing effort by anglers using flat-line trolling, was somewhat similar at 57% and 48%, respectively. Depth-controlled trolling comprised 12% of the effort in District 2 and 46% in District 3. Harvest rates were highest for depth-controlled trolling in all districts, followed by flat-line trolling and casting. Harvest rates by district for anglers seeking walleye, ranged from 0.36 fish per angler hour in Districts 2 and 3 to 0.49 fish per angler hour in District 1. The lakewide harvest rate of 0.42 fish per angler hour decreased from 0.45 fish per angler hour in 2008, but remained above the ten year average. Boat limit trips averaged 17%, which was a 2% increase compared to 2008 (Table 4.1.7).

The 2009 charter boat fishery harvest of 0.15 million fish was a 23% decrease from 2008, and was below the ten year average (Table 4.1.9). Walleye harvest was highest in District 1 (63%), followed by District 3 (31%) and District 2 (6%; Tables 4.1.4). Targeted walleye effort was the lowest recorded since 1980; however, the targeted harvest rate of 0.60 fish per angler hour remained near the ten year average (Table 4.1.9). Similar to past years, the targeted release rate was low at 0.05 fish per angler hour (Table 4.1.8). Charter boat limit trips ranged from 19% in District 2 to 32% in District 1.

The majority of the walleye sport harvest was from the 2003 year-class (66%), followed by the 2007 (9%) and 2006 (6%) year-classes (Table 4.1.11). Eighteen year-classes were present in the 2009 harvest. Age-6 and older walleye constituted 76% of the lakewide catch due to the strength of the 2003 cohort. Walleye mean age at harvest increased from west to east and averaged 5.8 yr in 2009 compared to 5.4 yr in 2008. Walleye mean size also increased from west to east and ranged from 511 mm and 1,336 g in District 1 to 585 mm and 2,033 g in District 3. The lakewide average was 537 mm and 1,583 g.

Yellow Perch

Private boat anglers harvested 4.1 million yellow perch and expended 1.2 million targeted angler hours during 2009 (Table 4.1.12). Harvest increased 4% compared to 2008, but was the second lowest since 1994. Harvest was greatest in District 1 (45%) followed by District 2 (32%) and District 3 (23%). Yellow perch harvest was highest during September, but seasonal differences occurred across districts (Table 4.1.3). The peak months for harvest occurred in August and September in District 1; September in District 2; and July and September in District 3. Targeted angler hours increased 8% from 2008, but remained well below the ten-year average (Table 4.1.12). Harvest rate decreased 2% from 2008 and averaged 3.2 fish per angler hour. Anglers averaged 14.1 fish per angler trip and 37.4 fish per boat trip (Table 4.1.7). Private boat limit trips ranged from 13% in District 2 to 34% in District 1.

The charter boat harvest and targeted effort decreased 18% and 14%, respectively, compared to 2008 (Table 4.1.12). Harvest rate (4.1 fish per angler hour) remained relatively unchanged and close to the ten-year average. Percent of limit trips by charter anglers increased to 42% (Table 4.1.8) compared to 36% in 2008. The 2007 (30%), 2003 (28%) and 2006 (19%) year-classes comprised the majority of the yellow perch harvest in 2009 (Table 4.1.13). Twelve year-classes were present in the 2009 harvest. The lakewide mean age of harvested yellow perch was 4.0 yr, down from 4.3 yr in 2008. Yellow perch mean age ranged from 3.2 yr in District 1 to 5.0 yr in District 3. The percentage of fish age-6 and older in the harvest was 33% due to the strong 2003 cohort. Mean size at harvest increased across Districts 1 to 3 and averaged 225 mm and 152 g.

Smallmouth Bass

Private boat angler harvest (182%) and targeted effort (55%) increased compared to 2008 when harvest and targeted effort were the lowest since the May-June seasonal regulation was implemented in 2004 (Table 4.1.14). Smallmouth bass was the third most sought species by private boat anglers, behind walleye and yellow perch, but at 173,663 hours it constitutes only 5% of the total angler hours for the fishery. As in previous years, the release rate (0.39 fish per angler hour) was considerably higher than the targeted harvest rate (0.01 fish per angler hour; Table 4.1.7). Very few charter trips were made targeting smallmouth bass during 2009 (Table 4.1.14). Similar to the private boat fishery, estimated angler hours (1,012 angler hours) and harvest (343 fish) remained very low for 2009. The 2005 (34%) and 2006 (19%) year-classes constituted 54% of the smallmouth bass harvest in Ohio's waters (Table 4.1.15). Thirteen year-classes were present in the 2009 harvest. Mean age in the harvest was 6.3 yr. Age-10 and older smallmouth comprised 25% of the total harvest. Lakewide, the smallmouth bass mean size at harvest was 422 mm and 1,365 g.

Steelhead Trout

The combined 2009 private and charter boat harvest increased 110% compared to 2008, however it remained well below the ten year average (Tables 4.1.3 and 4.1.4). Steelhead trout are harvested primarily from the central basin; 45% of the harvest was from District 2 and 55% from District 3. Targeted angler effort remained low for both fisheries. Anglers spent 1,295 targeted hours (private and charter) fishing for steelhead trout in 2009 (Tables 4.1.5 and 4.1.6). The targeted harvest and release rates were 0.00 fish per angler hour and 0.25 fish per angler hour, respectively for the private boat fishery (Table 4.1.7), and 0.92 fish per angler hour and 0.12 fish per angler hour, respectively, for the charter boat fishery. Beginning in 2000, an additional category was added to the target species list (walleye/steelhead or "combo") in order to measure the number of combined angler trips targeting both walleye and steelhead since they both can be sought while trolling. Walleye/steelhead target angler hours for 2009 totaled 5,730 and 604 for the private boat and charter boat fisheries, respectively. The targeted harvest rate for the combination trips was 0.17 fish per angler hour for the private boat fishery and 0.25 fish per angler hour for the charter boat fishery. Combining steelhead length-at-harvest data across all districts, harvested steelhead trout averaged 617 mm and 2,726 g.

White Bass

The white bass private boat harvest (51%) and targeted effort (107%) increased compared to 2008 (Table 4.1.16). The majority of the harvest came from District 1 (75%) followed by District 2 (23%; Table 4.1.3). Targeted harvest rate decreased from 3.8 fish per angler hour in 2008 to 3.0 fish per angler hour in 2009, but remained near the ten year average (Table 4.1.16). As in past years, very few angler trips were targeted for this species and the majority of white bass were harvested as incidental catch from anglers targeting other species. There were no targeted charter boat trips for white bass during 2009. The 2007 year-class comprised 32% of the harvest followed by the 2005 (29%) and 2008 (21%; Table 4.1.17) year classes. Mean age in the lakewide harvest was 2.8 yr. White bass mean size was 311 mm and 393 g.

White Perch

The 2009 estimated sport harvest of 105,588 white perch (Tables 4.1.3 and 4.1.4) was a 180% increase, compared to 2008. Harvest was fairly constant across months during the fishing season with the peak harvest occurring in July (32%). District 2 anglers accounted for 57% of the catch followed by 36% from District 1. There were no targeted angler trips for white perch in 2009, so the harvested fish were from anglers targeting other species or the category anything that bites. The 2005 year-class comprised 34% of the white perch sport harvest followed by the 2007 (26%) and 2006 year-classes (23%; Table 4.1.18). White perch mean age in the harvest was 3.6 yr, and mean size was 230 mm and 184 g lakewide.

Other Species

Private and charter boat anglers harvested 101,885 freshwater drum, channel catfish, rock bass, goby and other species in 2009 (Tables 4.1.3 and 4.1.4) with the majority of the harvest occurring in May and June (68%). These fish were primarily harvested by anglers as incidental catch while targeting other major species. Estimated district harvest, by weight, for channel catfish, freshwater drum, and steelhead trout are reported in Appendix A.

4.2 Sandusky and Maumee Rivers Tributary Fisheries *(FSDR03)*

A direct contact creel survey was conducted on the Sandusky and Maumee Rivers from March 16 to April 30, 2009. Surveys were conducted from Ewing Island to Jerome Road on the Maumee River and from Brady's Island to Rodger Young Park on the Sandusky River (Figure 4.2.1). Two weekdays and both weekend days were surveyed each week of the survey. All survey sites were sampled on each day worked. Instantaneous counts were completed at each site. After the count was completed at a site, the clerk stayed for a pre-determined amount of time to interview anglers and collect biological data from harvested fish. Survey dates and times of counts were randomly selected within strata for month, survey location, and weekday-weekend. Angler interviews were conducted to determine hours fished, target species sought, and the number of each species harvested and released. Only completed-trip interviews were used to estimate harvest. Angler effort was estimated from instantaneous counts during daylight hours which included 0730-1900 in March and 0800-2030 in April. Mean counts were expanded to angler hours by constants for daylight hours per day, days per month, and the number of count locations on each river.

Walleye length and gender data were collected by the creel clerk to characterize harvested fish. Number harvested was estimated by 25 mm length bins, for both males and females, from each river. Otoliths collected from walleye sampled by electrofishing were used to develop an age-length key for each river and estimate age-specific harvest. The percent of each year-class within length bins, based on otolith data, was applied to the estimated harvest, by gender, for each river.

Compared to 2008, estimated walleye harvest increased in both the Maumee River (57,247) and the Sandusky River (3,802; Tables 4.2.1 and 4.2.2). The harvest in the Maumee River was the highest since 1990 and the highest in the Sandusky River since 2004. The harvest rate for anglers seeking walleye averaged 0.29 fish per hour on the Maumee River (up from 0.22 in 2008) and 0.16 fish per hour on the Sandusky River (down from 0.17 in 2008). Release rates were 0.41 fish per hour on the Maumee River and 0.23 fish per hour on the Sandusky River (Table 4.2.2).

We also estimated white bass harvest from both rivers (Tables 4.2.1 and 4.2.2) during the walleye survey period. However, these data are not comparable to previous surveys which included the entire white bass run during May.

Targeted walleye angler hours observed from interviews totaled 1,643 and 528 for the Maumee River and Sandusky River, respectively (Table 4.2.3). Targeted walleye angler effort was estimated at 194,187 hrs in the Maumee River was and 22,774 hrs in the Sandusky River (Table 4.2.2).

Male walleye dominated the catch, accounting for 70.7% of the harvest in the Sandusky River and 90.6% in the Maumee River (Tables 4.2.4 and 4.2.5). In the Sandusky River, male walleye age averaged 5.7 yrs and female age averaged 7.1 yrs, with the oldest walleye harvested being 15 yrs (1994 year-class). In the Maumee River, male walleye age averaged 6.6 yrs and female age averaged 7.8 yrs with the oldest walleye harvested being 17 yrs (1992 year-class). The 2003 year-class comprised the largest percentage of harvest in the Maumee River (72.5%) followed by the 2005 year-class (6.8%). The 2003 and 2004 year-classes accounted for the largest percentage of the Sandusky River harvest (21.6% and 16.3%, respectively). Harvested walleye length and age means were 521 mm and 6.7 yrs in the Maumee River and 536 mm and 6.1 yrs in the Sandusky River.

4.3 Tournament Fishery Assessment *(FFDR01)*

Walleye

During the 2009 season, a large national walleye tournament circuit held an April event that launched out of Port Clinton. The tournament was sampled to collect biological information from the fish that were weighed in. On the days that the tournament was sampled, sub-samples were collected for later lab analysis of length, gender, and age. Fish for age analysis were selected based upon a stratified random sampling design with up to ten fish being randomly selected per 25 mm length bin per gender. Aged sub-samples were used to apply ages to fish that were only measured at the weigh-ins. Harvest information from the tournament was not included in open lake creel survey harvest estimates; however, age distribution information was used in developing age-length keys for the open lake fisheries assessment.

During tournament sampling, 739 walleye were measured, including 207 that were collected for lab sampling. Three year-classes (2003, 1999, and 2001, from highest to lowest) accounted for 84.3% of the sampled fish (Table 4.3.1). The oldest individual sampled was 21 years old from the 1988 year-class. Male and female lengths averaged 499 and 623 mm, respectively, with the overall mean length of the sample being 611 mm. Of the fish weighed-in on days that were sampled, 89.7% were females.

Black Bass

During the 2009 season, a large national black bass tournament circuit held a September event that launched out of Sandusky Bay. The tournament was sampled to collect biological information from the fish that were weighed-in. On the day that the tournament was sampled, sub-samples were collected for later lab analysis of length, gender, and age. Fish for age analysis were selected based upon a stratified random sampling design with up to five fish being randomly selected per 25 mm length bin. Aged sub-samples were used to apply ages to fish that were only measured at the weigh-in. Catch information from the tournament was not included in open lake creel survey estimates; however, age distribution information was used in developing age-length keys for the open lake fisheries assessment.

During tournament sampling 359 smallmouth bass and 226 largemouth bass were measured including 48 smallmouth bass and 30 largemouth bass that were collected for lab sampling. Two year-classes (2005 and 2002) accounted for 49.9% of the sampled smallmouth bass (Table 4.3.2), while five year classes (2001, 2005, 2004, 2002 and 2007, from highest to lowest) each contributed 10% or more of the sampled largemouth bass. The oldest individual smallmouth bass sampled was 16 years old from the 1993 year-class. The oldest individual largemouth bass sampled was 11 years old from the 1998 year-class. Smallmouth bass and largemouth bass lengths averaged 439 and 399 mm, respectively, with mean ages of 7.2 and 5.6 years, respectively.

4.4 Shoreline Sport Fisheries *(FFDR07)*

Ohio’s Lake Erie shoreline was surveyed by a direct contact creel survey during 2006 and 2007. The creel survey was conducted from Toledo to Conneaut at 39 major shore access sites along Ohio's portion of the Lake Erie shoreline. The survey area was divided into three creel areas: Area 21 from Toledo to Huron (13 locations), Area 22 from Lorain to Euclid (15 locations), and Area 23 (11 locations) from Eastlake to Conneaut (Figure 4.4.1). In 2006 the survey ran from May 10 to October 29. The 2007 survey ran from May 9 to October 31. Beginning September 1 in both survey years, three locations where angler’s target steelhead trout were added to Area 23. The survey included daylight hours: 700-2100 hours (military time) for May to July, 700-2000 hours for August, 800-2000 hours for September and 800-1900 hours for October. Area 21 was surveyed two weekdays and both weekend days per week. Areas 22 and 23 were surveyed three weekdays and both weekend days. Daily survey schedules for each creel area include morning and afternoon start times, and east and west starting points. Survey dates, start times, and starting points were randomly selected within each weekday-weekend strata for each month. The amount of time spent at each survey location was determined from the angler usage patterns from the 1993 shoreline survey. At each location an instantaneous count of anglers and angler interviews were completed. Only interviews with fishing trips greater than 30 minutes were completed by the survey clerks and included in the analysis.

Survey data was stratified by month, survey area and weekday-weekend. Angler effort was estimated from instantaneous counts made at designated times at each of the survey locations. Mean counts for weekday and weekend days were expanded by the number of hours per survey day and days per month. In-progress and completed trip interviews were obtained to determine the percentage of persons fishing, number of anglers in party, length of fishing trip, primary target species, grid location, and the number of each species harvested and released. Catch rates were calculated for 10 major targeted species. Catch per unit of effort was expressed as the number of fish harvested and released per angler hour. If more than one species was indicated as the primary target species, the interviews were recorded to "anything that bites" and not included in species analyses. Calculations of angler hours, harvest and catch per unit effort were completed following the procedures in Table 4.4.1. Estimates were summarized by location, statistical district, and month. Results and discussion for both years will be presented in the FFDR07 project final report to be completed in spring of 2010.

4.5 Lake Erie Steelhead Tributary Creel Survey *(FFDR08)*

We completed the first of two consecutive years of creel surveys for the steelhead fishery on Ohio's Lake Erie tributaries and access points. Seventeen different streams and 89 locations were surveyed by two creel survey clerks during the period of late September, 2008, to early May, 2009 (Table 4.5.1). A total of 2,897 interviews of 3,838 anglers were completed during the survey period. Nearly all anglers interviewed (99.7%) were seeking steelhead. An estimated total of 361,423 angler hours were expended during the September-May survey period over all survey locations (Table 4.5.2). The Grand River had the most angler effort (an estimated 117,740 hours), while no angler effort was observed on Porter and Cahoon creeks. Overall steelhead catch rate during the time period was 0.387 fish per hour; with the harvested steelhead catch rate of 0.043 fish kept per hour and the legal-released steelhead catch rate of 0.344 fish caught and released per hour (Table 4.5.2). An estimated 139,769 steelhead were captured in the study areas during the survey period, of which 124,286 (89%) were released. Average total length of the 417 observed steelhead during the surveys was 625 mm. About 7% of steelhead observed by creel clerks in the surveys exhibited new or old sea lamprey wounds.

Demographic information collected during the creel surveys found that steelhead anglers came from 59 of Ohio's 88 counties and from 19 states and the province of Ontario to fish for steelhead in Ohio waters. Gear preferences for steelhead angling method were predominantly spinning (61%), followed by fly fishing (34%) and center-pinning (4%). The majority of anglers (51%) stated that it was not important for them to keep the steelhead they caught; 24% stated it was only slightly important. Preferred trip length (median=5 hours) and expenditures (median=$20) were also recorded. Nearly all (97.7%) of the anglers recorded by sex in the survey were male, and the most frequent age for anglers (by decade) was the 40s. More detailed analyses of the steelhead fishery and angler demographics can be found in the Year 1 Progress Report that accompanied this project's annual report (Kayle 2009).

A total of 1,512 steelhead anglers were signed up for a more in-depth human dimensions survey of steelhead anglers through The Ohio State University School of Natural Resources. Division personnel assisted Dr. Jeremy Bruskotter and graduate student Kristina Slagel in the design of the human dimensions survey. Results of the survey are being analyzed.

A second year of steelhead creel surveys is underway for September 2009 through May 2010. The final project report will be completed and possible publication(s) initiated during calendar year 2010 (Fiscal Year 2011).

Table 4.1.1. Method of calculating boat trips, angler hours, and harvest per grid, area, and month.

a) Boat trips for the i th day of week strata:

$T_i = (b_i) * (I_i) * (D_i) * (L_i)$ where:

T_i = estimated number of boat trips
b_i = mean number of boats counted in 20-minute interval
I_i = number of 20-minute count intervals per day
D_i = number of days per month
L_i = number of harbor count locations per area.

b) Grid angler hours for the j th grid:

$E_{ij} = (T_i) * (P_{ij}) * (A_{ij}) * (a_{ij}) * (h_{ij})$ where:

E_{ij} = estimated number of angler hours
P_{ij} = proportion of boat interviews in each grid
A_{ij} = proportion of angling interviews
a_{ij} = mean number of anglers per fishing boat
h_{ij} = mean number of hours per fishing trip.

c) Grid catch per angler hour for the k th species:

$F_{ijk} = (c_{ijk}) / (e_{ijk})$ where:

F_{ijk} = catch per angler hour
c_{ijk} = observed number of fish in sample interviews
e_{ijk} = observed number of angler hours in sample interviews.

d) Grid catch of k th species:

$C_{ijk} = (E_{ij}) * (F_{ijk})$ where:

C_{ijk} = estimated catch of a species.

Table 4.1.2. Length-weight regression equations used for the 2009 biological sampling of harvest from the Ohio waters of Lake Erie.

Species	Assessment Method	District	Season	Regression Equation [a,b]	Date	SE[c] Intercept	SE[c] Slope
Walleye	Gill nets, Sport	All	All	log W= -5.4003+3.1402 log TL	2004	0.040	0.015
Yellow Perch	Sport	All	May-June	log W= -5.1356+3.0911 log TL	2005	0.126	0.054
		1	July-August	log W= -5.4809+3.2454 log TL	2005	0.101	0.044
		1	Sept-Oct	log W= -5.5666+3.2698 log TL	2005	0.049	0.022
		2	July-August	log W= -5.1749+3.1075 log TL	2005	0.089	0.039
		2	Sept-Oct	log W= -5.4389+3.2281 log TL	2005	0.052	0.022
		3	July-Oct	log W= -5.3179+3.1739 log TL	2005	0.059	0.025
	Commercial	All	May-July	log W= -5.18515+3.10349 log TL	2009	0.111	0.046
		All	August-December	log W= -5.46133+3.23728 log TL	2009	0.109	0.045
White Bass	Commercial	All	All	log W= -4.6776+2.9048 log TL	2004	0.112	0.045
White Perch	Commercial	All	All	log W= -4.6472+2.9168 log TL	2004	0.203	0.088
Smallmouth Bass	Sport	All	All	log W= -4.6446+2.9583 log TL	2006	0.185	0.070
Steelhead Trout	Sport	All	All	log W= -4.1708+2.7217 log TL	2004	0.236	0.084
Channel Catfish	Trawl	All	All	log W= -5.8121+3.3346 log TL	2006	0.183	0.069
Freshwater Drum	Trawl	All	All	log W= -5.8973+3.3750 log TL	2006	0.194	0.076
Whitefish [d]	Commercial	All	All	log W= -5.38316+3.13455 log TL	2009	0.223	0.082

[a] W = weight in grams; TL = total length in millimeters.

[b] Log values are $\log_{10}$

[c] SE = standard error

[d] Summary includes data contributed by the USGS Great Lakes Science Center, Lake Erie Biological Station, Sandusky, OH.

Table 4.1.3. Private boat angler harvest (numbers of fish) of major species, by statistical district and month, in the Ohio waters of Lake Erie during 2009.

District	Month	Walleye	Yellow Perch	White Bass	Smallmouth Bass	Freshwater Drum	Channel Catfish	White Perch	Steelhead Trout	Others[a]	Total
1	April	13,414	7,372	0	132	0	0	0	0	0	20,918
	May	136,996	94,400	2,028	82	588	0	5,580	0	335	240,009
	June	116,392	122,880	23,233	0	92	332	3,249	0	0	266,178
	July	94,182	334,649	48,998	905	129	129	6,811	0	649	486,452
	August	90,958	630,362	25,403	430	0	380	12,848	0	2,664	763,045
	September	7,023	577,999	21,335	0	0	589	6,167	0	321	613,434
	October	1,669	60,911	210	0	0	0	122	0	0	62,912
	Total	460,634	1,828,573	121,207	1,549	809	1,430	34,777	0	3,969	2,452,948
2	May	24,608	198,587	850	130	306	260	10,543	0	14,518	249,802
	June	102,955	149,932	3,035	0	1,266	962	6,838	502	11,665	277,155
	July	55,558	165,187	5,666	541	356	1,183	24,743	1,079	9,802	264,115
	August	48,205	199,939	21,065	0	293	628	13,622	377	2,474	286,603
	September	42,635	467,302	4,172	532	31	0	2,565	0	6,010	523,247
	October	4,348	119,049	1,607	314	22	0	1,219	22	1,337	127,918
	Total	278,309	1,299,996	36,395	1,517	2,274	3,033	59,530	1,980	45,806	1,728,840
3	May	1,578	116,853	532	0	437	0	3,536	0	30,077	153,013
	June	8,487	178,355	177	0	1,027	0	1,862	460	11,676	202,044
	July	12,120	240,553	0	0	218	0	754	199	2,509	256,353
	August	39,023	163,377	1,102	0	0	0	134	862	851	205,349
	September	21,328	189,019	1,354	0	0	42	1,179	524	3,900	217,346
	October	0	53,909	67	0	0	34	0	0	1,694	55,704
	Total	82,536	942,066	3,232	0	1,682	76	7,465	2,045	50,707	1,089,809
Lakewide	April	13,414	7,372	0	132	0	0	0	0	0	20,918
	May	163,182	409,840	3,410	212	1,331	260	19,659	0	44,930	642,824
	June	227,834	451,167	26,445	0	2,385	1,294	11,949	962	23,341	745,377
	July	161,860	740,389	54,664	1,446	703	1,312	32,308	1,278	12,960	1,006,920
	August	178,186	993,678	47,570	430	293	1,008	26,604	1,239	5,989	1,254,997
	September	70,986	1,234,320	26,861	532	31	631	9,911	524	10,231	1,354,027
	October	6,017	233,869	1,884	314	22	34	1,341	22	3,031	246,534
	Total	821,479	4,070,635	160,834	3,066	4,765	4,539	101,772	4,025	100,482	5,271,597

[a]"Others" includes largemouth bass, rock bass, bluegill, white crappie, common carp, and rainbow smelt.

Table 4.1.4. Charter boat angler harvest (numbers of fish) of major species, by statistical district and month, in the Ohio waters of Lake Erie during 2009.

District	Month	Walleye	Yellow Perch	White Bass	Smallmouth Bass	Freshwater Drum	Channel Catfish	White Perch	Steelhead Trout	Others[a]	Total
1	April	5,646	25	0	0	0	0	0	0	0	5,671
	May	33,103	821	350	0	0	74	682	0	0	35,030
	June	17,802	803	723	33	0	59	712	0	0	20,132
	July	17,844	3,932	337	12	0	129	1,399	0	0	23,653
	August	15,152	4,823	44	10	75	62	61	0	0	20,227
	September	2,661	11,684	0	288	0	0	0	0	33	14,666
	October	66	1,503	0	0	0	0	0	0	0	1,569
	Total	92,274	23,591	1,454	343	75	324	2,854	0	33	120,948
2	May	349	2,242	0	0	0	0	0	0	304	2,895
	June	3,975	80	15	0	0	0	7	64	0	4,141
	July	1,690	1,565	364	0	0	59	0	556	185	4,419
	August	1,533	2,321	279	0	48	0	10	878	7	5,076
	September	704	10,691	15	0	0	0	179	0	291	11,880
	October	243	321	0	0	0	0	0	0	26	590
	Total	8,494	17,220	673	0	48	59	196	1,498	813	29,001
3	May	666	636	0	0	17	0	137	0	17	1,473
	June	10,722	6,315	13	0	24	0	27	772	259	18,132
	July	9,015	20,756	259	0	0	0	324	170	26	30,550
	August	13,877	19,530	97	0	0	0	24	452	0	33,980
	September	10,949	49,374	255	0	0	0	254	745	255	61,832
	October	0	18,176	0	0	0	0	0	0	0	18,176
	Total	45,229	114,787	624	0	41	0	766	2,139	557	164,143
Lakewide	April	5,646	25	0	0	0	0	0	0	0	5,671
	May	34,118	3,699	350	0	17	74	819	0	321	39,398
	June	32,499	7,198	751	33	24	59	746	836	259	42,405
	July	28,549	26,253	960	12	0	188	1,723	726	211	58,622
	August	30,562	26,674	420	10	123	62	95	1,330	7	59,283
	September	14,314	71,749	270	288	0	0	433	745	579	88,378
	October	309	20,000	0	0	0	0	0	0	26	20,335
	Total	145,997	155,598	2,751	343	164	383	3,816	3,637	1,403	314,092

[a] "Others" includes largemouth bass, rock bass, chinook salmon, and rainbow smelt.

Table 4.1.5. Private boat angler hours for target species, by statistical district and month, in the Ohio waters of Lake Erie during 2009.

District	Month	Walleye	Yellow Perch	White Bass	Smallmouth Bass	Steelhead Trout	Walleye/ Steelhead	Largemouth Bass	Channel Catfish	Rock Bass	Anything	Total Hours
1	April	55,515	2,269	0	338	0	0	0	0	0	0	58,122
	May	266,275	40,367	689	5,169	0	0	0	0	0	1,695	314,195
	June	290,251	53,953	11,906	6,672	0	0	1,311	0	0	1,423	365,516
	July	161,043	110,208	7,999	26,285	0	0	9,589	0	0	9,031	324,155
	August	116,157	166,120	8,686	9,009	0	0	15,583	0	0	0	315,555
	September	17,963	166,732	5,211	12,827	0	0	1,709	0	0	0	204,442
	October	6,146	31,595	0	1,388	0	0	2,004	0	0	0	41,133
	Total	913,350	571,244	34,491	61,688	0	0	30,196	0	0	12,149	1,623,118
2	May	115,701	60,046	0	6,092	0	0	860	0	607	2,531	185,837
	June	267,910	69,748	0	7,061	0	0	3,103	0	276	9,956	358,054
	July	179,148	62,532	802	29,795	0	1,975	2,323	0	0	5,020	281,595
	August	104,039	54,018	2,368	5,487	0	2,884	3,389	550	0	6,847	179,582
	September	76,332	121,093	0	25,441	0	0	4,659	0	0	1,186	228,711
	October	17,938	44,962	0	1,666	0	57	0	0	0	76	64,699
	Total	761,068	412,399	3,170	75,542	0	4,916	14,334	550	883	25,616	1,298,478
3	May	25,612	50,537	0	17,120	0	0	0	0	1,575	0	94,844
	June	40,522	65,473	0	12,751	0	814	0	0	0	0	119,560
	July	53,710	61,082	0	3,333	0	0	890	0	888	555	120,458
	August	55,247	33,692	0	2,162	0	0	0	0	0	1,082	92,183
	September	44,370	42,507	0	789	136	0	0	0	0	0	87,802
	October	0	12,731	0	278	0	0	0	0	0	0	13,009
	Total	219,461	266,022	0	36,433	136	814	890	0	2,463	1,637	527,856
Lakewide	April	55,515	2,269	0	338	0	0	0	0	0	0	58,122
	May	407,588	150,950	689	28,381	0	0	860	0	2,182	4,226	594,876
	June	598,683	189,174	11,906	26,484	0	814	4,414	0	276	11,379	843,130
	July	393,901	233,822	8,801	59,413	0	1,975	12,802	0	888	14,606	726,208
	August	275,443	253,830	11,054	16,658	0	2,884	18,972	550	0	7,929	587,320
	September	138,665	330,332	5,211	39,057	136	0	6,368	0	0	1,186	520,955
	October	24,084	89,288	0	3,332	0	57	2,004	0	0	76	118,841
	Total	1,893,879	1,249,665	37,661	173,663	136	5,730	45,420	550	3,346	39,402	3,449,452

Table 4.1.6. Charter boat angler hours for target species, by statistical district and month, in the Ohio waters of Lake Erie during 2009.

District	Month	Walleye	Yellow Perch	Smallmouth Bass	Steelhead Trout	Walleye/ Steelhead	Total Hours
1	April	11,803	0	0	0	0	11,803
	May	50,625	0	0	0	0	50,625
	June	39,589	0	0	0	0	39,589
	July	24,310	819	0	0	0	25,129
	August	18,073	1,679	0	0	0	19,752
	September	4,069	3,167	840	0	0	8,076
	October	1,141	1,394	0	0	0	2,535
	Total	149,610	7,059	840	0	0	157,509
2	May	1,526	888	0	0	0	2,414
	June	6,211	0	0	0	0	6,211
	July	3,137	192	0	120	562	4,011
	August	1,594	250	0	1,039	0	2,883
	September	1,027	2,423	0	0	0	3,450
	October	2,609	1,508	0	0	0	4,117
	Total	16,104	5,261	0	1,159	562	23,086
3	May	5,635	1,798	172	0	0	7,605
	June	21,539	3,814	0	0	0	25,353
	July	16,343	3,992	0	0	42	20,377
	August	13,264	2,535	0	0	0	15,799
	September	13,211	8,711	0	0	0	21,922
	October	0	2,730	0	0	0	2,730
	Total	69,992	23,580	172	0	42	93,786
Lakewide	April	11,803	0	0	0	0	11,803
	May	57,786	2,686	172	0	0	60,644
	June	67,339	3,814	0	0	0	71,153
	July	43,790	5,003	0	120	604	49,517
	August	32,931	4,464	0	1,039	0	38,434
	September	18,307	14,301	840	0	0	33,448
	October	3,750	5,632	0	0	0	9,382
	Total	235,706	35,900	1,012	1,159	604	274,381

Table 4.1.7. Characteristics of private boat angler trips, by target species, in the Ohio waters of Lake Erie during 2009.

					Target Species			Angler Harvest Success[a]		
Target Species	District	Number of Interviews	Boat Trips	Angler Trips	Harvested per Angler Hour	Released per Angler Hour	Total per Angler Hour	Fish per Angler Trip	Fish per Boat Trip	% Boat[b] Limit Trips
Walleye	1	698	63,866	171,743	0.49	0.07	0.56	2.59	6.96	23.08
	2	361	51,952	137,690	0.36	0.03	0.39	1.82	4.83	10.89
	3	255	14,111	37,693	0.36	0.01	0.37	2.07	5.54	12.31
	Total	1,314	129,929	347,126	0.42	0.05	0.47	2.23	5.96	17.04
Yellow Perch	1	512	48,127	129,140	3.14	1.64	4.78	14.28	38.32	33.89
	2	565	36,318	93,746	3.03	1.40	4.43	12.70	32.78	12.62
	3	402	21,068	56,588	3.41	0.67	4.08	16.03	43.05	26.67
	Total	1,479	105,513	279,474	3.16	1.35	4.52	14.10	37.36	25.13
Smallmouth Bass	1	47	4,550	8,215	0.01	0.31	0.32	0.09	0.17	0.00
	2	36	6,108	11,754	0.01	0.26	0.27	0.19	0.36	0.00
	3	41	2,692	5,923	0.00	0.80	0.80	0.00	0.00	0.00
	Total	124	13,350	25,892	0.01	0.39	0.40	0.11	0.22	0.00
White Bass	1	22	2,647	6,398	2.80	0.89	3.69	15.36	37.14	-
	2	3	478	788	5.44	0.32	5.76	25.49	42.05	-
	3	0	0.00	-	-	-	-	-	-	-
	Total	25	3,125	7,186	3.02	0.84	3.86	16.47	37.89	-
Steelhead Trout	1	0	-	-	-	-	-	-	-	-
	2	0	-	-	-	-	-	-	-	-
	3	1	34	34	0.00	0.25	0.25	0.00	0.00	0.00
	Total	1	34	34	0.00	0.25	0.25	0.00	0.00	0.00

[a]Angler success reported in numbers of fish.
[b]Boat limits were defined as those boats for which each individual angler had a personal limit.
Note: Daily personal bag limits during 2009: 4 walleye during March and April, 6 walleye during May through February; 30 yellow perch, except 25 yellow perch in District 1; 5 black bass from June 28 to April 30; 5 trout and salmon in the aggregate from May 16 - August 31, and 2 trout and salmon in the aggregate from September 1 - May 15.

Table 4.1.8. Characteristics of charter boat angler trips, by target species, in the Ohio waters of Lake Erie during 2009.

					Target Species			Angler Harvest Success[a]		
Target Species	District	Number of Interviews	Boat Trips	Angler Trips	Harvested per Angler Hour	Released per Angler Hour	Total per Angler Hour	Fish per Angler Trip	Fish per Boat Trip	% Boat[b] Limit Trips
Walleye	1	281	4,226	24,894	0.60	0.08	0.68	3.56	20.99	31.85
	2	80	529	2,704	0.56	0.01	0.57	3.16	16.19	18.65
	3	228	2,372	11,848	0.63	0.01	0.63	3.72	18.56	22.33
	Total	589	7,127	39,446	0.60	0.05	0.66	3.58	19.83	27.70
Yellow Perch	1	17	220	1,200	3.39	1.46	4.86	20.00	109.10	46.27
	2	33	267	1,246	3.35	1.61	4.97	13.92	64.73	16.59
	3	81	918	4,803	4.47	0.57	5.03	21.94	115.00	48.93
	Total	131	1,405	7,249	4.09	0.90	4.99	20.24	104.50	42.37
Smallmouth Bass	1	2	22	123	0.36	0.16	0.52	2.45	13.50	0.00
	2	0	-	-	-	-	-	-	-	-
	3	1	34	69	0.00	0.20	0.20	0.00	0.00	0.00
	Total	3	56	192	0.30	0.17	0.47	1.57	5.30	0.00

[a] Angler success reported in nunbers of fish.

[b] Boat limits were defined as those boats for which each individual angler had a personal limit.

Note: Daily personal bag limits during 2009: 4 walleye during March and April, 6 walleye during May through February; 30 yellow perch, except 25 yellow perch in District 1; 5 black bass from June 28 to April 30; 5 trout and salmon in the aggregate from May 16 - August 31, and 2 trout and salmon in the aggregate from September 1 - May 15.

Table 4.1.9. Walleye sport angler harvest (thousands of fish), targeted angler effort (thousands of angler hours), and targeted harvest rate (fish per angler hour), by statistical district and fishery, 1975-2009.

		District 1			District 2			District 3			Lakewide		
	Year	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]
Total [b]	1975-77 mean	905	32	937	26	--	26	2	--	2	933	32	965
Harvest	1978-79 "	2,264	160	2,424	--	--	--	--	--	--	--	--	--
	1980-84 "	2,260	260	2,520	218	3	221	55	1	56	2,533	264	2,797
	1985-89 "	2,853	643	3,496	507	49	556	249	30	279	3,609	722	4,331
	1990-94 "	950	427	1,378	305	32	337	258	44	302	1,512	503	2,016
	1995-99 "	869	358	1,227	235	34	269	131	40	172	1,236	432	1,668
	2000	465	209	674	140	24	165	72	21	93	678	255	932
	2001	711	230	941	155	16	171	30	16	46	896	262	1,158
	2002	349	167	516	125	16	141	34	11	46	509	194	702
	2003	484	231	715	213	18	232	33	35	68	730	285	1,015
	2004	362	153	515	248	24	272	56	17	73	666	194	859
	2005	242	133	374	95	16	110	91	35	126	427	184	610
	2006	899	296	1,195	471	32	503	145	26	171	1,515	354	1,869
	2007	1,171	242	1,414	550	28	578	136	33	169	1,857	304	2,160
	2008	392	133	524	315	18	333	186	39	225	892	190	1,083
	2009	461	92	553	278	8	287	83	45	128	821	146	967
Targeted	1975-77 mean	1,501	36	1,537	125	--	125	8	--	8	1,634	36	1,670
Effort	1978-79 "	3,381	149	3,530	--	--	--	--	--	--	--	149	--
	1980-84 "	4,368	407	4,775	514	9	523	239	2	241	5,120	418	5,538
	1985-89 "	5,088	918	6,005	1,271	95	1,366	624	47	671	6,983	1,060	8,042
	1990-94 "	2,799	876	3,676	1,208	80	1,287	707	70	777	4,714	1,026	5,740
	1995-99 "	2,288	587	2,875	747	60	807	363	52	415	3,398	698	4,097
	2000	1,499	477	1,975	502	38	540	240	41	281	2,240	556	2,796
	2001	1,624	328	1,952	645	52	697	226	35	261	2,496	414	2,910
	2002	1,078	316	1,393	397	47	444	202	44	246	1,677	407	2,084
	2003	1,376	343	1,719	645	30	675	164	72	236	2,186	445	2,631
	2004	983	273	1,257	703	33	736	151	28	179	1,837	335	2,171
	2005	854	326	1,180	534	38	573	205	56	261	1,593	420	2,013
	2006	1,451	306	1,757	861	39	899	233	27	260	2,545	372	2,917
	2007	1,803	274	2,076	1,112	35	1,147	279	42	321	3,193	350	3,543
	2008	854	173	1,027	780	31	810	313	44	357	1,947	248	2,195
	2009	913	150	1,063	761	16	777	219	70	289	1,894	236	2,130
Targeted	1975-77 mean	0.35	0.76	0.36	0.16	--	0.16	0.16	--	0.16	0.34	0.76	0.35
Harvest	1978-79 "	0.51	1.04	0.53	--	--	--	--	--	--	--	--	--
Rate [c]	1980-84 "	0.42	0.65	0.44	0.23	0.28	0.23	0.15	0.38	0.15	0.40	0.65	0.41
	1985-89 "	0.53	0.70	0.56	0.37	0.48	0.38	0.34	0.57	0.36	0.49	0.68	0.52
	1990-94 "	0.33	0.49	0.37	0.25	0.40	0.26	0.36	0.63	0.38	0.32	0.49	0.35
	1995-99 "	0.36	0.60	0.41	0.28	0.55	0.30	0.36	0.73	0.40	0.35	0.61	0.39
	2000	0.31	0.45	0.34	0.29	0.59	0.31	0.29	0.51	0.32	0.30	0.46	0.33
	2001	0.42	0.71	0.47	0.23	0.29	0.23	0.13	0.40	0.17	0.34	0.63	0.38
	2002	0.32	0.52	0.37	0.28	0.32	0.28	0.16	0.25	0.18	0.29	0.47	0.33
	2003	0.36	0.63	0.41	0.32	0.57	0.33	0.20	0.49	0.29	0.34	0.60	0.38
	2004	0.36	0.55	0.40	0.34	0.59	0.35	0.35	0.58	0.39	0.35	0.56	0.38
	2005	0.28	0.41	0.32	0.17	0.36	0.18	0.42	0.64	0.47	0.26	0.43	0.30
	2006	0.62	0.97	0.68	0.53	0.79	0.54	0.62	0.97	0.66	0.59	0.95	0.64
	2007	0.65	0.86	0.68	0.47	0.83	0.48	0.47	0.80	0.51	0.57	0.85	0.60
	2008	0.44	0.74	0.49	0.39	0.60	0.40	0.59	0.85	0.62	0.45	0.74	0.48
	2009	0.49	0.60	0.51	0.36	0.56	0.36	0.36	0.63	0.43	0.42	0.60	0.44

[a] Totals may differ due to rounding.
[b] Includes catch from targeted and untargeted effort.
[c] Targeted harvest rate means for grouped time periods reflect an average of annual values, not weighted means.

Table 4.1.10. Private boat angler hours seeking walleye and walleye harvest per angler hour, by fishing method[a], in the Ohio waters of Lake Erie during 2009.

			Casting		Flat-line Trolling		Depth-control Trolling		All
District	Month	Walleye Angler Hours	Hours (%)	Harvest Rate	Hours (%)	Harvest Rate	Hours (%)	Harvest Rate	Harvest Rate
1	April	55,515	63.88	0.17	28.42	0.22	7.69	0.06	0.18
	May	266,275	51.28	0.32	22.21	0.62	24.43	0.83	0.51
	June	290,251	44.24	0.21	16.61	0.52	38.65	0.60	0.41
	July	161,043	36.41	0.49	14.64	0.52	39.90	0.64	0.57
	August	116,157	49.58	0.77	14.60	0.44	31.02	0.85	0.74
	September	17,963	29.78	0.25	36.33	0.21	14.09	0.49	0.34
	October	6,146	-	-	48.55	0.24	15.83	0.08	0.30
	Total	913,350	46.20	0.36	18.96	0.50	31.23	0.68	0.49
2	May	115,701	53.75	0.17	41.66	0.30	3.83	0.06	0.22
	June	267,910	20.04	0.18	54.84	0.47	15.69	0.42	0.38
	July	179,148	25.12	0.13	62.68	0.33	9.42	0.43	0.30
	August	104,039	22.11	0.09	49.26	0.51	21.65	0.90	0.47
	September	76,332	19.03	0.20	70.70	0.63	7.61	0.59	0.52
	October	17,938	-	-	99.48	0.22	0.52	0.00	0.22
	Total	761,068	26.07	0.16	56.56	0.43	12.06	0.53	0.36
3	May	25,612	8.18	0.00	76.12	0.05	-	-	0.06
	June	40,522	2.15	0.00	59.38	0.22	35.02	0.15	0.19
	July	53,710	1.14	0.00	55.62	0.24	41.39	0.18	0.21
	August	55,247	-	-	40.14	0.71	57.90	0.66	0.69
	September	44,370	-	-	20.13	0.39	73.48	0.48	0.45
	October	0	-	-	-	-	-	-	-
	Total	219,461	1.63	0.00	47.63	0.31	46.03	0.42	0.36
Lakewide	April	55,515	63.88	0.17	28.42	0.22	7.69	0.06	0.18
	May	407,588	49.27	0.27	31.12	0.41	17.05	0.78	0.40
	June	598,683	30.56	0.20	36.61	0.45	28.13	0.52	0.38
	July	393,901	26.47	0.33	42.08	0.34	26.24	0.50	0.40
	August	275,443	29.26	0.58	32.81	0.54	32.87	0.79	0.63
	September	138,665	14.33	0.21	50.07	0.56	29.53	0.50	0.48
	October	24,084	-	-	86.48	0.22	4.43	0.08	0.24
	Total	1,893,879	32.95	0.29	37.39	0.43	25.24	0.60	0.42

[a] A 95.6% response level was achieved for the question regarding fishing method.

Table 4.1.11. Walleye sport harvest (numbers), year class composition (% comp), mean length (mm), mean weight (g) by age, and mean age (yr), by district, for Ohio's private and charter boat fisheries in 2009.

District	Year Class Age	2007 2	2006 3	2005 4	2004 5	2003 6	2002 7	2001 8	2000 9	1999 10	1998 11	1997 12	*Continued below*
1	Numbers	60,949	42,175	35,619	20,035	365,759	0	9,217	505	9,549	2,858	338	
	% Comp	11.02	7.63	6.44	3.62	66.15	-	1.67	0.09	1.73	0.52	0.06	
	Length	407	488	502	511	522	-	593	653	642	628	608	
	Weight	633	1,112	1,213	1,286	1,391	-	2,125	2,772	2,665	2,557	2,353	
2	Numbers	22,985	10,528	9,265	8,343	195,558	0	11,846	2,692	8,512	3,461	4,314	
	% Comp	8.01	3.67	3.23	2.91	68.19	-	4.13	0.94	2.97	1.21	1.5	
	Length	419	492	520	567	571	-	625	641	669	679	685	
	Weight	693	1,146	1,370	1,806	1,846	-	2,438	2,631	3,011	3,146	3,277	
3	Numbers	6,030	5,428	6,610	4,341	79,930	0	9,100	1,429	6,877	1,733	1,202	
	% Comp	4.72	4.25	5.17	3.4	62.56	-	7.12	1.12	5.38	1.36	0.94	
	Length	431	503	530	555	584	-	633	660	664	691	662	
	Weight	749	1,225	1,460	1,698	1,972	-	2,534	2,866	2,936	3,421	2,979	
Total[a]	Numbers	89,964	58,130	51,494	32,719	641,247	0	30,163	4,626	24,939	8,052	5,854	
	% Comp	9.3	6.01	5.32	3.38	66.28	-	3.12	0.48	2.58	0.83	0.61	
	Length	412	490	509	531	545	-	618	648	657	664	676	
	Weight	656	1,128	1,273	1,473	1,602	-	2,371	2,719	2,858	2,996	3,162	

District	Year Class Age	1996 13	1995 14	1994 15	1993 16	1992 17	1991 18	1990 19	1989 20	1988 21	Total[a]	Mean	Sample (N)
1	Numbers	3,017	423	1,284	505	338	123	214	0	0	552,908		
	% Comp	0.55	0.08	0.23	0.09	0.06	0.02	0.04	-	-		5.39 yr	431
	Length	705	659	707	657	699	574	805	-	-		511 mm	4,598
	Weight	3,555	2945	3,562	2952	3412	1833	5302	-	-		1,336 g	
2	Numbers	3,564	423	2,903	1,275	423	0	390	0	320	286,803		
	% Comp	1.24	0.15	1.01	0.44	0.15	-	0.14	-	0.11		6.14 yr	283
	Length	701	700	692	600	606	-	715	-	735		567 mm	728
	Weight	3,474	3419	3,400	2107	2174	-	3654	-	3985		1,859 g	
3	Numbers	1,284	476	942	1,135	604	0	646	0	0	127,765		
	% Comp	1.01	0.37	0.74	0.89	0.47	-	0.51	-	-		6.43 yr	688
	Length	703	679	713	689	662	-	677	-	-		585 mm	1,277
	Weight	3,507	3183	3,666	3312	2965	-	3105	-	-		2,033 g	
Total[a]	Numbers	7,866	1,321	5,129	2,915	1,364	123	1,251	0	320	967,476		
	% Comp	0.81	0.14	0.53	0.3	0.14	0.01	0.13	-	0.03		5.75 yr	1,402
	Length	703	679	700	644	654	574	711	-	735		537 mm	6,603
	Weight	3,510	3182	3,490	2722	2830	1833	3653	-	3985		1,583 g	

[a] Totals may differ due to rounding.

Table 4.1.12. Yellow perch sport angler harvest (thousands of fish), targeted angler effort (thousands of angler hours), and targeted harvest rate (fish per angler hour), by statistical district and fishery, 1975-2009**.

		District 1			District 2			District 3			Lakewide		
	Year	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]
Total [b] Harvest	1975-77 mean	6,463	104	6,567	1,221	2	1,223	258	0	258	7,942	106	8,048
	1980-84 "	7,780	202	7,982	1,417	26	1,443	232	1	233	9,429	229	9,658
	1985-89 "	4,525	381	4,906	1,745	88	1,833	491	19	510	6,761	488	7,249
	1990-94 "	1,109	133	1,242	1,093	51	1,144	172	16	187	2,374	199	2,573
	1995-99 "	3,271	187	3,458	1,443	26	1,469	317	21	338	5,031	234	5,265
	2000	2,957	105	3,062	1,730	40	1,771	636	45	680	5,322	190	5,512
	2001	2,433	209	2,642	1,976	62	2,037	787	50	837	5,195	321	5,517
	2002	3,097	193	3,290	2,062	65	2,127	1,093	82	1,175	6,252	340	6,592
	2003	3,850	324	4,174	2,101	90	2,191	764	82	846	6,715	496	7,211
	2004	2,501	102	2,603	2,487	112	2,600	1,523	130	1,653	6,512	344	6,856
	2005	2,386	207	2,593	2,169	72	2,242	921	73	994	5,477	352	5,829
	2006	3,033	140	3,173	1,930	47	1,977	448	33	481	5,411	220	5,630
	2007	2,660	157	2,817	1,417	47	1,465	709	72	781	4,786	276	5,063
	2008	1,368	49	1,417	1,547	48	1,595	984	93	1,077	3,898	190	4,089
	2009	1,829	24	1,852	1,300	17	1,317	942	115	1,057	4,071	156	4,226
Targeted Effort	1975-77 mean	1,747	24	1,771	649	7	656	133	0	133	2,529	31	2,560
	1980-84 "	1,682	29	1,711	612	16	628	156	<1	157	2,450	46	2,496
	1985-89 "	1,008	68	1,076	461	34	495	147	6	153	1,617	108	1,724
	1990-94 "	441	39	480	392	19	411	83	5	88	916	63	979
	1995-99 "	766	33	798	448	5	453	100	5	105	1,314	43	1,357
	2000	943	23	966	594	7	602	207	8	215	1,744	38	1,782
	2001	687	34	721	581	14	595	257	12	269	1,525	59	1,585
	2002	863	37	900	647	12	659	390	27	417	1,900	76	1,976
	2003	1,119	64	1,183	614	19	633	240	17	257	1,973	99	2,072
	2004	815	18	834	633	26	659	343	25	369	1,792	70	1,862
	2005	769	48	817	772	13	785	293	13	306	1,834	74	1,908
	2006	663	21	684	489	11	499	134	6	140	1,285	38	1,323
	2007	787	37	824	491	8	499	203	16	219	1,481	61	1,541
	2008	504	15	519	438	12	450	220	14	234	1,162	42	1,203
	2009	571	7	578	412	5	418	266	24	290	1,250	36	1,286
Targeted Harvest Rate [c]	1975-77 mean	4.2	3.9	4.2	2.0	0.3	2.0	2.0	--	2.0	3.6	3.8	3.6
	1980-84 "	5.0	5.9	5.0	2.3	2.7	2.3	1.3	2.2	1.3	4.0	4.7	4.0
	1985-89 "	4.0	5.1	4.0	3.5	2.4	3.5	2.9	3.2	2.9	3.8	4.1	3.8
	1990-94 "	2.2	2.9	2.3	2.6	3.0	2.6	1.8	2.8	1.9	2.3	2.9	2.4
	1995-99 "	4.0	4.2	4.0	3.2	4.2	3.2	2.9	3.6	2.9	3.7	4.3	3.7
	2000	3.0	2.7	3.0	2.9	5.6	3.0	3.0	5.3	3.1	3.0	3.8	3.0
	2001	3.4	5.2	3.5	3.2	4.1	3.2	2.9	4.8	3.0	3.2	4.8	3.3
	2002	3.4	4.2	3.4	3.1	4.9	3.1	2.7	2.8	2.7	3.2	3.8	3.2
	2003	3.4	4.5	3.5	3.3	4.3	3.3	3.0	4.5	3.1	3.3	4.5	3.4
	2004	3.0	4.0	3.0	3.7	4.5	3.7	4.3	5.0	4.4	3.5	4.5	3.5
	2005	3.1	3.6	3.1	2.8	4.8	2.8	3.1	5.6	3.2	3.0	4.1	3.0
	2006	4.2	5.4	4.2	3.7	3.8	3.7	3.2	5.6	3.3	3.9	4.9	3.9
	2007	3.3	3.9	3.4	2.8	6.2	2.8	3.4	4.3	3.5	3.2	4.3	3.2
	2008	2.7	3.0	2.7	3.4	3.9	3.4	4.1	5.5	4.2	3.2	4.1	3.3
	2009	3.1	3.4	3.1	3.0	3.4	3.0	3.4	4.5	3.5	3.2	4.1	3.2

[a] Totals may differ due to rounding.

[b] Includes catch from targeted and untargeted effort.

[c] Targeted harvest rate means for grouped time periods reflect an average of annual values, not weighted means.

** No Surveys completed in 1978 and 1979.

Table 4.1.13. Yellow perch sport harvest (numbers), year class composition (% comp), mean length (mm), mean weight (g), by age, and mean age (yr), by district, for Ohio's private and charter boat fisheries in 2009.

District	Year Class / Age	2008 / 1	2007 / 2	2006 / 3	2005 / 4	2004 / 5	2003 / 6	2002 / 7	*Continued below*
1	Numbers	3,090	891,879	450,520	141,426	23,099	307,591	10,649	
	% Comp	0.17	48.15	24.32	7.64	1.25	16.61	0.57	
	Length	155	188	211	226	250	240	260	
	Weight	43	79	116	149	199	177	222	
2	Numbers	2,298	293,805	216,523	236,245	77,596	389,177	35,218	
	% Comp	0.17	22.30	16.44	17.94	5.89	29.55	2.67	
	Length	151	196	220	232	245	249	250	
	Weight	40	93	138	163	185	199	200	
3	Numbers	0	81,447	118,028	239,469	61,348	470,840	41,437	
	% Comp	-	7.71	11.17	22.66	5.8	44.55	3.92	
	Length	-	208	233	249	248	263	254	
	Weight	-	114	163	202	192	235	211	
Total[a]	Numbers	5,387	1,267,131	785,071	617,140	162,042	1,167,608	87,305	
	% Comp	0.13	29.98	18.58	14.60	3.83	27.63	2.07	
	Length	153	191	217	237	247	252	253	
	Weight	42	84	129	175	190	208	208	

District	Year Class / Age	2001 / 8	2000 / 9	1999 / 10	1998 / 11	1997 / 12	1996 / 13	Total[a]	Mean	Sample (N)
1	Numbers	8,312	3,722	5,074	6,276	0	526	1,852,164		
	% Comp	0.45	0.2	0.27	0.34	-	0.03		3.22 yr	893
	Length	279	248	259	234	-	261		207 mm	6,575
	Weight	290	186	215	154	-	216		114 g	
2	Numbers	46,890	11,104	6,710	844	0	807	1,317,216		
	% Comp	3.56	0.84	0.51	0.06	-	0.06		4.34 yr	641
	Length	266	239	275	235	-	267		230 mm	3,094
	Weight	244	170	257	156	-	232		160 g	
3	Numbers	28,321	2,348	1,103	9,021	0	3,491	1,056,853		
	% Comp	2.68	0.22	0.1	0.85	-	0.33		5.01 yr	283
	Length	280	230	278	284	-	261		252 mm	1,232
	Weight	290	149	274	291	-	216		208 g	
Total[a]	Numbers	83,523	17,174	12,887	16,141	0	4,824	4,226,233		
	% Comp	1.98	0.41	0.30	0.38	-	0.11		4.02 yr	1,817
	Length	272	240	269	262	-	262		225 mm	10,901
	Weight	264	171	242	231	-	218		152 g	

[a] Totals may differ due to rounding.

Table 4.1.14. Smallmouth bass sport angler harvest (thousands of fish), targeted angler effort (thousands of angler hours), and targeted harvest rate (fish per angler hour), by statistical district and fishery, 1975-2009**.

		District 1			District 2			District 3			Lakewide		
	Year	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]
Total [b] Harvest	1975-77 mean	18.0	3.2	21.2	4.2	0.0	4.2	4.9	0.0	4.9	27.1	3.2	30.3
	1980-84 "	29.2	4.6	33.8	4.3	0.0	4.3	13.0	0.0	13.0	46.5	4.6	51.1
	1985-89 "	13.7	6.8	20.5	3.0	0.2	3.2	4.5	0.1	4.6	21.2	7.1	28.3
	1990-94 "	18.3	7.3	25.6	5.8	0.4	6.2	7.1	0.7	7.8	31.2	8.4	39.6
	1995-99 "	39.2	13.6	52.9	14.7	4.4	19.1	15.9	2.0	18.0	69.9	20.1	90.0
	2000	18.0	10.0	28.0	15.2	0.1	15.2	9.1	0.9	10.0	42.3	10.9	53.2
	2001	19.4	5.7	25.1	13.7	0.2	13.9	9.5	1.1	10.6	42.5	7.1	49.6
	2002	15.0	7.4	22.4	12.5	2.4	14.8	4.0	0.8	4.7	31.5	10.5	42.0
	2003	29.6	5.4	35.0	8.2	0.0	8.2	6.9	0.8	7.7	44.7	6.2	50.9
	2004	4.6	1.2	5.9	3.3	<0.1	3.3	0.9	0.0	0.9	8.8	1.2	10.1
	2005	4.6	0.5	5.2	1.4	<0.1	1.4	0.9	0.0	0.9	6.9	0.6	7.4
	2006	5.2	2.4	7.6	2.2	<0.1	2.2	1.3	0.0	1.3	8.7	2.4	11.1
	2007	2.4	0.3	2.7	1.2	0.0	1.2	1.4	0.1	1.4	5.0	0.3	5.3
	2008	0.1	0.1	0.2	0.4	0.0	0.4	0.6	0.1	0.6	1.1	0.2	1.3
	2009	1.5	0.3	1.9	1.5	0.0	1.5	0.0	0.0	0.0	3.1	0.3	3.4
Targeted Effort	1975-77 mean	6.7	3.6	10.3	1.0	0.0	1.0	1.3	0.0	1.3	9.0	3.6	12.6
	1980-84 "	64.0	7.4	71.4	5.5	0.0	5.5	24.2	0.0	24.2	93.7	7.4	101.1
	1985-89 "	29.1	10.7	39.8	1.1	0.2	1.4	8.9	0.4	9.2	39.2	11.2	50.4
	1990-94 "	101.2	13.4	114.5	15.6	0.6	16.2	23.8	1.4	25.3	140.6	15.4	156.0
	1995-99 "	222.3	20.9	243.3	88.3	4.3	92.6	61.1	3.8	64.9	371.6	29.1	400.7
	2000	172.1	28.9	201.0	98.3	0.8	99.1	58.8	4.8	63.6	329.2	34.5	363.7
	2001	219.8	16.0	235.8	120.9	0.2	121.1	76.2	5.9	82.1	417.0	22.1	439.1
	2002	136.1	20.1	156.2	127.8	1.9	129.7	47.7	8.5	56.2	311.6	30.5	342.0
	2003	211.8	8.1	220.0	89.4	0.5	89.9	43.9	4.4	48.3	345.1	13.0	358.1
	2004	100.4	4.0	104.3	87.4	0.2	87.7	20.3	0.4	20.6	208.1	4.6	212.7
	2005	105.7	1.9	107.6	98.5	3.2	101.7	40.0	0.0	40.0	244.1	5.1	249.3
	2006	58.2	5.3	63.5	81.9	0.1	82.0	31.3	0.0	31.3	171.4	5.4	176.8
	2007	90.2	0.2	90.4	99.1	0.0	99.1	33.6	0.0	33.6	222.9	0.2	223.1
	2008	44.0	0.2	44.2	41.8	0.0	41.8	26.3	0.6	26.9	112.1	0.8	112.8
	2009	61.7	0.8	62.5	75.5	0.0	75.5	36.4	0.2	36.6	173.7	1.0	174.7
Targeted Harvest Rate [c]	1975-77 mean	0.14	0.73	0.31	0.13	--	0.13	0.13	--	0.13	0.14	0.73	0.43
	1980-84 "	0.27	0.43	0.29	0.17	--	0.17	0.25	--	0.25	0.25	0.43	0.26
	1985-89 "	0.20	0.46	0.27	0.21	0.27	0.28	0.30	0.31	0.30	0.22	0.45	0.28
	1990-94 "	0.12	0.37	0.15	0.10	0.32	0.10	0.22	0.41	0.24	0.13	0.37	0.16
	1995-99 "	0.11	0.43	0.14	0.08	0.79	0.11	0.19	0.46	0.22	0.13	0.50	0.15
	2000	0.05	0.38	0.10	0.12	0.03	0.12	0.12	0.17	0.12	0.08	0.35	0.11
	2001	0.09	0.24	0.10	0.09	0.00	0.09	0.09	0.18	0.10	0.09	0.22	0.10
	2002	0.07	0.37	0.11	0.07	0.60	0.08	0.05	0.10	0.06	0.07	0.31	0.09
	2003	0.06	0.57	0.08	0.04	0.13	0.04	0.16	0.21	0.16	0.07	0.43	0.08
	2004	0.05	0.31	0.06	0.02	0.00	0.02	0.02	0.00	0.02	0.03	0.27	0.04
	2005	0.04	0.24	0.04	0.00	0.00	0.00	0.02	--	0.02	0.02	0.09	0.02
	2006	0.06	0.44	0.09	0.02	0.15	0.02	0.04	--	0.04	0.03	0.43	0.04
	2007	0.02	0.00	0.02	0.01	--	0.01	0.04	--	0.04	0.02	0.00	0.02
	2008	0.00	0.27	0.00	0.00	--	0.00	0.02	0.00	0.02	< 0.01	0.06	< 0.01
	2009	0.01	0.36	0.01	0.01	--	0.01	0.00	0.00	0.00	0.01	0.30	0.01

[a] Totals may differ due to rounding.

[b] Includes catch from targeted and untargeted effort.

[c] Targeted harvest rate means for grouped time periods reflect an average of annual values, not weighted means.

** No Surveys completed in 1978 and 1979

Table 4.1.15. Smallmouth bass sport harvest (numbers), year class composition (% comp), mean length (mm), mean weight (g), by age, and mean age (yr), by district, for Ohio's private and charter boat fisheries in 2009.

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	*Continued*
District	Age	2	3	4	5	6	7	8	9	10	*below*
All	Numbers	197	653	1,173	0	197	134	134	63	134	
	% Comp	5.77	19.17	34.41	-	5.77	3.93	3.93	1.85	3.93	
	Length	377	389	402	-	423	446	432	458	444	
	Weight	977	1,050	1,156	-	1,339	1,559	1,419	1,687	1,539	

	Year Class	1998	1997	1996	1995	1994	1993			Sample[b]
District	Age	11	12	13	14	15	16	Total	Mean	(N)
All	Numbers	134	126	268	63	0	134	3,409		
	% Comp	3.93	3.70	7.85	1.85	-	3.93		6.34 yr	146
	Length	500	478	477	451	-	504		422 mm	35
	Weight	2,187	1,917	1,900	1,612	-	2,239		1,365 g	

[a] Totals may differ due to rounding

[b] Otoliths collected from gillnet surveys were pooled by 25-mm bins to apply ages to length samples collected in the creel.

Table 4.1.16. White bass sport angler harvest (thousands of fish), targeted angler effort (thousands of angler hours), and targeted harvest rate (fish per angler hour), by statistical district and fishery, 1975-2009**.

		District 1			District 2			District 3			Lakewide		
	Year	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]	Private Boat	Charter Boat	Total [a]
Total [b]	1975-77 mean	154	19	173	778	0	778	76	0	76	1,008	19	1,027
Harvest	1980-84 "	298	14	312	599	<1	599	72	0	72	969	14	983
	1985-89 "	151	15	166	136	3	139	25	1	26	312	19	331
	1990-94 "	26	3	28	36	<1	36	3	<1	4	65	4	69
	1995-99 "	33	3	36	102.6	2	104.2	7	<1	7.4	142.8	5	147.8
	2000	59	12	71	112	9	121	8	1	9	179	21	200
	2001	74	9	83	126	7	133	20	1	21	221	17	237
	2002	60	12	72	48	1	50	1	<1	2	109	14	124
	2003	19	4	23	69	2	71	<1	1	1	88	7	95
	2004	25	2	26	35	2	36	11	<1	11	70	4	74
	2005	75	4	79	115	2	116	1	<1	1	190	6	196
	2006	90	4	93	112	1	113	0	<1	<1	201	5	206
	2007	83	6	89	98	2	100	6	1	7	187	9	196
	2008	69	<1	70	32	2	34	6	1	6	107	3	109
	2009	121	1	123	36	<1	37	3	<1	4	161	3	164
Targeted	1975-77 mean	80	4	84	252	0	252	27	0	27	359	4	363
Effort	1980-84 "	26	1	27	128	0	128	34	0	34	188	1	189
	1985-89 "	8	<1	8	33	<1	33	4	<1	4	45	<1	45
	1990-94 "	3	<1	3	10	<1	10	2	<1	2	14	<1	15
	1995-99 "	5	<1	6	21	0	21	1	0	1	28	<1	28
	2000	4	0	4	16	0	16	0	0	0	20	0	20
	2001	10	0	10	38	0	38	3	0	3	51	0	51
	2002	8	2	9	7	0	7	0	0	0	15	2	17
	2003	5	0	5	7	0	7	0	0	0	12	0	12
	2004	5	0	5	2	0	2	0	0	0	7	0	7
	2005	11	<1	11	18	0	18	0	0	0	29	<1	30
	2006	6	0	6	11	0	11	0	0	0	17	0	17
	2007	6	0	6	7	0	7	0	0	0	14	0	14
	2008	15	0	15	3	0	3	0	0	0	18	0	18
	2009	34	0	34	3	0	3	0	0	0	38	0	38
Targeted	1975-77 mean	1.17	2.81	1.25	2.65	--	2.65	2.65	--	2.65	2.29	2.81	2.30
Harvest	1980-84 "	3.98	3.47	3.88	4.18	--	4.18	2.09	--	2.09	3.69	3.47	3.69
Rate [c]	1985-89 "	4.58	8.39	4.67	2.86	2.12	2.86	1.74	0.04	1.72	3.20	2.42	2.92
	1990-94 "	2.10	0.28	2.03	1.47	1.32	1.48	3.70	0.22	3.11	1.54	0.69	1.51
	1995-99 "	1.39	0.00	1.39	2.93	--	2.93	0.02	--	0.02	2.65	0.00	2.64
	2000	3.95	--	3.95	2.68	--	2.68	--	--	--	2.92	--	2.92
	2001	2.20	--	2.20	2.52	--	2.52	3.09	--	3.09	2.49	--	2.49
	2002	1.33	4.04	1.78	2.29	--	2.29	--	--	--	1.79	4.04	2.00
	2003	0.21	--	0.21	4.17	--	4.17	--	--	--	2.49	--	2.49
	2004	2.21	--	2.21	3.66	--	3.66	--	--	--	2.56	--	2.56
	2005	3.75	2.67	3.71	4.72	--	4.72	--	--	--	4.36	2.67	4.34
	2006	6.01	--	6.01	4.40	--	4.40	--	--	--	4.96	--	4.96
	2007	4.58	--	4.58	5.96	--	5.96	--	--	--	5.31	--	5.31
	2008	3.06	--	3.06	7.76	--	7.76	--	--	--	3.77	--	3.77
	2009	2.80	--	2.80	5.44	--	5.44	--	--	--	3.02	--	3.02

[a] Totals may differ due to rounding.

[b] Includes catch from targeted and untargeted effort.

[c] Targeted harvest rate means for grouped time periods reflect an average of annual values, not weighted means.

** No Surveys completed in 1978 and 1979.

Table 4.1.17. White bass sport harvest (numbers), year class composition (% comp), mean length (mm), mean weight (g), by age, and mean age (yr), by district, for Ohio's private and charter boat fisheries in 2009.

	Year Class	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	Total[a]		Sample[b]
District	Age	0	1	2	3	4	5	6	7	8	9	10		Mean	(N)
1	Numbers	4,447	17,273	40,136	6,064	39,929	2,540	7,552	1,762	2,959	0	0	122,661		
	% Comp	3.63	14.08	32.72	4.94	32.55	2.07	6.16	1.44	2.41	-	-		3.01 yr	112
	Length	203	247	309	329	349	346	383	364	387	-	-		318 mm	85
	Weight	107	194	365	436	512	498	681	578	691	-	-		416 g	
2	Numbers	0	16,960	11,872	302	5,540	0	302	735	1,357	0	0	37,068		
	% Comp	-	45.75	32.03	0.81	14.95	-	0.81	1.98	3.66	-	-		2.20 yr	210
	Length	-	240	304	323	334	-	385	390	390	-	-		285 mm	49
	Weight	-	176	351	408	454	-	680	704	706	-	-		309 g	
3	Numbers	0	400	749	168	2,099	0	301	0	0	0	140	3,856		
	% Comp	-	10.36	19.42	4.35	54.44	-	7.80	-	-	-	3.63		3.63 yr	6
	Length	-	271	315	337	340	-	377	-	-	-	416		334 mm	26
	Weight	-	246	384	462	476	-	643	-	-	-	852		460 g	
All	Numbers	4,447	34,634	52,757	6,533	47,568	2,540	8,154	2,497	4,316	0	140	163,585		
	% Comp	2.72	21.17	32.25	3.99	29.08	1.55	4.98	1.53	2.64	-	0.09		2.84 yr	328
	Length	203	244	308	329	347	346	383	372	388	-	416		311 mm	160
	Weight	107	185	362	435	503	498	679	615	696	-	852		393 g	

[a] Totals may differ due to rounding.

[b] Otoliths collected from the fall gillnet survey were pooled by 10 mm bins to apply ages to length samples collected in the creel.

Table 4.1.18. White perch sport harvest (numbers), year class composition (% comp), mean length (mm), mean weight (g), by age, and mean age (yr), by district, for Ohio's private and charter boat fisheries in 2009.

	Year Class	2008	2007	2006	2005	2004	2003	2002	2001	Total[a]		Sample[b]
District	Age	1	2	3	4	5	6	7	8		Mean	(N)
1	Numbers	1,078	14,599	7,208	11,406	663	1,646	396	634	37,631		
	% Comp	2.87	38.8	19.16	30.31	1.76	4.37	1.05	1.68		3.15 yr	7
	Length	192	189	232	243	258	275	298	280		222 mm	113
	Weight	103	101	180	207	245	295	371	311		166 g	
2	Numbers	183	12,904	15,234	19,849	1,989	6,939	802	1,825	59,726		
	% Comp	0.31	21.6	25.51	33.23	3.33	11.62	1.34	3.06		3.73 yr	72
	Length	192	185	232	246	263	273	295	276		234 mm	85
	Weight	103	93	180	213	257	291	360	298		193 g	
3	Numbers	0	0	1,976	5,054	180	416	416	189	8,231		
	% Comp	-	-	24.01	61.40	2.18	5.06	5.06	2.29		4.13 yr	29
	Length	-	-	238	235	256	252	265	273		240 mm	36
	Weight	-	-	195	189	237	228	264	287		199 g	
All	Numbers	1,261	27,503	24,419	36,309	2,832	9,002	1,614	2,648	105,588		
	% Comp	1.19	26.05	23.13	34.39	2.68	8.53	1.53	2.51		3.56 yr	108
	Length	192	187	232	244	261	273	288	277		230 mm	234
	Weight	103	97	181	208	253	289	338	300		184 g	

[a] Totals may differ due to rounding.

[b] Scales collected by creel clerks were used to apply ages to lengths collected by the creel clerks.

Table 4.2.1 Summary of angler hours, harvest rates, and harvest in the spring creel surveys on the Sandusky and Maumee rivers from 1975-2009.

		Angler Hours			Walleye		White Bass	
River	Year*	Walleye[a]	White Bass[b]	Total	Harvest Rate[a]	Harvest	Harvest Rate[b]	Harvest
Sandusky	1975	87,500	75,900	168,800	0.11	9,725	1.76	133,763
	1976	29,700	78,900	116,100	0.38	11,231	2.14	168,807
	1977	27,700	145,500	215,400	0.42	11,509	1.32	191,706
	1978[c]	63,500	-	-	0.12	9,289	-	-
	1979[c]	94,400	-	-	0.11	8,212	-	-
	1980	45,000	43,400	100,000	0.08	4,247	0.83	39,200
	1981	36,100	218,200	266,400	0.05	2,180	1.08	240,078
	1982	40,500	197,300	252,600	0.07	3,656	0.94	165,126
	1984	29,300	135,400	183,000	0.06	3,740	1.88	278,051
	1990	25,000	590	25,600	0.09	2,261	0.10	245
	1993	46,300	48,100	94,415	0.13	5,771	0.86	43,853
	1997	32,498	28,697	65,853	0.29	9,716	0.94	27,763
	1998	26,650	35,437	68,198	0.28	7,849	2.07	75,332
	2001	22,221	69,983	94,565	0.18	4,070	2.65	186,696
	2002[c]	26,237	1,669	28,850	0.18	4,620	0.38	1,028
	2003[c]	20,704	9,410	34,311	0.10	2,075	1.32	13,609
	2004[c,d]	26,291	3,375	30,590	0.16	4,258	1.72	7,133
	2005[c,d]	23,937	1,224	25,743	0.16	3,774	0.60	791
	2006[c,d]	25,618	7,893	35,210	0.08	2,230	1.34	11,942
	2007[c,d]	13,852	2,557	17,821	0.08	1,089	0.66	3,213
	2008[c,d]	15,999	6,347	22,576	0.17	2,840	1.72	10,943
	2009[c,d]	22,774	4,652	30,216	0.16	3,802	2.10	10,831
Maumee	1975	112,500	43,800	214,100	0.14	15,475	0.84	36,731
	1976	36,700	81,600	186,800	0.15	5,336	1.52	124,235
	1977	41,600	40,800	125,700	0.15	6,136	2.00	79,995
	1978[c]	73,900	-	-	0.29	22,747	-	-
	1979[c]	184,800	-	-	0.18	33,614	-	-
	1980	155,800	46,700	230,800	0.23	38,442	1.34	87,700
	1981	161,700	93,200	298,200	0.11	21,415	1.48	165,500
	1982	201,400	133,100	368,900	0.16	37,300	1.05	172,372
	1984	143,200	59,900	210,100	0.17	28,899	1.56	137,091
	1987	247,000	56,100	339,500	0.25	69,871	0.75	66,633
	1990	250,600	2,400	253,500	0.36	92,146	0.03	33
	1993	150,300	32,700	183,400	0.13	19,477	1.24	45,317
	1997	150,671	14,053	164,724	0.31	47,502	1.76	33,622
	2001[c]	137,000	-	138,205	0.24	32,612	-	-
	2002[c]	132,342	4,451	137,830	0.25	32,889	0.28	4,556
	2003[c]	138,454	1,610	140,593	0.27	37,335	2.76	6,165
	2004[c,d]	99,580	1,702	102,662	0.28	27,853	0.35	2,247
	2005[c,d]	152,808	359	155,492	0.18	27,041	0.00	371
	2006[c,d]	171,999	1,132	176,031	0.20	34,533	0.40	3,350
	2007[c,d]	102,567	0	103,139	0.17	17,595	-	154
	2008[c,d]	125,342	1,575	130,822	0.22	27,701	0.33	3,124
	2009[c,d]	194,187	1,518	195,705	0.29	57,247	0.67	1,518

*Missing years were not surveyed.

[a] Anglers seeking walleye.

[b] Anglers seeking white bass.

[c] Only the walleye fishery was surveyed (mid-March - April 30).

[d] Only completed trip interviews were used to calculate effort and harvest

Table 4.2.2. Monthly summary of target angler hours, harvest and release rates, and total harvest (numbers) on the Sandusky and Maumee rivers in 2009.

		Walleye				White Bass		
River	Month	Angler Hours[a]	Harvest Rate[a]	Release Rate[a]	Harvest[b]	Angler Hours[a]	Harvest Rate[a]	Harvest[b]
Sandusky	March	10,855	0.16	0.31	1,740	0	-	0
	April	11,919	0.17	0.15	2,062	4,652	2.10	10,831
	Totals	22,774	0.16	0.23	3,802	4,652	2.10	10,831
Maumee	March	77,728	0.27	0.32	21,197	0	-	0
	April	116,459	0.31	0.48	36,050	1,518	0.67	1,518
	Totals	194,187	0.29	0.41	57,247	1,518	0.67	1,518

[a] Summary of hours and catch rates from targeted effort

[b] Summary of harvest from all effort

Table 4.2.3. Summary of walleye and white bass angler interviews for the 2009 spring fishery on the Sandusky and Maumee rivers.

			Interviews				Harvest Rate[a]	
River	Target Species	Month	Type	N	Anglers	Angler Hours	Walleye	White Bass
Sandusky	Walleye	March	Shore	63	112	355	0.16	
		April	Shore	27	49	173	0.17	
		All		90	161	528	0.16	
	White Bass	March	Shore	0	0	0		-
		April	Shore	10	17	62		2.10
		All		10	17	62		2.10
Maumee	Walleye	March	Shore	87	158	851	0.27	
		April	Shore	95	165	792	0.31	
		All		182	323	1,643	0.29	
	White Bass	March	Shore	0	0	0		-
		April	Shore	1	1	9		0.67
		All		1	1	9		0.67

[a] Targeted effort harvest rate (fish harvested per hour)

Table 4.2.4. Walleye sport harvest (numbers), year class composition (% comp), and mean length (mm), by age, and mean age (yr), by sex, for the Maumee River, March and April, 2009.

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	*Continued*
Sex	Age	2	3	4	5	6	7	8	9	10	*below*
Males	Numbers	379	316	3,518	0	38,697	0	2,350	622	2,193	
	% Comp	0.73%	0.61%	6.79%	0.00%	74.63%	0.00%	4.53%	1.20%	4.23%	
	Length	386	446	470	-	507	-	529	535	565	
Females	Numbers	0	0	379	120	2,826	0	560	0	337	
	% Comp	0.00%	0.00%	7.03%	2.22%	52.40%	0.00%	10.39%	0.00%	6.24%	
	Length	-	-	534	622	579	-	635	-	680	
All[a]	Numbers	379	316	3,898	120	41,522	0	2,911	622	2,530	
	% Comp	0.66%	0.55%	6.81%	0.21%	72.54%	0.00%	5.09%	1.09%	4.42%	
	Length	386	446	476	622	511	-	549	535	579	

	Year Class	1998	1997	1996	1995	1994	1993	1992			Sample
Sex	Age	11	12	13	14	15	16	17	Total[a]	Mean	(N)
Males	Numbers	1,650	443	852	451	0	0	379	51,850	6.59 yrs	93
	% Comp	3.18%	0.85%	1.64%	0.87%	0.00%	0.00%	0.73%	90.58%		
	Length	573	622	579	562	-	-	608		512 mm	490
Females	Numbers	120	459	238	126	228	0	0	5,392	7.79 yrs	79
	% Comp	2.22%	8.50%	4.42%	2.34%	4.23%	0.00%	0.00%	9.42%		
	Length	618	662	743	715	697	-	-		614 mm	45
All[a]	Numbers	1,769	901	1,091	577	228	0	379	57,242	6.70 yrs	535
	% Comp	3.09%	1.57%	1.91%	1.01%	0.40%	0.00%	0.66%			
	Length	576	642	612	592	697	-	608		521 mm	285

[a] Totals may differ due to rounding.

Table 4.2.5. Walleye sport harvest (numbers), year class composition (% comp), mean length (mm), by age, and mean age (yr), by sex, for the Sandusky River, March and April, 2009.

Sex	Year Class / Age	2007 / 2	2006 / 3	2005 / 4	2004 / 5	2003 / 6	2002 / 7	2001 / 8	2000 / 9	*Continued below*
Males	Numbers	330	253	297	504	599	0	406	62	
	% Comp	12.28%	9.42%	11.05%	18.73%	22.27%	0.00%	15.11%	2.30%	
	Length	415	458	488	508	524	-	539	553	
Females	Numbers	0	67	161	117	221	0	198	159	
	% Comp	0.00%	6.02%	14.44%	10.55%	19.83%	0.00%	17.75%	14.26%	
	Length	-	546	562	593	611	-	655	680	
All[a]	Numbers	330	320	458	621	820	0	604	221	
	% Comp	8.69%	8.42%	12.04%	16.34%	21.55%	0.00%	15.88%	5.80%	
	Length	415	468	505	518	539	-	571	643	

Sex	Year Class / Age	1999 / 10	1998 / 11	1997 / 12	1996 / 13	1995 / 14	1994 / 15	Total[a]	Mean	Sample (N)
Males	Numbers	65	0	93	24	0	57	2,690	5.74 yrs	118
	% Comp	2.41%	0.00%	3.45%	0.88%	0.00%	2.11%	70.73%		
	Length	504	-	552	642	-	593		506 mm	85
Females	Numbers	0	191	0	0	0	0	1,113	7.07 yrs	44
	% Comp	0.00%	17.16%	0.00%	0.00%	0.00%	0.00%	29.27%		
	Length	-	730	-	-	-	-		644 mm	24
All[a]	Numbers	65	191	93	24	0	57	3,803	6.13 yrs	162
	% Comp	1.71%	5.02%	2.44%	0.62%	0.00%	1.49%			
	Length	504	730	552	642	-	593		536 mm	109

[a] Totals may differ due to rounding.

Table 4.3.1. Harvest-at-age (numbers), year class composition (%), mean length (mm) and standard deviation of tournament caught walleye, April 2009, at Port Clinton, Ohio.

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	*Continued*
Gender	Age	2	3	4	5	6	7	8	9	10	11	12	*below*
Males	Number	9	0	3	0	53	0	5	0	3	1	0	
	% of Males	11.84%	-	3.95%	-	69.74%	-	6.58%	-	3.95%	1.32%	-	
	Mean Length	388	-	448	-	508	-	548	-	592	568	-	
	St. Dev. (Length)	9	-	35	-	24	-	16	-	36	-	-	
Females	Number	0	2	8	3	434	0	45	15	83	14	11	
	% of Females	-	0.30%	1.21%	0.45%	65.46%	-	6.79%	2.26%	12.52%	2.11%	1.66%	
	Mean Length	-	457	537	539	598	-	665	659	671	653	702	
	St. Dev. (Length)	-	0	7	10	30	-	27	31	40	29	37	
All	Number	9	2	11	3	487	0	50	15	86	15	11	
	% of Total	1.22%	0.27%	1.49%	0.41%	65.90%	-	6.77%	2.03%	11.64%	2.03%	1.49%	
	Mean Length	388	457	513	539	588	-	653	659	668	647	702	
	St. Dev. (Length)	9	0	45	10	41	-	44	31	42	36	37	

	Year Class	1996	1995	1994	1993	1992	1991	1990	1989	1988	Total		Sample
Gender	Age	13	14	15	16	17	18	19	20	21		Mean	(N)
Males	Number	0	1	0	0	0	1	0	0	0	76	6.07 yr	56 ages
	% of Males	-	1.32%	-	-	-	1.32%	-	-	-	10.28%		20 lengths
	Mean Length	-	532	-	-	-	565	-	-	-		499 mm	76 males
	St. Dev. (Length)	-	-	-	-	-	-	-	-	-		53 mm	
Females	Number	28	2	2	8	2	2	0	1	3	663	7.50 yr	151 ages
	% of Females	4.22%	0.30%	0.30%	1.21%	0.30%	0.30%	-	0.15%	0.45%	89.72%		512 lengths
	Mean Length	717	719	743	730	742	705	-	708	739		623 mm	663 females
	St. Dev. (Length)	34	20	13	13	5	3	-	-	14		53 mm	
All	Number	28	3	2	8	2	3	0	1	3	739	7.35 yr	207 ages
	% of Total	3.79%	0.41%	0.27%	1.08%	0.27%	0.41%	-	0.14%	0.41%	100.00%		532 lengths
	Mean Length	717	657	743	730	742	658	-	708	739		611 mm	739 total
	St. Dev. (Length)	34	109	13	13	5	81	-	-	14		65 mm	

Table 4.3.2. Catch-at-age (numbers), year class composition (%), mean length (mm) and standard deviation of tournament caught smallmouth bass and largemouth bass, September 2009, at Sandusky, Ohio.

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	*Continued*
Species	Age	2	3	4	5	6	7	8	9	10	*below*
Smallmouth	Number	2	24	127	0	34	52	0	28	10	
bass	% of total	0.6%	6.7%	35.4%	-	9.5%	14.5%	-	7.8%	2.8%	
	Mean Length	347	387	403	-	451	469	-	458	438	
	St. Dev. (Length)	1	10	23	-	33	22	-	20	8	
Largemouth	Number	25	14	44	37	14	26	54	6	3	
bass	% of total	11.1%	6.2%	19.5%	16.4%	6.2%	11.5%	23.9%	2.7%	1.3%	
	Mean Length	362	386	384	394	393	416	418	438	478	
	St. Dev. (Length)	7	7	25	12	5	11	37	8	7	

	Year Class	1998	1997	1996	1995	1994	1993	Total		Sample
Species	Age	11	12	13	14	15	16		Mean	(N)
Smallmouth	Number	13	23	9	26	7	4	277	7.17 yr	48 ages
bass	% of total	3.6%	6.4%	2.5%	7.2%	1.9%	1.1%			311 lengths
	Mean Length	497	469	490	475	488	511		439 mm	
	St. Dev. (Length)	15	10	18	19	7	6		42 mm	
Largemouth	Number	3						223	5.61 yr	30 ages
bass	% of total	1.3%								196 lengths
	Mean Length	466							399 mm	
	St. Dev. (Length)	13							32 mm	

Table 4.4.1. Method of calculating shore angler hours and harvest by survey location, area and month.

a) Location angler hours for the i th day of week strata:

$E_i = (\bar{a}_i) * (H_i) * (D_i)$ where:

E_i = estimated number of angler hours
$\bar{a}_i$ = mean number of anglers counted
H_i = number of hours per day
D_i = number of days per month

b) Location catch per angler hour for the k^{th} species:

$F_{ik} = (\Sigma c_{ik}) / (\Sigma e_{ik})$ where:

F_{ik} = catch per angler hour
c_{ik} = observed number of fish in sample interviews
e_{ik} = observed number of angler hours in sample interviews

c) Location catch of the k^{th} species:

$C_{ik} = (E_i) * (F_{ik})$ where:
C_{ik} = estimated catch of species

Table 4.5.1. Lake Erie steelhead tributary creel survey locations.

Location Number	AREA 1 - SEGMENT A
	Vermilion River
101	South St. municipal boat ramp
102	Vermilion Rd. pull-off N Rt 2
103	Vermilion Rd. pull-off S Rt 2
104	Bacon Woods metro park
105	Mill Hollow Park
106	Gore Orphanage Rd MetroPark
107	Dean Rd. bridge - dns. LH side
108	Schoepfle Gardens / Rt 113 bridge
	misc west tribs
109	Beaver Creek Park - Amherst & GC access
110	French Creek Reservation
111	Avon Lake CEI / Miller Rd pier
112	Porter & Cahoon Creeks Huntington Pk
113	Bradstreet Landing
	Rocky River
114	Emerald Necklace marina
115	1st Riffle & bridge
116	Rock Cliff Springs & Pool
117	Madison Pool
118	Horse Ford
119	Morley Ford
120	(under) Lorain Rd bridge
121	Blue Bank pools/ Little Met GC/ old Lorain Rd.
122	Mastic Woods / Big Met GC
123	Picnic areas N of I-480
124	I-480 & Brookpark overpasses
125	Nature Center / ford
126	Cedar Point pools area
127	Lagoon dam
	AREA 1 - SEGMENT B
	Cuyahoga River
128	CVNRA - Rockside Rd. / Harvard Rd bridge
128	CVNRA Park - Canal Rd/ Tinkers Cr.
129	Rt 82 Dam - Brecksville
130	CVNRA Park - Peninsula
	Euclid Creek
131	Wildwood State Park & breakwall
132	Lakeshore Blvd (upstream end)
	Chagrin River
133	Eastlake CEI wall
134	Soccer fields/ Woodland Park
135	Borac's Landing/ Lakeshore Blvd.
136	Chagrin River Park
137	Gilson Park/ Rt.2 bridge
138	Todd Field
139	Daniels Park & dam
140	Pleasant Valley Pk./ Warner Nursery
141	Rogers / River Rd
142	N Chagrin Reservation
143	S Chagrin Reservation

Location Number	AREA 2 - SEGMENT A
	Grand River
201	Mentor Headlands breakwall
202	St Rt 535 bridge
203	Fairport Harbor short pier
204	Grand River Landing (St Clair)
205	Uniroyal property
206	Asphalt plant
207	(under) Rts. 2 & 20 bridges
208	Painesville City Park
209	Helen Hazen Wyman park
210	Beaty Landing
211	St Rt 84 access
212	Mason's Landing
213	Indian Point Park
214	Hidden Valley Park
215	Riverview Park
216	Hogsback Ridge Park
217	County Line Rd.
218	Harpersfield Dam and Park
	misc east tribs
219	Arcola Creek Park and Beach
220	Wheeler Creek
221	Geneva State Park marina
222	Cowles Creek
223	Indian Creek
	AREA 2 - SEGMENT B
	Ashtabula River
224	Walnut Beach breakwall
225	E 24th St. Bridge
226	Cederquist Park
227	Indian Trails Park
228	State Rd. covered bridge
229	Hadlock Rd. "ford"
	Conneaut Creek
230	Conneaut west breakwall
231	Conneaut marina
232	Woodworth Rd boat ramp/ arches
233	Main St bridge / US Rt 20
234	St Rt 7 and RR bridge
235	Mill St bridge
236	Center St @ CLYO park
237	Blue Bell / Parrish Rd. dead end
238	Keefus Rd.
239	Creek Rd covered bridge
240	S Ridge Rd bridge
241	State Rd. covered bridge
242	Wetmore/Horton Rd bridge
243	Center St bridge & park
244	Middle Rd covered bridge
245	Furnace Rd bridge

Table 4.5.2 Steelhead angler hours, numbers of steelhead caught, kept and released, % released (% REL) and corresponding catch rates (CUE) for steelhead anglers in fish per hour during the September 2008-May 2009 Ohio steelhead tributary creel surveys.

	Angler	Estimated Steelhead in Fishery				Steelhead Catch Rates (fish/hr)		
Stream	Hours	Catch	Kept	Released	% REL	CatchCUE	KeptCUE	RelCUE
Arcola	10,943	5,074	1,030	4,044	79.7	0.464	0.094	0.370
Ashtabula	33,740	15,555	1,643	13,911	89.4	0.461	0.049	0.412
AvonCEI	2,409	420	170	250	59.6	0.174	0.070	0.104
Beaver	637	736	23	713	96.9	1.156	0.037	1.120
Chagrin	39,052	13,324	1,491	11,833	88.8	0.341	0.038	0.303
Conneaut	66,319	33,002	3,333	29,668	89.9	0.498	0.050	0.447
Cowles	3,469	938	278	660	70.4	0.270	0.080	0.190
Cuyahoga	2,508	725	205	520	71.8	0.289	0.082	0.207
Euclid	4,348	528	333	195	37.0	0.121	0.077	0.045
French	31	0	0	0	-	0.000	0.000	0.000
Geneva	3,204	824	195	629	76.4	0.257	0.061	0.196
Grand	117,740	36,671	4,477	32,194	87.8	0.311	0.038	0.273
Indian	360	0	0	0	-	0.000	0.000	0.000
Porter/Cahoon	0	0	0	0	-	.	.	.
Rocky	51,936	23,142	1,391	21,751	94.0	0.446	0.027	0.419
Vermilion	23,982	8,829	913	7,916	89.7	0.368	0.038	0.330
Wheeler	746	0	0	0	-	0.000	0.000	0.000
ALL streams	361,423	139,769	15,481	124,286	88.9	0.387	0.043	0.344

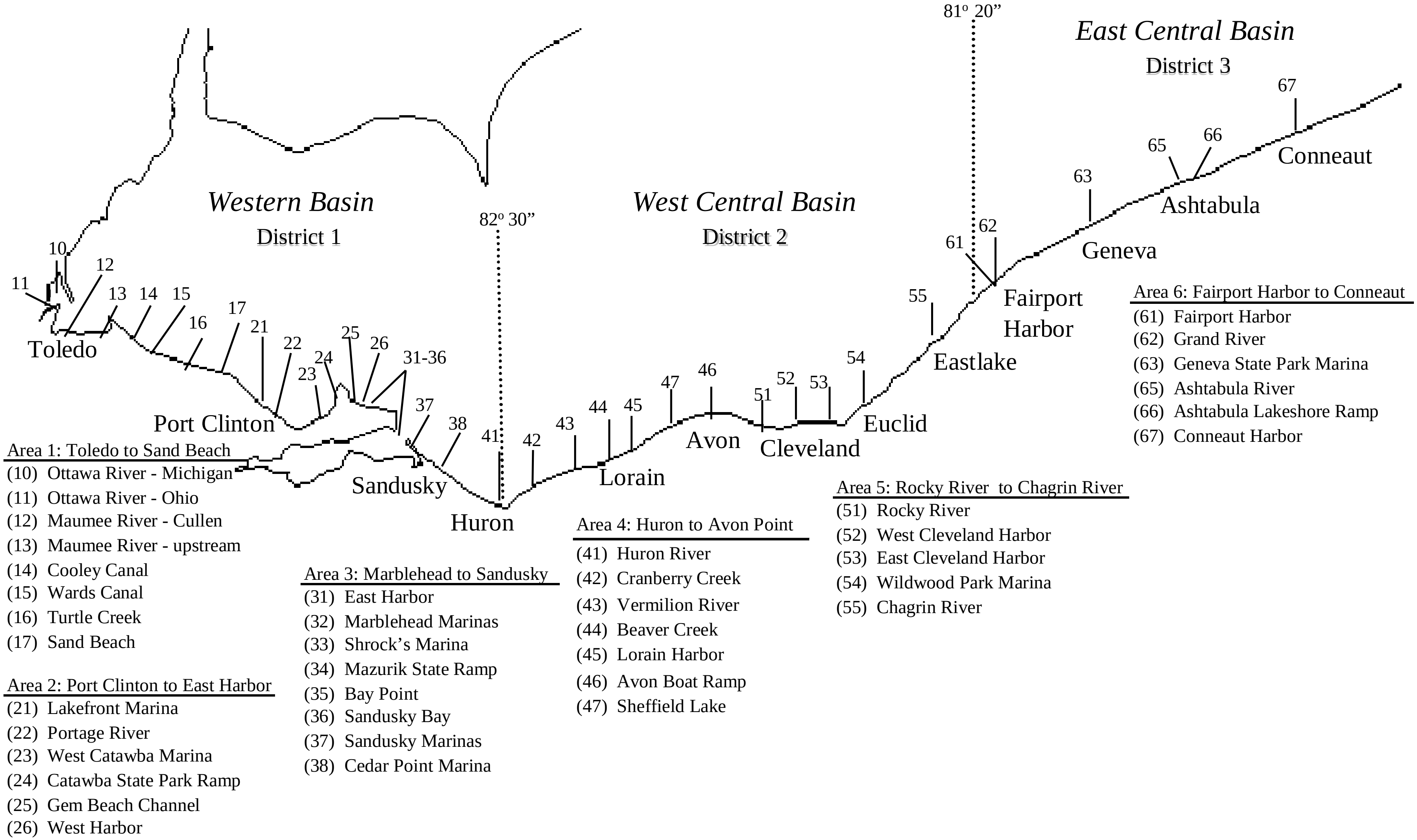


Figure 4.1.1. Creel survey areas and major boat harbor count locations for Ohio's Lake Erie open water creel survey.

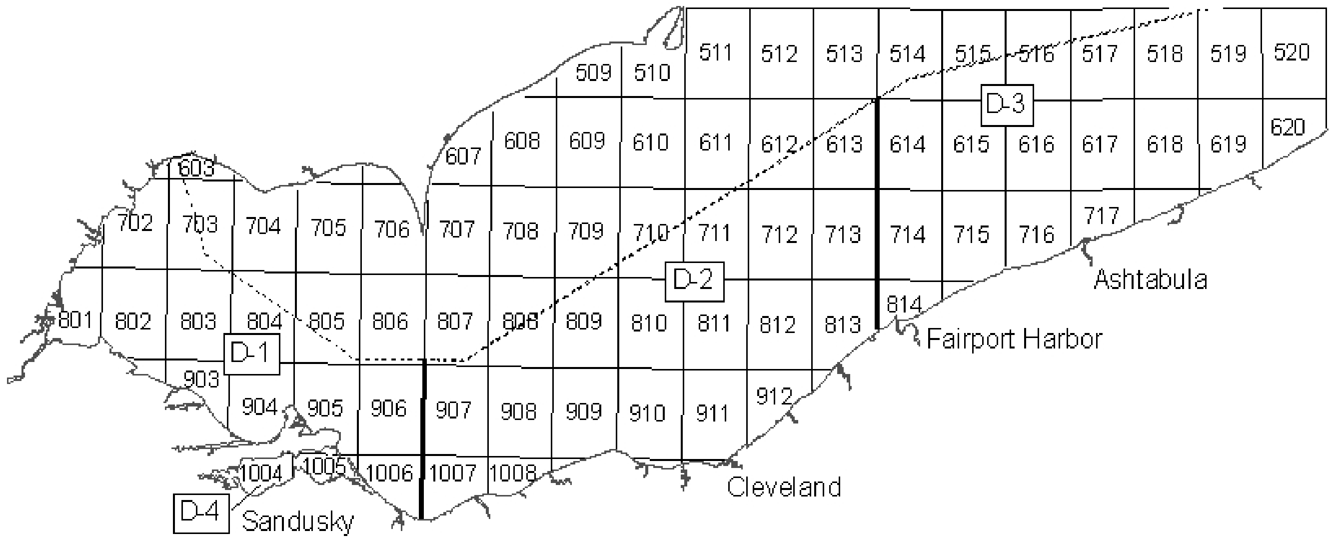


Figure 4.1.2. Catch reporting system of grids (10 minute latitude x 10 minute longitude) and districts for the Ohio waters of Lake Erie.

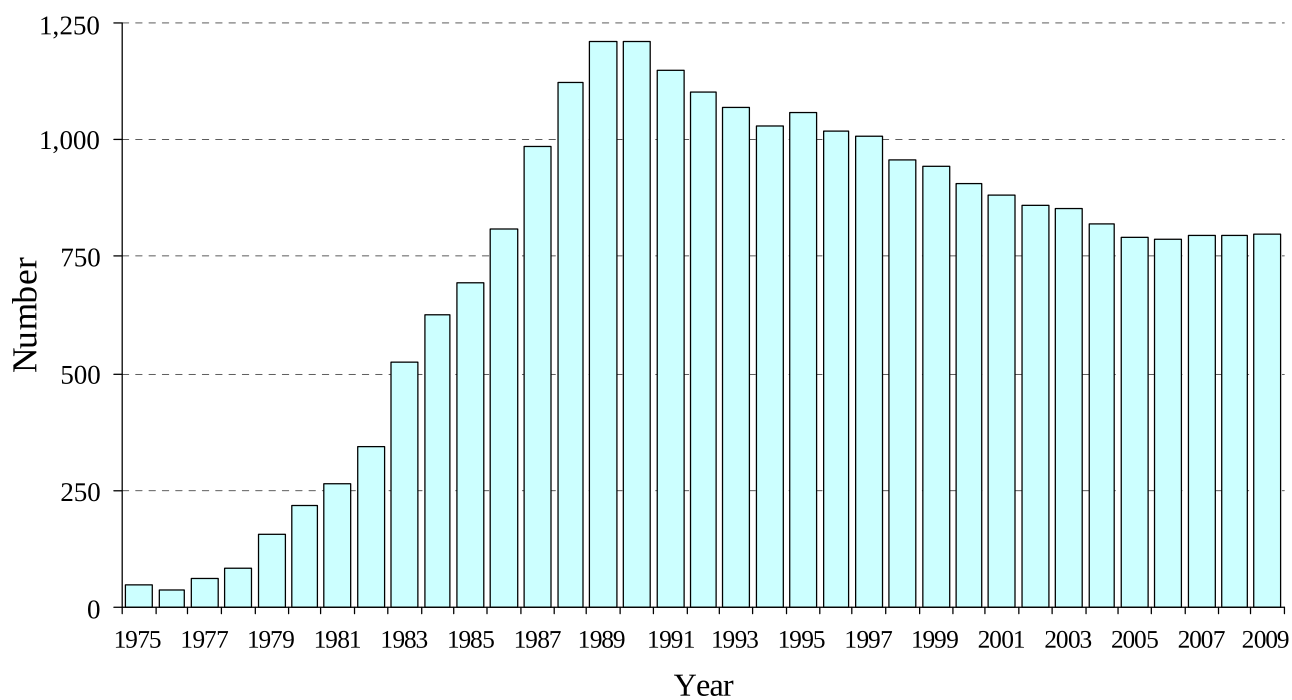
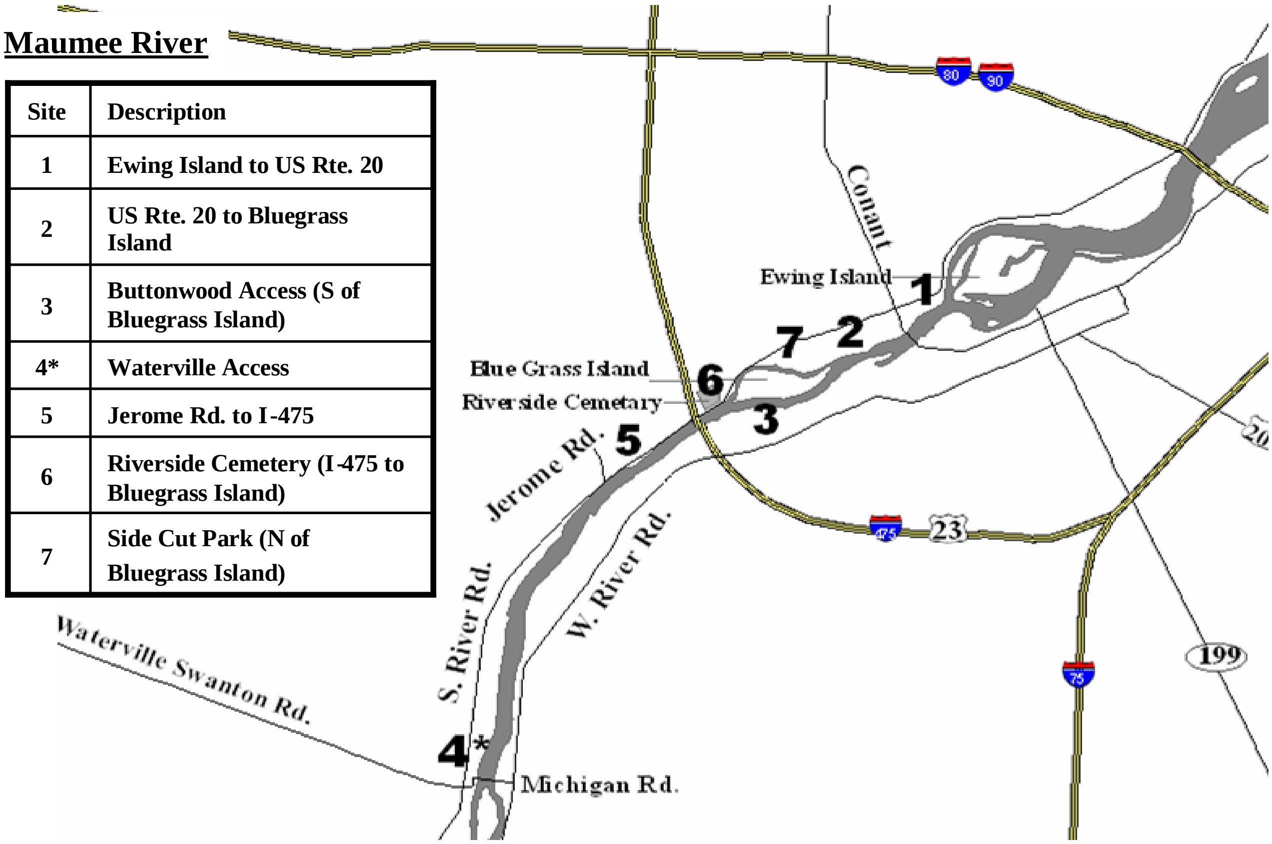


Figure 4.1.3. Number of licensed charter boat operators in the Ohio waters of Lake Erie, 1975-2009.

Maumee River

Site	Description
1	Ewing Island to US Rte. 20
2	US Rte. 20 to Bluegrass Island
3	Buttonwood Access (S of Bluegrass Island)
4*	Waterville Access
5	Jerome Rd. to I-475
6	Riverside Cemetery (I-475 to Bluegrass Island)
7	Side Cut Park (N of Bluegrass Island)



Sandusky River

Site	Description
1	Brady Island to State St. (US Rte. 20)
2	State St. to Hayes Ave.
3	Hayes Ave. to Railroad bridge
4	Railroad bridge to Rodger Young Park
5**	Rodger Young Park to Tiffin Rd. Access
6**	Tiffin Rd. Access to Ballville Dam

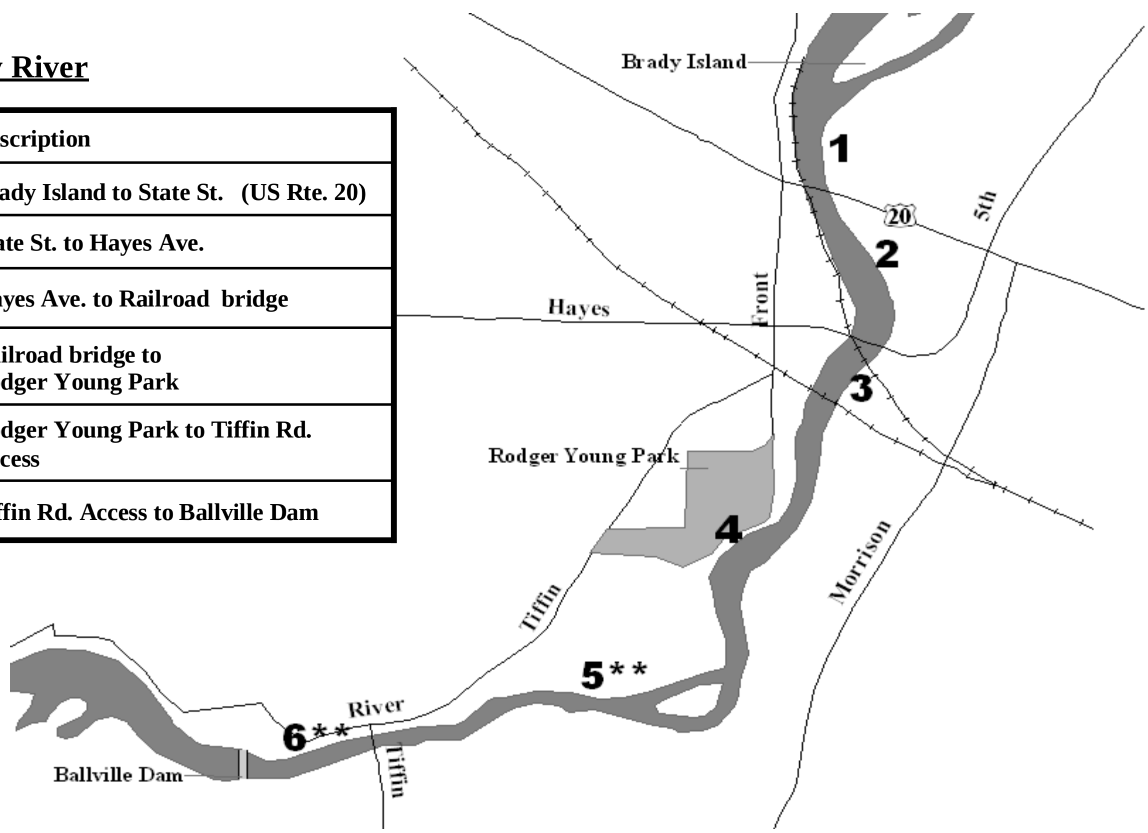
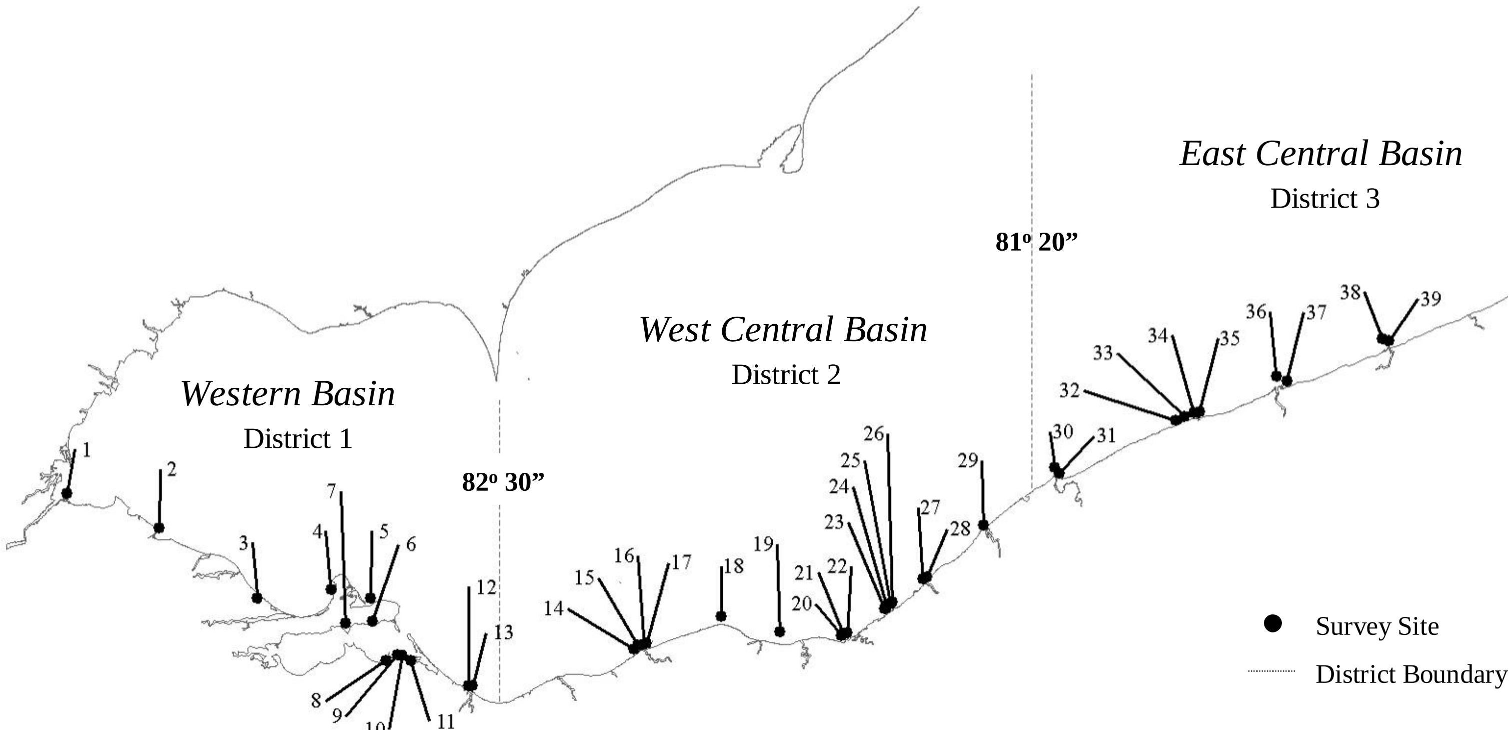


Figure 4.2.1. Creel survey locations on the Maumee River (top) and the Sandusky River (bottom). Sites with (*) are no longer sampled and those with (**) are only sampled during the white bass spawning run.



Area 21: Toledo to Huron

1. Bayshore Power Plant
2. Metzger Pier
3. Camp Perry Pier
4. Catawba State Park Pier
5. Mazurik Pier
6. Dempsey Pier
7. Sandusky Bay Bridge
8. Jackson St. Pier
9. Shoreline Park
10. Battery Park Pier
11. Police Station Pier
12. Huron Pier
13. Nickel Plate Pier

Area 22: Lorain to Euclid

14. Lorain Hot Waters
15. Lorain Ore Dock Pier
16. Disposal Plant Pier
17. Lorain Mile Pier
18. Avon Lake Pier
19. Bay Village Pier
20. Edgewater State Park I Pier
21. Edgewater State Park Breakwall
22. Edgewater Treatment Plant Pier
23. Edgewater State Park E. 55th St. Pier
24. Edgewater State Park U Pier
25. Edgewater State Park 72nd St. Pier
26. Gordon State Park Pier
27. Villa Angela Pier
28. Wildwood State Park Pier

Area 23: Eastlake to Conneaut

29. Eastlake CEI Pier
30. Headlands Beach Pier
31. Fairport Harbor Pier
32. Arcola Cr.
33. Wheeler Cr.
34. Geneva State Park Pier
35. Cowles Cr.
36. Ashtabula West Breakwall
37. Lakeshore Park Pier
38. Conneaut West Breakwall
39. Conneaut City Pier

Figure 4.4.1. Creel survey areas and count locations for Ohio’s Lake Erie shore creel survey.

5.0 Commercial Fishery Summary *(FSDR06)*

In 2009, licensed commercial trap net operators submitted electronic catch reports to track harvest and fishing effort. These data were summarized to determine total harvest (in pounds) and fishing effort for all species by month, statistical grid, and district (Figure 4.1.2). The dollar value of Ohio's commercial fish harvest was estimated based on average weekly prices reported by cooperating processing facilities and applied to weekly reported landings. Lake Erie and inland district seine and trotline effort and harvest were summarized based on paper reports submitted monthly by license holders.

Yellow perch landings were sampled in spring and fall from peak harvest areas to determine mean length, weight, and age composition of the commercial harvest. Age distributions (from otoliths), length data, and length-weight regression equations (Table 4.1.2) were used to estimate harvested age groups in pounds and numbers. Whitefish and white perch harvest was characterized based on landed samples contributed by the USGS Great Lakes Science Center, Lake Erie Biological Station, Sandusky, OH.

The reported 2009 commercial harvest from Ohio waters of Lake Erie totaled 5.0 million pounds (Appendix A), up 0.8 million pounds from 2008 (Table 5.0.1). Trap nets (3.3 million pounds) accounted for 76.9% of the harvest (Table 5.0.2). District 1 (46%) led all statistical areas in total landings. Peak harvest (63%) occurred during April and May (Table 5.0.3) and the total dockside value was estimated at 4.0 million dollars (Table 5.0.4). Trap net effort (10,309 total lifts) peaked in May (1,669 lifts), followed by September and August (Tables 5.0.5 and 5.0.6), and was below the 10 year average of number of lifts. Seine effort was highest in March, April, and May in District 1, April in District 4 (Sandusky Bay), and May in District 5 (inland fishing district).

Yellow Perch

The total 2009 allocation of yellow perch to Ohio's licensed commercial trap net fishery was 1.847 million pounds, with a District 2 (west-central basin) quota of 1.678 million pounds and a District 3 (east-central basin) quota of 0.169 million pounds. District 1 (western basin) was closed to commercial yellow perch harvest in 2009. Harvest of 1,338,616 lbs was reported by commercial operations in District 2, with 112,030 lbs landed in District 3 (Table 5.0.2). The reported trap net harvest, in both Districts 2 and 3, was the third highest in the past 10 years (Table 5.0.7). The lakewide trap net yellow perch catch rate was 213.4 lbs/lift (Table 5.0.8), the second highest in the past 10 years and well above the 10 year average. The estimated number of yellow perch harvested from District 2 (3.6 million fish) accounted for 92% of the total (Table 5.0.9). The 2003 cohort was again the most abundant of the ten year-classes in the fishery.

District 2 yellow perch trap net harvest came primarily came from grids 908, 907, 808, and 909 (49.3%, 23.4%, 12.7% and 7.3%, respectively, Table 5.0.12). A total of 659,361 pounds were harvested from grid 908, leading all Ohio grids. Yellow perch trap net harvest in District 3 came from three grids, 716, 717, and 814.

White Bass

White bass reported harvest, 671,151 pounds in 2009, was the highest in the past ten years (Table 5.0.1). District 1 trap nets annually account for the bulk (87% in 2009) of this primarily springtime harvest (Tables 5.0.2 and 5.0.3). Dockside value of the white bass harvest increased to $505,042 (Table 5.0.4), also highest in the past ten years. The catch rate in trap nets (131.5 lbs/lift) was the second highest reported in the past 10 years, while the seine catch rate was 150.9 lbs/1000 ft (Table 5.0.8).

Most (99%) of the white bass trap net harvest came from District 1 with 32.8% of this coming from grid 1006 (Table 5.0.12). The remaining harvest in this district came primarily from three grids, 802 (27.9%), 902 (20.2%), and 904 (11.9%). In District 2, grid 1008 provided 90.3% of the white bass trap net harvest.

White Perch

White perch landings totaled 680,125 pounds, the highest reported harvest in the past ten years (Table 5.0.1). Most white perch (79%) were harvested in District 1 trap nets (Table 5.0.2) during April and May (Table 5.0.3). The reported dockside value of white perch increased to $284,669 which was the highest value in the past 10 years (Table 5.0.4). The trap net catch rate was 97.9 lbs/lift (Table 5.0.8), the third highest in the past ten years. White perch harvest primarily came from three year-classes, 2005, 2006, and 2003 (Table 5.0.10). The mean age in the harvest was 4.49 years, the mean length was 241 mm, and the mean weight was 240 g.

The majority (79.8%) of the white perch trap net harvest came from District 1 with 53.4% of this coming from grid 1006, just east of Cedar Point (Table 5.0.12). The remaining harvest in this district came primarily from two other grids: 904 (18.4%) and 802 (12.6%). In District 2, 48.4% of the harvest came from grid 1008, and 18.4% came from grid 908.

Lake Whitefish

Reported lake whitefish harvest increased to 288,299 pounds, which was the highest since the fishery reopened in 1987 and was more than 5 times higher than the ten year mean (Table 5.0.1). The lake whitefish catch rate of 156.7 lbs/lift was also a record for the recent time series (Table 5.0.8). Typical of other years, 86% of the 2009 whitefish harvest was taken in November (Table 5.0.3) with 99.6% of the total harvest coming from District 1 trap nets (Table 5.0.2). Lake whitefish harvest primarily came from the 2003 year-class (Table 5.0.11). The mean age in the harvest was 6.4 years, the mean length was 521 mm, and the mean weight was 1,382 g. In District 1, most lake whitefish trap net harvest came from grid 801 (78%, Table 5.0.12). In District 2, 56% came from grid 908.

Other Species

A total of 1.924 million pounds of “other species” were landed in addition to the species characterized in the text above. This accounts for 38% of the total commercial harvest from the Ohio waters of Lake Erie. Freshwater drum led all “other species” with 543,409 pounds landed (Table 5.0.1). Seines accounted for 54% of “other species” harvested (Table 5.0.2).

Table 5.0.1. Annual commercial harvest (pounds) from the Ohio waters of Lake Erie, by species, 2000-2009.

Year	Buffalo	Bullhead	Burbot[a]	Carp	Channel Catfish	Freshwater Drum	Gizzard Shad	Goldfish	Quillback	Suckers	White Bass	White Perch	Whitefish	Yellow Perch[bc]	Total
2000	162,477	41,695	78	956,218	260,512	428,660	2,809	19,473	140,183	30,195	317,336	182,254	41,472	962,841	3,546,203
2001	257,621	24,106	47	857,694	322,488	284,883	1,970	18,837	149,549	41,040	226,664	155,555	47,639	1,089,247	3,477,340
2002	281,955	23,409	59	523,539	311,824	248,567	545,151	10,625	170,096	32,641	161,664	269,512	6,539	1,438,215	4,023,796
2003	278,544	21,815	192	582,035	319,378	261,068	45	31,406	227,195	15,469	318,327	312,240	13,244	1,505,840	3,886,798
2004	234,673	11,005	857	469,059	271,627	298,336	85,540	23,834	195,931	30,836	358,810	386,800	10,529	1,577,113	3,954,950
2005	230,426	17,012	363	340,399	310,115	438,589	219,800	35,396	263,818	41,763	347,657	428,822	4,613	1,563,200	4,241,973
2006	263,396	25,118	305	271,190	385,134	411,840	195	58,812	250,052	33,233	483,314	655,551	29,795	1,050,614	3,918,549
2007	268,884	25,790	47	322,323	341,843	320,747	55,259	29,148	211,208	17,165	334,721	573,996	41,554	1,950,661	4,493,346
2008	226,574	26,881	4	198,616	447,232	423,705	38,272	32,941	197,378	23,971	424,225	545,138	82,914	1,515,666	4,183,517
2009	371,632	32,197	0	249,417	407,386	543,409	9,850	62,087	211,422	36,738	671,151	680,125	288,299	1,450,646	5,014,359
Mean	257,618	24,903	195	477,049	337,754	365,980	95,889	32,256	201,683	30,305	364,387	418,999	56,660	1,410,404	4,074,083

[a] The commercial harvest of burbot was reinstated in 1995 following a 1971 closure.

[b] A spring (March - April) closure on commercial yellow perch harvest was enacted in 1993.

[c] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2008 and 2009.

Table 5.0.2. Commercial harvest (pounds), from the Ohio waters of Lake Erie, by species, gear, and district in 2009.

Gear	District	Buffalo	Bullhead	Burbot	Carp	Channel Catfish	Freshwater Drum	Gizzard Shad	Goldfish	Quillback	Suckers	White Bass	White Perch	Whitefish	Yellow Perch [a]	Total
Trap Net	1	81,881	3,998	0	36,897	183,494	282,167	565	1,094	143,812	26,926	586,801	535,102	287,273	0	2,170,010
	2	25	0	0	241	61,511	27,565	79	0	747	3,955	4,307	135,528	984	1,338,616	1,573,558
	3	0	0	0	0	0	0	0	0	0	0	0	0	37	112,030	112,067
	Total	81,906	3,998	0	37,138	245,005	309,732	644	1,094	144,559	30,881	591,108	670,630	288,294	1,450,646	3,855,635
Seines	1	30,000	0	0	4,650	17,345	39,462	1,121	600	18,674	283	6,825	265	5	0	119,230
	4	88,692	28,021	0	50,481	116,184	174,345	7,800	46,039	29,899	4,017	73,145	9,173	0	0	627,796
	5	170,766	0	0	156,651	0	19,735	285	14,351	18,267	1,557	0	14	0	0	381,626
	Total	289,458	28,021	0	211,782	133,529	233,542	9,206	60,990	66,840	5,857	79,970	9,452	5	0	1,128,652
Trotlines	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	4	268	178	0	497	28,852	135	0	3	23	0	73	43	0	0	30,072
	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	268	178	0	497	28,852	135	0	3	23	0	73	43	0	0	30,072
Carp Aprons	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	111,881	3,998	0	41,547	200,839	321,629	1,686	1,694	162,486	27,209	593,626	535,367	287,278	0	2,289,240
	2	25	0	0	241	61,511	27,565	79	0	747	3,955	4,307	135,528	984	1,338,616	1,573,558
	3	0	0	0	0	0	0	0	0	0	0	0	0	37	112,030	112,067
	4	88,960	28,199	0	50,978	145,036	174,480	7,800	46,042	29,922	4,017	73,218	9,216	0	0	657,868
	5	170,766	0	0	156,651	0	19,735	285	14,351	18,267	1,557	0	14	0	0	381,626
	Total	371,632	32,197	0	249,417	407,386	543,409	9,850	62,087	211,422	36,738	671,151	680,125	288,299	1,450,646	5,014,359

[a] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2009.

Table 5.0.3. Monthly commercial harvest (pounds) from the Ohio waters of Lake Erie in 2009.

Species	March	April	May	June	July	August	September	October	November	December	Total
Buffalo	103,689	44,812	44,797	21,780	15,384	33,378	57,449	26,386	8,779	15,178	371,632
Bullhead	20,315	6,992	797	229	4	-	1,477	1,389	839	155	32,197
Burbot	-	-	-	-	-	-	-	-	-	-	-
Carp	77,330	43,240	53,112	31,988	2,313	6,140	10,261	12,324	12,598	111	249,417
Channel Catfish	45,941	136,852	27,037	29,326	16,784	7,591	33,117	66,037	43,682	1,019	407,386
Freshwater Drum	61,818	161,216	149,713	58,437	14,348	7,011	23,258	41,047	26,347	214	543,409
Gizzard Shad	2,813	6,730	53	-	-	-	-	244	-	10	9,850
Goldfish	25,135	18,214	5,759	3,135	41	277	5,449	3,611	437	29	62,087
Quillback	49,748	55,612	35,460	26,564	11,539	3,843	8,916	10,695	8,883	162	211,422
Suckers	14,117	6,732	299	-	14	332	807	6,960	6,979	498	36,738
White Bass	68,028	151,908	216,872	147,170	29,983	6,511	12,976	19,525	18,027	151	671,151
White Perch	19,518	235,786	269,579	67,139	16,017	2,742	4,248	25,743	38,191	1,162	680,125
Whitefish	36	180	794	83	5	-	20	7,006	249,303	30,872	288,299
Yellow Perch [ab]	-	-	956,125	89,486	156,070	104,590	90,818	35,150	17,487	920	1,450,646
Total	488,488	868,274	1,760,397	475,337	262,502	172,415	248,796	256,117	431,552	50,481	5,014,359

[a] A spring (March - April) closure on commercial yellow perch harvest was enacted in 1993.

[b] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2009.

Table 5.0.4. Dockside value[a] , in dollars, of the commercial harvest in the Ohio waters of Lake Erie, 2000-2009.

Year	Carp	Channel Catfish	Freshwater Drum	White Bass	White Perch	Yellow Perch	Others	Total Value
2000	80,054	156,307	51,439	256,085	104,486	2,507,431	131,656	3,287,458
2001	85,769	193,493	28,488	142,725	55,233	2,576,085	131,387	3,213,180
2002	70,131	187,094	30,856	81,242	67,153	2,507,119	146,301	3,089,896
2003	78,705	52,695	32,490	181,953	116,049	2,261,971	139,055	2,862,918
2004	70,359	108,651	36,473	219,074	155,150	2,585,908	152,018	3,327,633
2005	51,060	124,046	59,070	253,125	170,732	3,361,983	148,127	4,168,143
2006	38,461	125,292	56,299	330,057	253,741	2,379,749	193,947	3,377,546
2007	38,439	102,546	56,141	242,477	209,920	4,452,605	200,028	5,302,156
2008	39,723	146,908	71,788	229,414	219,335	2,469,539	241,640	3,418,347
2009	51,411	133,650	101,198	505,042	284,669	2,403,468	530,027	4,009,465
Mean	60,411	133,068	52,424	244,119	163,647	2,750,586	201,419	3,605,674

[a] Estimated value based on average weekly dockside prices and weekly landings, in pounds, by species.

Table 5.0.5. Annual commercial fishing effort[a] in the Ohio waters of Lake Erie, by district and gear, 2000-2009.

	District 1		District 2	District 3	District 4	District 5	Total	
Year	Trap Net	Seine	Trap Net	Trap Net	Seine	Seine	Trap Net	Seine
2000	6,180	148.0	5,498	1,640	551.3	401.6	13,318	1,100.9
2001	3,424	153.2	4,906	32	532.1	336.9	8,362	1,022.2
2002	4,126	118.8	7,755	0	498.2	289.6	11,881	906.6
2003	3,803	237.1	10,275	0	596.6	169.3	14,078	1,003.0
2004	6,428	94.7	12,251	0	433.4	208.4	18,679	736.5
2005	4,565	264.2	9,132	947	433.1	84.3	14,644	781.6
2006	4,788	77.9	7,711	881	646.0	215.4	13,380	939.2
2007	4,088	61.9	9,299	713	451.9	237.3	14,100	751.0
2008	2,183	69.6	4,049	1,288	437.9	251.1	7,520	758.7
2009	3,360	44.6	6,467	482	520.9	481.1	10,309	1,046.6
Mean	4,295	127.0	7,734.3	598.3	510.1	267.5	12,627	904.6

Table 5.0.6. Monthly commercial fishing effort[a] in the Ohio waters of Lake Erie, by district and gear, in 2009.

	District 1		District 2	District 3	District 4	District 5	Total	
Month	Trap Net	Seine[b]	Trap Net	Trap Net	Seine[b]	Seine[c]	Trap Net	Seine
March	173	12.4	0	0	147.8	59.4	173	219.5
April	542	12.4	57	0	156.7	49.5	599	218.5
May	595	12.4	1,074	0	64.2	130.7	1,669	207.2
June	440	7.4	692	68	15.8	61.1	1,200	84.3
July	131	0.0	921	199	0.0	29.0	1,251	29.0
August	100	0.0	1,095	159	0.0	104.9	1,354	104.9
September	213	0.0	1,147	56	97.6	23.4	1,416	121.0
October	435	0.0	907	0	38.9	13.9	1,342	52.7
November	646	0.0	564	0	0.0	6.9	1,210	6.9
December	85	0.0	10	0	0.0	2.3	95	2.3
Total	3,360	44.6	6,467	482	520.9	481.1	10,309	1,046.6

[a] Trap net lifts; thousands of feet of seine.

[b] Seine season closed from June 15 to September 15, except for carp aprons and inland seines.

[c] Inland district not subject to summer closure.

Table 5.0.7. Ohio's yellow perch TAC, commercial harvest, sport harvest, and combined harvest (millions of pounds), by Management Unit (MU) .

	Ohio's TAC			Ohio's Commercial Harvest			Ohio's Sport Harvest			Ohio's Combined Harvest		
Year[a]	MU 1	MU 2	MU 3	MU 1[b]	MU 2	MU 3	MU 1	MU 2	MU 3	MU 1	MU 2	MU 3
1996	0.619	0.720	0.188	0.200	0.323	0.103	0.925	0.500	0.083	1.126	0.823	0.187
1997	1.080	1.426	0.299	0.212	0.499	0.055	0.859	0.581	0.165	1.071	1.080	0.220
1998	1.191	1.406	0.365	0.184	0.305	0.090	0.785	0.323	0.185	0.969	0.628	0.275
1999	1.070	1.368	0.299	0.201	0.390	0.106	0.708	0.584	0.246	0.909	0.974	0.353
2000	1.041	1.457	0.369	0.241	0.565	0.157	0.798	0.604	0.287	1.039	1.169	0.443
2001	0.851	1.699	0.491	0.179	0.905	0.004	0.736	0.842	0.460	0.916	1.747	0.465
2002	1.466	1.991	0.568	0.338	1.100	0.000	0.979	0.887	0.640	1.317	1.987	0.640
2003	1.258	2.167	0.858	0.250	1.255	0.000	1.156	0.858	0.482	1.406	2.113	0.482
2004	1.929	2.418	0.768	0.289	1.288	0.000	0.802	0.959	0.659	1.091	2.246	0.659
2005	1.843	2.523	1.066	0.357	1.163	0.043	0.608	0.680	0.414	0.965	1.843	0.458
2006	1.516	4.040	1.930	0.236	0.744	0.070	0.820	0.649	0.201	1.055	1.394	0.271
2007	0.833	2.418	1.670	0.201	1.702	0.048	0.782	0.543	0.343	0.983	2.245	0.391
2008	0.708	2.300	1.380	0.000	1.377	0.139	0.410	0.628	0.490	0.410	2.005	0.629
2009	1.026	2.890	1.361	0.000	1.339	0.112	0.464	0.463	0.485	0.464	1.802	0.597

[a] From 1996 through 2007, MU 2 and MU 3 were combined into a "central basin" quota in Ohio waters.

[b] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2008 and 2009.

Table 5.0.8. Annual harvest rates[a] of major commercial species in the Ohio waters of Lake Erie, by gear, 2000-2009.

	Yellow Perch	White Bass		White Perch		Channel Catfish		Whitefish
Year	Trap Net	Trap Net	Seine	Trap Net	Seine	Trap Net	Seine	Trap Net
2000	87.7	53.9	102.3	26.5	17.9	21.3	205.8	19.9
2001	172.9	60.7	61.9	38.0	4.9	41.5	268.8	30.4
2002	138.4	38.5	65.6	50.4	10.6	31.7	257.1	6.5
2003	121.2	77.4	106.6	49.8	10.5	35.4	210.1	8.4
2004	96.3	71.9	90.0	48.3	16.8	17.9	249.9	8.0
2005	119.3	80.7	168.8	60.2	26.4	28.1	276.9	3.6
2006	88.0	107.1	69.9	76.3	14.7	36.5	182.6	24.0
2007	152.1	82.9	90.5	98.3	25.1	49.1	275.4	29.1
2008	287.5	144.9	93.3	144.0	12.2	93.7	299.2	67.1
2009	213.4	131.5	150.9	97.9	18.7	58.2	243.6	156.7
Mean	147.7	84.9	100.0	69.0	15.8	41.3	246.9	35.4

[a] Pounds per trap net lift, pounds per 1,000 feet of seine haul.

Table 5.0.9. Yellow perch commercial harvest (numbers), year class composition (% comp.), mean length (mm), mean weight (g), and mean age (yr), by district, in 2009.

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	Total		Sample
District(s)	Age	2	3	4	5	6	7	8	9	10	11		Mean	(N)
1[a]	Numbers	0	0	0	0	0	0	0	0	0	0	0		
	% Comp	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
	Length	-	-	-	-	-	-	-	-	-	-			
	Weight	-	-	-	-	-	-	-	-	-	-			
2	Numbers	53,849	264,692	713,683	135,742	2,177,550	12,448	204,281	2,341	3,660	9,959	3,578,205		
	% Comp	1.50	7.40	19.95	3.79	60.86	0.35	5.71	0.07	0.10	0.28		5.42 yr	388
	Length	240	240	240	240	242	287	244	222	282	264		242 mm	1,664
	Weight	180	170	167	164	169	281	176	135	272	213		170 g	
3[b]	Numbers	3,957	21,359	59,423	11,377	184,054	1,064	17,248	172	299	851	299,804		
	% Comp	1.32	7.12	19.82	3.79	61.39	0.35	5.75	0.06	0.10	0.28		5.44 yr	-
	Length	240	240	240	240	242	287	244	222	282	264		242 mm	-
	Weight	180	168	165	164	168	281	174	135	272	213		169 g	
Total	Numbers	57,806	286,051	773,106	147,119	2,361,604	13,512	221,529	2,513	3,959	10,810	3,878,009		
	% Comp	1.49	7.38	19.94	3.79	60.90	0.35	5.71	0.06	0.10	0.28		5.42 yr	388
	Length	240	240	240	240	242	287	244	222	282	264		242 mm	1,664
	Weight	180	170	166	164	169	281	176	135	272	213		170 g	

[a] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2009.

[b] District 3 summarized using biological samples from District 2.

Table 5.0.10. White perch commercial trap net harvest (numbers), year class composition (% comp.), mean length (mm), mean weight (g), and mean age (yr), by district, in 2009 [a].

	Year Class	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	Total		Sample
District(s)	Age	2	3	4	5	6	7	8	9	10	11		Mean	(N)
All	Numbers	139,265	211,995	505,383	38,864	189,700	90,683	65,238	6,477	12,955	6,477	1,267,037		
	% Comp	10.99	16.73	39.89	3.07	14.97	7.16	5.15	0.51	1.02	0.51		4.49 yr	275
	Length	204	218	237	254	263	280	276	305	304	302		241 mm	566
	Weight	130	163	220	291	302	373	378	448	515	530		240 g	

[a] Summary includes data contributed by the USGS Great Lakes Science Center, Lake Erie Biological Station, Sandusky, OH.

Table 5.0.11. Whitefish commercial trap net harvest (numbers), year class composition (% comp.), mean length (mm), mean weight (g), and mean age (yr), by district, in 2009 [a].

	Year Class	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	Total		Sample[b]
District(s)	Age	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		Mean	(N)
All	Numbers	8,630	5,465	52,928	15,246	6,616	1,151	1,151	1,151	288	863	288	288	288	0	288	94,638		
	% Comp	9.12	5.78	55.93	16.11	6.99	1.22	1.22	1.22	0.30	0.91	0.30	0.30	0.30	0.00	0.30		6.41 yr	327
	Length	481	493	520	520	554	574	581	574	566	604	635	572	641	-	604		521 mm	329
	Weight	1,046	1,164	1,351	1,371	1,652	1,867	1,970	1,994	2,001	2,186	2,681	2,102	2,709	-	2,523		1,382 g	

[a] Summary includes data contributed by the USGS Great Lakes Science Center, Lake Erie Biological Station, Sandusky, OH.

[b] All samples were collected in November and December when 97% of the harvest occurred, and were all collected from the western basin where over 99% of the harvest occurred.

Table 5.0.12. Summary of 2009 commercial trap net effort, harvest, percent of basin harvest, and catch rate, by interagency 10-minute grids, for selected species.

			Yellow Perch[d]			White Bass			White Perch			Whitefish		
District	Grid[a]	Effort[b]	Pounds	%	Catch Rate[c]	Pounds	%	Catch Rate[c]	Pounds	%	Catch Rate[c]	Pounds	%	Catch Rate[c]
1	801	314	0	-	-	3,406	0.6%	10.85	2,344	0.4%	7.46	223,105	77.7%	710.53
	802	522	0	-	-	163,909	27.9%	314.00	67,431	12.6%	129.18	37,415	13.0%	71.68
	804	6	0	-	-	591	0.1%	98.50	528	0.1%	88.00	0	0.0%	0.00
	902	302	0	-	-	118,824	20.2%	393.46	41,896	7.8%	138.73	13	0.0%	0.04
	904	692	0	-	-	69,838	11.9%	100.92	98,621	18.4%	142.52	21,045	7.3%	30.41
	905	277	0	-	-	38,015	6.5%	137.24	38,371	7.2%	138.52	406	0.1%	1.47
	1006	1,247	0	-	-	192,218	32.8%	154.14	285,911	53.4%	229.28	5,289	1.8%	4.24
	Total	3,360	0		-	586,801		174.64	535,102		159.26	287,273		85.50
2	808	455	170,017	12.7%	373.66	0	0.0%	0.00	8,007	5.9%	17.60	25	2.5%	0.05
	907	702	313,451	23.4%	446.51	22	0.5%	0.03	15,584	11.5%	22.20	138	14.0%	0.20
	908	2,624	659,361	49.3%	251.28	252	5.9%	0.10	24,979	18.4%	9.52	551	56.0%	0.21
	909	669	97,664	7.3%	145.99	39	0.9%	0.06	10,261	7.6%	15.34	124	12.6%	0.19
	910	566	36,126	2.7%	63.83	14	0.3%	0.02	2,184	1.6%	3.86	6	0.6%	0.01
	911	852	47,363	3.5%	55.59	90	2.1%	0.11	8,870	6.5%	10.41	14	1.4%	0.02
	1008	599	14,634	1.1%	24.43	3,890	90.3%	6.49	65,643	48.4%	109.59	126	12.8%	0.21
	Total	6,467	1,338,616		206.99	4,307		0.67	135,528		20.96	984		0.15
3	716	206	53,195	47.5%	258.23	0	-	-	0	-	-	0	0.0%	0.00
	717	116	50,564	45.1%	435.90	0	-	-	0	-	-	37	100.0%	0.32
	814	160	8,271	7.4%	51.69	0	-	-	0	-	-	0	0.0%	0.00
	Total	482	112,030		232.43	0		-	0		-	37		0.08

[a] Interagency 10-minute grid system

[b] Trap net lifts, grid total for season

[c] Pounds per lift for all lifts in grid (not targeted effort, includes all trap net effort)

[d] Management Unit 1 (the western basin) was closed to commercial yellow perch harvest in 2009.

6.0 Population Assessments

In 2009, experimental trawl and gill net surveys were conducted, in the Ohio waters of Lake Erie, to assess the relative abundance and growth of major predator (walleye, yellow perch, white bass, smallmouth bass) and forage fish (white perch, gizzard shad, emerald shiners, rainbow smelt, round gobies) species. This information is collected for population modeling purposes and to assess temporal and spatial changes in the Lake Erie fish community at the interagency (Lake Erie Committee) level.

6.1 Western *(FSDR13)* and Central *(FFDR04)* Basin Trawl Surveys

Western and central basin August and September bottom trawl surveys (Figure 6.1.1) were conducted as scheduled in 2009. Additional trawls taken between May and July, in both basins, are not presented in this report. In the western basin, the trawl survey was conducted with the Research Vessel (*R/V*) *Explorer*, docked in Sandusky, and in the central basin with the R/V *Grandon*, docked in Fairport Harbor.

All bottom trawl relative abundance indices were computed as arithmetic mean catch-per-hectare trawled (CPHT). Some western basin indices have been recalculated using fishing power correction (FPC) factors derived from a comparative trawling exercise conducted during the summer of 2003. The FPCs were developed to correct for differences in the catchability of targeted species between old and new research vessels due to differences in net/vessel configurations (Ohio Division of Wildlife 2007). The derived FPC's were species and age group specific and were applied to those groups for which there were adequate samples to determine statistical differences based upon an *a priori* decision rule (Monro 1998, Tyson et al. 2006). Further, all index values were converted to CPHT based on the sample-specific area swept by the trawl. This increases sample comparability by taking into account variability in vessel speed and distance towed at different sites instead of just using a fixed amount of time, as previously calculated.

Any reference to average length or weight refers to mean total length in millimeters (mm) and mean wet weight in grams (g). Selected species were also analyzed for sex, maturity, age, and diet composition through laboratory examination. Fish were aged using otoliths removed from a stratified random subsample of each of the primary-reported species. Length-age keys were used to assign ages to non-subsampled fish based on length and age distributions for each species, month, and district.

Using a stratified random subsample for selected species, diet samples were taken by removing the stomach contents of the fish and examining the mouth, throat, and digestive tract for any ingested items. Fish with inverted stomachs were not included in the diet analyses. Samples were identified to species, for fish and plankton, and order for insects. Counts, or wet weight of diet items, were converted to dry weights for caloric value of fish consumption by using in-house developed conversion tables for prey number or wet weight to dry weight. Diet analysis summaries are reported as percent dry weight except where noted.

Western Basin Trawl Survey

Trawling was stratified over four depth strata (0-3 m, 3-6 m, 6-9 m, and >9 m) with effort allocated in proportion to the number of available sampling units (2.5 minute grids) per strata. One 10-minute tow was conducted at each site using a flat-bottom semi-balloon otter trawl with a 10.7-m head rope and 13-mm bar mesh in the cod end. The August interagency survey and the September survey attempt to sample 38 District 1 stations annually (Figure 6.1.1). For the trawls conducted from May through July, the number of sites surveyed has been reduced to 22 due to the logistic constraints imposed by other field projects. The results of the reduced survey will be analyzed to make sure sample sizes provide adequate estimates of relative abundance.

Central Basin Trawl Survey

Monthly bottom trawl surveys are conducted, by district, from May through October across four depth strata (5-10 m, 10-15 m, 15-20 m, and >20 m). From 1990-1992, the survey consisted of twenty-four, randomly selected trawls, per district, from Vermilion to the Pennsylvania state line. In 1993, Chagrin and Perry were the only sites sampled (N=16; 4 per site per depth strata). In 1994, transects were established every 20 km (*District 2*: Vermilion, Lorain, Avon, Cleveland, and Chagrin; *District 3*: Perry and Ashtabula; Figure 6.1.1). The trawl survey was expanded from Avon to Conneaut, from 1994 to 1997, and was further expanded west to Berlin Heights from 1998 to 2003. Historically, catch rates from the established transects have demonstrated that three trawls per depth stratum can substantially improve precision and reduce bias (Knight et al. 1993). In 2004, a similar trend in catch rates between the Ashtabula and Conneaut transects was noted, so these sites were combined to increase sample size (from two to three samples per depth strata) and improve estimates of abundance. In 2005, the Cleveland transect was combined with the Avon transect and the Lorain transect was combined with the Vermilion transect. In 2006, District lines were moved to reflect Lake Erie Committee Management Unit boundaries and Berlin Heights became an eastern District 1 site.

Bottom trawling was conducted before, during, and after lake stratification at three stations per depth strata per transect. A 10-minute tow was conducted at sites that had depths greater than 10 m using a Yankee two-seam bottom trawl with a 10.4-m head rope, 25-mm bar mesh in the cod end, 13-mm stretched mesh liner, and 25.4-cm roller gear. Five-minute tows were conducted at sites with depths less than 10 m. Trawl indices prior to 1995 were adjusted with FPCs to account for catchability differences between old Biloxi trawls and new Yankee trawls (Ohio Division of Wildlife 2007).

6.2 Western and Central Basin Gill Net Survey *(FSDR20)*

A gill net survey designed to assess adult abundance of walleye and white bass in Lake Erie was initiated in 1978. The survey design has changed through the years, in terms of effort expended, but utilizes the same sampling gear. While the initial survey focused on the western basin, in 1983 the survey was expanded to include the central basin due to the migratory nature of walleye in Lake Erie and to get broader spatial coverage of walleye habitat.

The 2009 gill net sites include historic sampling sites (n=7), in Districts 1 and 2, and additional sites (n=41) from Toledo to Conneaut (Figure 6.2.1). Additional sites were selected, in both districts, to maximize spatial coverage of the basin. In Districts 2 and 3, sites were selected by 5-m depth strata (< 5, 5-10, 10-15, 15-20 and >20 m) from transects that correspond with the trawl survey. Overnight sets of nylon multifilament gill nets were fished (kegged) 1.8 m below the surface at each station. Each net consisted of a gang of 13 randomly-ordered panels, each 30.5 m (length) by 1.8 m (height) and ranging from 51-127 mm stretched mesh in 6-mm increments. In addition, bottom gill nets were fished at all historic sites (n=7) and at select random central basin sites (n=4) using modified interagency community monofilament gill nets (Figure 6.2.1). These nets consisted of a gang of 12 randomly ordered sections, each 15.2 m (length) by 1.8 m (height), ranging from 32-76 mm stretched mesh by 6-mm increments and from 76-127 mm by 12-mm increments. For each gill net type, effort was expressed as number of nets set.

Relative abundance indices of age-1 and older walleye and white bass were calculated from fall gill net catches as the geometric mean of the catch per gill net set. Catch rates were reported as the number of fish, by species and age, caught in each district, by the number of nets, by type, and set.

6.3 Relative Abundance, Growth, Maturity, and Diet of Selected Species *(FSDR13, FSDR20, FFDR04)*

Walleye

Relative Abundance

For both the August and September trawls in each district, age-0 walleye indices were again well below the long-term mean (1990-2008; Tables 6.3.1 and 6.3.2). Index values were very low in District 1 and no age-0 walleye were sampled in District 2 during August or in either August or fall surveys in District 3.

Fall gill net catch rates (i.e., of all age groups) in each of Ohio's Lake Erie Districts 1, 2 and 3 in 2009 were higher than the catches observed in 2008 (Table 6.3.3). In District 1 the overall catch rate was similar to the historic average but in Districts 2 and 3 the 2009 catch rate was higher than the historic means. Age-1 (i.e., 2008 year-class) catch rates were below the historic means in each district; however, age-1 are not fully recruited to this gear therefore inferences regarding the relative strength of this year-class are not warranted until they are age-2. The 2009 fall gill net survey in Ohio waters was dominated by walleye originating from the 2007 (age-2) and 2003 (age-6) year-classes in each district. The catch of age-2 walleye was higher than the historic mean catch in Districts 1 and 2, and in District 3 the catch rate of age-2 walleye was similar to the historic mean. These observations suggest that the 2007 year-class (age-2) strength for this cohort is moderate (average) in size. The next prominent age group, although to a much lower degree, were age-4 fish originating from the 2005 year-class. In 2009 the District 1 catch rate of age-4 walleye was lower than the historic mean, but near average in Districts 2 and 3. High gill net catch rates of the 2003 cohort (age-6 walleye) were the highest on record in all districts, particularly District 2, highlighting the continued strength of this year-class.

Growth

The mean length of age-0 walleye observed in the District 1 (188-mm) and District 2 (211-mm) fall trawl surveys were above the long-term averages (Table 6.3.4). Length-at-age data for walleye collected in the October gill net survey (all districts) are shown in Table 6.3.5. For years prior to 2003, length estimates for fish older than age-4 should be used with caution because scales were used as the aging structure. Research conducted with Lake Erie walleye in 2005 indicates that relative to sagittal otoliths, scales are suitable for aging younger fish (i.e., less than age-4, or about 500 mm); however, for fish larger than 500 mm, or greater than age-4, scales tend to underestimate the age. Since 2003, ages for walleye have been determined exclusively with sagittal otoliths. Although lengths for walleye less than age-3 have varied across years, temporal trends in growth are not apparent.

After two consecutive years (2008 and 2007) of record mean length-at-age values for age-1 walleye collected in fall gill nets, the value observed in 2009 was near the historic average in District 1, but still remained quite high in Districts 2 and 3. The mean lengths of age-2 walleye in Districts 1, 2 and 3 (427, 449, and 464 mm, respectively) were higher than the long-term averages (419, 431, and 424, respectively). For all ages, mean lengths continued to be higher in the central basin (Districts 2 and 3), compared to walleye from the western basin (District 1).

Maturity

In 2009, 43% of age-1male walleye in District 1 and 79% in District 2 were sexually mature. By age-2 96% and 99% were mature in those districts, respectively (Tables 6.3.6). Most (>75%) female walleye were sexually mature at age-4 (500 mm) in both districts. Walleye length-at-maturity was similar to that of recent years and did not appear to differ between basins. In 2009 there was a higher percentage of mature age-3 females in the central basin (i.e., Districts 2 and 3) compared to the western basin (i.e., District 1; Table 6.3.8).

Diet

Diet information was collected from age-1 and ages 2 and older (age-2+) walleye caught in the fall gill net survey (Figure 6.3.1). Of all walleye analyzed (n=1,051), 48% had empty stomachs. Diets in

District 1 were dominated by gizzard shad for both age-1 (62%) and age-2+ (60%) groups. Emerald shiners were a common (18%) diet item for age-1 walleye but only a small (3%) proportion of the diet for the age-2+ walleye. White perch, smelt, and gobies were minor prey items. In District 2, gizzard shad was also the primary diet item for age-1 (47%) and age-2+ (61%) walleye. Rainbow smelt becomes present in the diets in age-1 (33%) and age-2+ (31%). In District 3, rainbow smelt comprised a large proportion of the walleye diets for age-1 and age-2+, 84% and 70%, respectively, and although important, gizzard shad were less prominent. Round gobies comprised 8% of the observed diet items for age-1 fish but only 1% for age-2+ walleye. In general, the percentage of gizzard shad in walleye diets decreased from the west (District 1) to the east (District 3) basins. Likewise, the presence of rainbow smelt in the diets increased from the west to the east basins.

Yellow Perch

Relative Abundance

Age-0 yellow perch trawl indices declined, relative to 2008, and were well below the long-term mean during both August and fall surveys in all districts (Tables 6.3.1 and 6.3.2). The decline in District 1 was less severe than in Districts 2 and 3 where the index values were the lowest in the time-series during September and barely above the lowest value in the August series for District 3.

In District 1, the 2009 fall trawl catch rate of ages 2 and older (age-2+) yellow perch was substantially lower than the long-term mean (Table 6.3.9). In District 2 the 2009 catch rate of age-2+ yellow perch decreased 49% from 2008, but it increased almost four-fold in District 3. In District 2, the 2008 catch rate of age-2+ yellow perch was similar to the long-term mean while lower in District 3. In all Ohio districts, the 2008 year-class (age-1) dominated the fall trawl catches followed by the 2007 year-class (age-2). Highlighting the continued strength of the 2003 year-class, the catch rate of age-6 yellow perch was above the long-term mean in Districts 2 and 3. However, the catch rates for the 2003 year-class in District 1 was lower than the long-term mean.

Growth

Lengths of age-0 yellow perch observed in fall bottom trawl surveys in Districts 1, 2 and 3 (86, 85 and 95 mm, respectively) were similar to the long-term means (Table 6.3.4). Age-1 yellow perch mean lengths, from 2009 fall trawls, were lower than the 2008 values in District 1 but similar to the historic means in all districts (Table 6.3.10). In general, length-at-age values were higher than the long-term means for yellow perch for all age-groups in District 1 but below the historic means in Districts 2 and 3.

Maturity

For the second straight year, maturity rates for western basin age-2 female yellow perch from the 2009 fall bottom trawl survey were higher than those observed in 2007 and similar to historic values (Table 6.3.11). In the central basin, percent maturity of age-2 females were similar to 2008, and the second highest since 2003 (Table 6.3.11). The majority of age-2 and older female yellow perch (>97%) and age-1 and older male (>95%) yellow perch from gill nets were mature in all districts (Table 6.3.12). Across Ohio waters, nearly all of the males greater than 129 mm were mature in the 2009 gill net survey, whereas most females were not mature until they reached 200 mm; however, it should be noted that the sample sizes for females collected in the western basin were low across all length groups (Table 6.3.13).

Diet

Diet information was collected from age-1 and older yellow perch caught in spring, summer, and fall bottom trawl surveys and in fall gill net surveys in the central basin. Of all perch analyzed (n=419), only 33% had empty stomachs. In District 3, the consumption of benthic invertebrates (51%, including chironomids) was greater than in District 2 (27%). The diets in District 2 were dominated by zooplankton (53%, including Bythotrephes), yet in District 3 the zooplankton (including Bythotrephes) only occurred in 35% of the diets. On average, more chironomids where consumed in District 3(43%) than District 2(23%). During June, zooplankters (excluding Bythotrephes) were the dominant prey in District 2 (42%) yet in District 3 the dominate prey item was chironomids (42%). Bythotrephes becomes strongly present in the diets in July and persists through September. After July, the dominant prey item is Bythotrephes in District 2 (48%), yet in District 3 Bythotrephes is only the second-most dominant prey item (38%) behind chironomids (39%).

White Bass

Relative Abundance

The abundance of age-0 white bass was the highest recorded since 2003 and above the long-term mean in District 1 during August (Table 6.3.1). However, the District 1 September index declined, relative to 2008, and was below the long-term mean (Table 6.3.2). No white bass were sampled in August in District 2, and the District 3 index was one of the lowest in the series. District 2 and 3 September values were better than August but still declined relative to 2008, and were well below the mean values.

In 2009, the fall gill net index for age-1+ (i.e., all ages) white bass, in all districts, were above the long-term means in Districts 1 and 2 but below the historic mean in District 3 (Table 6.3.14). The majority of white bass collected in fall gill nets were from the 2008, 2007 and 2005 year-classes in all districts. White bass catch rates from the 2005 year-class (age-4) were well above the long term average for this age group.

Growth and Maturity

Lengths-at-age for white bass sampled from the fall surveys have generally shown no significant trend over time or between basins (Table 6.3.15). In the August trawl survey, age-0 white bass lengths in District 1 (88 mm) and District 3 (125 mm) declined sharply from 2007 lengths (Table 6.3.4). In Districts 1 and 2, the mean lengths of age-1 white bass were above the long term average, but for most age groups the 2009 values were similar to the long term means (Table 6.3.15). District 3 age-1 white bass mean lengths were similar to historic means although some age-specific differences did exist. Analyzing trends over the complete time series are difficult because aging with otoliths has shown a greater contribution of older fish (ages 6+) in the samples since 2003. Whether the abundances of older fish are due to reduced exploitation, improved aging techniques, or large cohorts will require further investigation.

In 2009, the majority (>99%) of the male white bass collected in gill nets, in both basins, were sexually mature at age-1 (Table 6.3.16), while the majority (>95%) of females were mature at age 2. All male white bass were mature at 240 mm in Districts 1 and 2, while nearly all females were mature at 290 mm (Table 6.3.17).

Diet

Diet information was collected from age-1+ white bass caught in June and September trawl surveys in the central basin and in fall gill net surveys in all districts (Figure 6.3.3). Of all the white bass analyzed for diets (N=781), 65% had empty stomachs. As in past years, white bass diets were variable throughout the season but were similar between Districts 2 and 3. In all districts, fish were the dominate prey item (93%). Emerald shiners were a strong component in all districts, but more prominent in District 1 (47%) and District 2 (29%). Rainbow smelt were a strong component in District 3 (50%) and District 2 (29%). Gizzard shad were present in October and were mostly present in District 1 (28%).

White Perch

Relative Abundance

The August 2009 age-0 white perch trawl index was lower than the 2008 value in District 1, yet remained above the long-term mean (Table 6.3.1). In Districts 2 and 3, white perch indices fell dramatically, relative to 2008, and were well below the long-term means. The September age-0 trawl indices were similar to 2008 in Districts 1 and 2 but were much lower in District 3 (Table 6.3.2). Despite the declines, white perch continued to be one of the most abundant species caught during both surveys.

The August abundance of age 1 and older (age-1+) white perch increased relative to 2008, in District 1, declined in District 2, and was the second highest in the time-series in District 3 (Table 6.3.18).

All three values district values were above the long-term mean. September age-1+ white perch abundances declined, relative to 2008, in Districts 1 and 2 and were below the long term mean (Table 6.3.19). However, the District 3 index was easily the largest in the time series. While age-0 white perch abundance declines from District 1 to 3, the exact opposite occurs for age-1+ white perch as abundance increases from west to east.

Growth and Maturity

Mean length at age for age-0 white perch from the 2009 fall bottom trawl survey in Districts 1 and 2 were similar to the historic mean, but values were higher than the historic mean in District 3 (Table 6.3.4). As in previous years, male white perch from the 2009 fall gill net and trawl surveys were sexually mature at age-1 in both basins (Table 6.3.16), while most females were mature by age-2. Length-at-maturity for females was 170 mm in the west and 180 mm in the central basin (Table 6.3.20). Most males were mature by 150 mm in both basins.

Lake Whitefish

Relative Abundance

Age-0 and age-1 lake whitefish are often seasonally absent from trawl collections because of their pelagic distribution. However, despite low index values, a good year-class is typically indicated when catches exceed 1.0 lake whitefish caught per hectare of trawling (Tables 6.3.1 and 6.3.2). Age-0 and age-1 lake whitefish were not sampled in any survey since 2007, suggesting weak cohorts in recent years. Trawl and gill net catches adult lake whitefish were dominated by fish from the 2003 year-class, followed by fish from the 2002 and 2001 year-classes (Table 6.3.21). However, 97% of the lake whitefish sampled were older than age-6. The oldest lake whitefish sampled was age-19.

Growth

Since 1990, lake whitefish have exhibited no trend in length or weight by gender and age. Data from 2009 continued to show a mean age of about age-9 for males and age-7 for females (Table 6.3.21). Fulton's Condition factor (K) generally increased with an increase in age and the onset of maturity. No noticeable changes in lake whitefish growth and condition have been noted with the loss of *Diporeia* from Lake Erie. However, condition values of age-4 and older lake whitefish are lower than those seen during the earlier part of the decade. They have declined for second consecutive year, and continue to be at, or below, the historic observations (Figure 6.3.4; and Van Oosten and Hile 1949).

Diet

Diet information was collected from age-1 and older lake whitefish caught in spring, summer, and fall bottom trawl surveys in the central basin and in fall gill net surveys in all districts (Figure 6.3.5). Of the lake whitefish diets analyzed (n=34), 59% had empty stomachs. Prey composition in lake whitefish diets by percent dry weight was summarized over the entire year because of low catch. Isopods, chironomids, sphaeriids and gastropods were the main component in the diet samples in District 2 (96%) and District 3 (74%). The second highest prey item in District 3 was dreissenids (19%).

Historically, lake whitefish in the Great Lakes have relied heavily upon the deepwater amphipod *Diporeia* for their dietary needs. With the loss of *Diporeia,* lake whitefish in other the Great Lakes may have had to rely upon lower quality benthic prey items. *Diporeia* was never a historically important component of the biota in the central basin of Lake Erie. Lake whitefish in Lake Erie seem to rely on other prey to sustain their growth.

Forage Fish

In 2009, District 1 August trawl indices for forage fishes (rainbow smelt, round goby, emerald shiner, spottail shiner, alewife, gizzard shad, trout perch, freshwater drum and silver chub) were dominated by record catches of age-0 (Table 6.3.1) rainbow smelt and age-1 and older (age-1+) smelt and emerald shiners (Table 6.3.18). Age-0 emerald shiners and gizzard shad indices were also well above average while spottail shiner, trout-perch, and drum declined. Age-1 and older freshwater drum increased dramatically to near-average levels while round gobies, spottail shiner, trout-perch, and silver chub were well below average.

In the central basin (Districts 2 and 3), almost all August age-0 indices for forage species were very low or zero (Table 6.3.1). This was most likely due to an extensive bottom layer of anoxic water in the central basin during the summer of 2009. Only round gobies, in both districts, increased and were above the long-term mean. Rainbow smelt numbers increased in District 3 but remained below average values. August abundance of age-1+ forage species was slightly better with only round gobies and freshwater drum increasing relative to 2008, and being above the long-term mean (Table 6.3.18).

In District 3, round gobies, drum, and smelt all increased, but only drum were found in above average numbers in September surveys. District 1 age-0 trawl indices increased from 2008 for all forage species except emerald shiners but were all below the long-term average (Table 6.3.2). The fall all-ages round goby index (Table 6.3.19) was a record and much higher than the August value due to a large increase in age-0 abundance. Age-1+ freshwater drum also showed a large increase and were above average while all other species indices were below average.

September age-0 indices were better than the August values for most species in District 2 but were lower than August in District 3 (Table 6.3.2). Freshwater drum, gizzard shad, and round gobies all increased in District 2, relative to 2008, but only drum were above the long-term mean while in District 3, all age-0 forage indices were at or near zero. In District 2, only age-1+ rainbow smelt increased and were above the long-term mean (Table 6.3.19), while emerald shiners and freshwater drum experienced large declines relative to 2008. District 3 age-1+ catches were dominated by rainbow smelt and emerald shiners. However, both indices were well below average and emerald shiners showed a large decline from last year.

6.4 Hydroacoustic Assessment *(FSDR13, FFDR04)*

Hydroacoustic surveys have been conducted in the eastern basin of Lake Erie since 1993 as part of an interagency forage assessment program under the Great Lakes Fishery Commission's Lake Erie Committee. In 2000, the Lake Erie acoustic survey was expanded to include the central basin; the western basin was incorporated into the lakewide survey in 2003.

Western Basin Survey

<u>*Methods*</u>

Equipment failures again plagued the western basin survey in 2009. Of the three proposed transects (limited to Ohio waters due to recent changes in border crossing rules), only the eastern transect was completed (Figure 6.4.1). A small portion of the western transect was completed prior to loss of function with the Lake Erie BioSonics DT-X surface unit, and data from this transect was unusable during analysis. Unlike previous years, the ODW Inland Fisheries Research (IFRE) BioSonics DT-X surface unit was not available for emergency use, and the survey ended incomplete. The equipment was returned to the manufacturer in August, and was returned in January, 2010. Extensive testing is planned for the summer of 2010 to ensure the equipment is fully functional prior to the 2010 hydroacoustic survey.

Data was collected in 2009 using a single, downward-facing, 6.8-degree, 201-kHz split-beam transducer, a Garmin global positioning system, and a Panasonic CF-30 laptop computer. The acoustic system was calibrated before the survey with a tungsten carbide reference sphere of known acoustic size. The mobile survey, conducted aboard the ODW's *R/V Almar*, was initiated 0.5 hr after sunset and completed by 0.5 hr prior to sunrise. Transects were navigated with waypoints programmed in a Lowrance GPS, and speed was maintained at 8-9 kph using the GPS. The transducer was mounted on a fixed pole located on the port side of the boat amidships. The transducer was mounted 1 m below the surface. Data were collected using BioSonics Visual Acquisition 5.0.4 software. Collection settings during the survey were 10 pings/second, a pulse length of 0.2 msec, and a minimum threshold of -70 dB. The sampling environment (water temperature) was set at the temperature 2 m deep on the evening of sampling. Data were written to file and named by the date and time the file was collected. Files were automatically collected every 30 minutes. Latitude and longitude coordinates were written to the file as the data were collected to identify sample location.

Data were analyzed using the Myriax software Echoview 4.5 using a modified process developed by the Ohio Division of Wildlife's Inland Fisheries Research Unit. Target strength range was estimated using Love's dorsal aspect equation (Love 1971):

$$\text{Total length} = 10 \wedge ((\text{Target Strength} + 26.1)/19.1) * 1000$$

Biomass estimates were based on average target length as determined by the above equation.

Results

Mean western basin forage fish density and biomass estimates from the eastern transect were 3,205 fish per hectare and 5.3 kg per hectare, respectively, which is similar to the 2006 and 2008 surveys (Figure 6.4.2). The majority (79%) of forage fish in the survey were estimated to be 20-59 mm TL; 93% were between 20-109 mm.

Central Basin Survey

Methods

The 2009 central basin acoustic survey was planned according to the protocol and sample design established at the hydroacoustic workshop held in Port Dover, Ontario in December 2003 (Forage Task Group 2005). In past surveys, this sample design consisted of eight cross-basin transects, requiring two acoustic survey vessels and two midwater trawling vessels. In 2009, two changes were made to the sample design to address issues that developed during analysis of 2008 data. The first change was to include midwater trawling aboard the *R/V Musky II* (United States Geological Survey; USGS) and *R/V Grandon* (ODNR-DOW) while collecting acoustic data. This would allow for a direct comparison of target strength to fish length from the trawl data and analysis of spatial aspects of fish distributions changing during the period between trawling with one vessel and acoustic data collection by a second vessel. The second change to the survey involved alternating the pulse widths between 0.2 msec (experimental) to 0.4 msec (standard) during data collection on one transect. Shorter pulse width may improve single target strengths (TS) that would allow for the use of in situ TS in areas of high fish concentrations, such as the age-0 rainbow smelt densities found in 2008. All central basin acoustic data collections, reporting and analysis were accomplished in collaboration with Dr. Patrick Kocovsky, (United States Geological Survey, USGS, Sandusky, Ohio).

In 2009, the USGS *R/V Musky II* and ODW *R/V Grandon* were the acoustic vessels. Acoustic transects corresponding to Loran-C TD lines were sampled from one half hour after sunset (around 2130) on either the north or south shore and continued to the opposite shore until the transect was completed or weather conditions forced cancellation of data collection. All sampling was conducted in waters 10 meters or deeper. Hydroacoustics data were collected using BioSonics DTX ® echosounders and BioSonics Visual Acquisition (release 5.1) software. The *R/V Musky II* collected acoustic data with a 120-kHz transducer and the *R/V Grandon* used a 70 kHz transducer. Transducers on both vessels were mounted to the starboard hull by brackets roughly equidistant between the bow and stern, approximately 1 m below the water surface. Global Positioning Systems coordinates were collected using a Garmin ® GPSMAP 225 on the *R/V Musky II* and a Lowrance iFinder on the *R/V Grandon* interfaced with the echosounder to obtain simultaneous latitude and longitude coordinates. Echosounders on both acoustic vessels were set according to collection parameters in the Great Lakes SOP (Parker-Stetter et al. 2009) for all transects except the western most transect, on which pulse duration was set at either 0.2 msec or 0.4 msec, alternating every 30 minutes. This was done to test whether the shorter pulse duration produced less bias *in-situ* for target strength estimates (see below). A coin flip determined starting pulse duration (0.2 msec).

Trawling

The R/V Keenosay, (Ontario Ministry of Natural Resources; OMNR), *R/V Musky II* and *R/V Grandon* all provided midwater trawling concurrent to the acoustic data collection. The *R/V Musky II* and *R/V Grandon* conducted four 10-minute trawls per transect, while the *R/V Keenosay* conducted up to eight 20-minute trawls per transect in Ontario waters. In order to maximize the number of midwater trawls, the *R/V Keenosay* and *R/V Musky II* trawled the same transect each night, while the *R/V Grandon* trawled the alternate transect. Whenever possible, trawl vessels attempted to distribute trawl effort above and below the thermocline to adequately assess species composition in each depth stratum. Total length and total catch were recorded from each trawl by species and age group. Age group classifications consisted of young-of-year (age-0) for all species and yearling-and-older (age-1+) for forage species and age-2-or-older (age-2+) for predator species.

Analysis

Acoustic transects were stratified along each transect into two depth layers for analysis: epilimnion (above the thermocline) and hypolimnion (below the thermocline). These layers were chosen based on temperature and dissolved oxygen profiles and acoustic target size distributions along each transect. Analysis of hydroacoustic data were conducted following the guidelines established in the GL-SOP (Parker-Stetter et al. 2009). Hydroacoustics data were analyzed using EchoView ® version 4.5 software. Proportionate area backscattering coefficient and single targets identified using Single Target Detection Method 2 (recommended by Sonar Data, Inc., developer of EchoView software, for BioSonics data) were used to generate density estimates for 500 to 1000-m intervals in each water stratum. For some data collected on the R/V Musky II data were partitioned into 6-minute strata owing to failure of GPS data collection. *In situ* data were used to determine single target (TS) numbers and sizes for converting total area backscattering (Sv) into fish density estimates (fish per hectare) for each interval and depth stratum. The Nv statistic, a measure of the relationship between the number of single targets and Sv, was calculated for each interval-by-depth stratum cell to monitor the quality of using *in situ* data to calculate TS (Sawada et al. 1993). If Nv for an interval-by-depth stratum cell was >0.1, the mean TS of the entire stratum within a transect where Nv values were <0.1 was used (Rudstam et al. 2009). Occasionally, using the mean TS value for the transect produced worse Nv values than either *in situ* TS or TS values derived from trawl data. In these cases, *in situ* TS was retained.

Results and Discussion

Due to weather constraints and equipment issues, four complete and two partial transects of acoustic data were collected from July 13 through July 21 (Figure 6.4.3). At this time, analysis of the central basin acoustic transects is not complete. However, preliminary results from 2009 show the highest density of acoustic targets occurred below the thermocline in all transects except the western-most transect. Acoustic densities below the thermocline were 1.2 to 4 times higher than densities above the thermocline, except for the western most transect where densities were similar.

Similar to 2008, with the high densities of YOY smelt around the thermocline, we again experienced very high Nv values at and below the thermocline. Based on the acoustic target size, midwater and bottom trawl surveys, the high Nv values are most likely due to the high abundance of YAO smelt in the central basin in 2009. High concentrations of YAO smelt at and below the thermocline were a problem in all transects. This created long stretches of transects where Nv values were too high to allow for the use of *in situ* TS. Following procedures established in the GL-SOP and Rudstam et al. (2009) we were able to improve the Nv values in most intervals, but in some instances the Nv values remained too high. Estimates of TS from equations based on trawl data can be used in place of *in situ* TS. In our analysis, the Sv was so high that using estimates of TS from trawl data did not improve Nv values relative to *in situ* TS.

Alternating pulse width settings on the western most transect was done to test whether the shorter pulse duration produced less biased *in-situ* target strength estimates. This should result in fewer instances of high Nv values in areas of high fish densities. On the western-most transect, varying pulse lengths between 0.2 msec and 0.4 msec resulted in eight 30-minute periods of collecting data at 0.2 msec and eight 30-minute periods collecting at 0.4 msec. Acoustic densities for the 0.2 msec pulse length setting averaged 1.2% higher above the thermocline, and 4.0% higher below the thermocline compared to density estimates for the 0.4 msec pulse length setting. There was a high percentage of high Nv values for both pulse duration settings. Thus, there was no apparent improvement in the ability of the shorter pulse duration to identify individual fish targets.

A more complete analysis of the differences in pulse length settings and the 2009 acoustic transects will be presented at a later date. We continue to improve our data collection, sample design and analytical skills through the Great Lakes Acoustic Study Group. We were involved in the recent GL-SOP workshop at the Cornell Biological Station, Oneida Lake, NY. We will also be participants in an acoustic workshop in September, 2010, at the USGS office in Sandusky, OH, that will focus on the standardization of Great Lakes ground-truthing.

Table 6.3.1. Arithmetic mean catch-per-hectare of age-0 fish for selected species during August trawls in the Ohio waters of Lake Erie, 1990-2009.

District	Year	Walleye	Yellow Perch	White Perch	White Bass	Smallmouth Bass	Lake Whitefish	Rainbow Smelt	Round Goby*	Emerald Shiner	Spottail Shiner	Alewife	Gizzard Shad	Trout-Perch	Freshwater Drum	Silver Chub
1	1990[a]	28.0	144.4	11,551.1	73.2	0.0	0.0	73.4		108.3	131.0	6.2	557.2	42.2	220.6	17.6
	1991	46.4	146.9	3,491.5	23.1	0.0	0.0	0.0		335.1	134.8	7.4	49.3	148.7	191.6	24.3
	1992	6.6	60.7	877.6	39.4	0.0	0.0	477.9		0.8	13.2	4,357.4	289.8	46.3	31.9	10.0
	1993	111.0	1,164.2	2,012.0	156.8	0.0	0.0	14.5		18.2	13.9	475.4	2,154.6	443.4	286.3	2.3
	1994	63.4	508.5	728.7	33.3	0.0	0.0	62.5		101.6	49.7	3.7	973.4	77.9	46.9	13.6
	1995	2.9	348.9	692.9	16.7	0.0	0.0	0.0	--	25.7	24.1	7.3	148.7	111.4	26.3	42.7
	1996	83.3	3,290.8	1,750.0	88.4	0.0	0.0	201.3	--	40.2	36.7	4.3	400.9	204.3	258.7	184.4
	1997	24.0	52.2	616.9	225.6	0.0	0.0	394.8	--	91.0	44.6	37.7	1,598.4	133.3	23.4	6.7
	1998	12.2	174.5	541.3	21.8	0.0	0.0	13.1	--	11.2	93.6	2.2	167.5	184.6	55.4	121.1
	1999	30.6	270.1	1,036.9	37.6	0.0	0.0	2.2	--	8.4	71.8	0.5	426.0	138.4	263.3	164.7
	2000	4.5	186.4	2,321.4	68.3	0.0	0.0	749.0	--	80.7	3.0	15.2	899.7	290.2	45.8	4.9
	2001	24.8	322.1	1,863.9	213.8	0.0	0.0	0.7	--	31.0	64.7	24.4	642.8	103.7	336.0	0.1
	2002	0.1	33.1	1,037.4	42.6	0.0	0.0	51.5	--	62.5	12.8	87.6	1,649.1	273.2	80.9	3.7
	2003	155.6	1,509.9	2,336.2	210.2	0.0	0.0	82.9	--	1.3	2.1	0.1	173.8	76.9	77.5	1.1
	2004	3.6	40.9	4,269.0	38.8	0.0	0.0	42.3	--	177.8	5.7	0.0	41.6	382.7	147.7	11.4
	2005	10.3	124.2	3,955.4	84.2	0.0	0.0	0.0	--	159.3	98.4	1.8	279.2	273.9	151.9	0.0
	2006	1.3	180.2	2,139.5	43.8	0.0	0.0	151.9	--	129.4	4.2	0.0	159.5	124.4	47.5	0.0
	2007	21.5	592.9	4,214.7	8.1	0.0	0.0	6.9	--	91.2	12.6	0.1	75.0	128.1	288.5	0.1
	2008	7.6	267.0	4,071.0	50.3	0.0	0.0	113.8	--	37.1	10.8	0.0	465.2	72.4	108.5	0.1
	2009	5.5	186.0	3,248.0	95.6	0.0	0.0	2,550.3	--	135.3	7.9	0.0	816.2	21.3	55.6	2.0
	Mean[b]	33.6	495.7	2,605.6	77.7	--	--	128.3	--	79.5	43.6	264.8	586.9	171.4	141.5	32.0
2	1990[c]	0.0	1.7	985.2	26.5	0.0	0.2	382.0	--	17.2	0.0	0.0	1.2	1.6	0.0	0.0
	1991	0.0	5.4	207.1	10.2	0.0	0.0	1.0	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1992	0.0	7.2	47.8	0.0	0.0	0.0	252.8	--	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1993	0.0	41.7	145.2	1.5	0.0	2.0	60.9	--	0.0	0.0	0.0	0.0	0.4	0.0	0.0
	1994	1.5	73.3	598.5	156.6	0.0	0.0	83.3	0.0	0.7	1.7	0.5	1.1	22.8	0.0	0.0
	1995	0.0	2.2	0.9	0.0	0.0	1.8	67.5	0.6	0.0	0.0	0.1	0.0	1.5	0.0	0.0
	1996	12.7	843.3	501.6	22.2	0.0	6.5	273.8	0.4	8.8	0.2	0.0	75.6	4.2	0.0	0.0
	1997	0.0	29.0	0.0	0.0	0.0	0.0	85.4	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0
	1998	6.4	223.8	209.3	51.2	0.0	0.1	138.9	64.4	3.2	7.8	13.7	65.2	12.5	0.4	0.0
	1999	0.0	26.8	276.2	134.4	0.0	0.1	10.6	14.3	102.3	0.4	1.7	32.3	0.0	0.0	0.0
	2000	0.0	0.6	0.2	0.0	0.0	0.0	2.2	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2001	3.5	341.9	2,569.8	373.4	0.0	0.0	32.8	12.0	0.0	0.3	8.5	46.8	0.2	0.0	0.0
	2002	0.0	0.3	56.9	0.0	0.0	0.1	99.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2003	66.0	1,077.5	998.7	62.2	0.0	0.1	120.3	5.1	87.5	0.1	0.0	133.7	1.4	0.1	0.0
	2004	0.4	39.7	2,722.4	3.6	0.0	0.0	383.0	12.3	0.0	0.0	0.0	7.3	7.8	0.4	0.0
	2005	0.4	118.8	2,455.8	73.2	0.0	0.1	5.0	46.3	27.6	0.4	0.0	21.5	0.2	0.0	0.0
	2006	0.0	4.9	74.6	3.0	0.0	0.0	4.9	2.2	0.3	0.0	0.0	0.9	0.0	0.0	0.0
	2007	0.4	244.5	1,090.2	25.2	0.0	0.1	133.0	18.1	21.9	1.5	0.0	66.6	0.1	0.0	0.0
	2008	2.5	287.2	4,540.6	37.4	0.0	0.0	7.0	6.0	2.1	0.5	0.0	142.3	0.0	0.0	0.0
	2009	0.0	12.2	74.0	0.0	0.0	0.0	3.4	13.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0
	Mean[b]	4.7	169.1	877.8	49.0	0.0	0.6	107.4	12.4	13.6	0.6	1.2	29.7	2.7	0.0	0.0
3	1990[c]	0.0	0.6	135.6	11.6	0.0	2.3	12.1	--	1.2	0.0	2.4	16.1	6.5	1.8	0.0
	1991	0.0	6.4	1,624.4	22.0	0.0	0.2	0.7	--	0.3	0.0	3.3	5.5	0.9	0.0	0.0
	1992	0.0	24.3	255.3	0.0	0.0	0.0	193.4	--	0.1	0.0	93.5	0.0	6.0	0.0	0.0
	1993	3.2	39.7	34.5	0.7	8.1	0.2	40.4	--	0.0	0.0	0.0	0.0	0.3	0.0	0.0
	1994	0.3	77.2	157.7	8.7	0.0	0.0	90.2	0.2	0.0	1.3	0.0	3.6	40.4	0.0	0.0
	1995	0.0	30.5	122.9	0.2	2.0	0.2	335.6	0.7	0.0	1.7	0.2	0.0	19.6	0.1	0.0
	1996	0.2	1,785.8	1,888.7	2.5	1.3	0.3	384.3	3.7	0.0	0.0	0.0	3.0	35.2	0.1	0.0
	1997[d]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1998	0.1	298.9	270.0	0.5	0.4	0.0	188.1	197.2	0.1	0.2	0.0	4.5	146.4	0.0	0.0
	1999	0.0	44.8	57.8	11.7	0.0	2.2	405.0	27.5	3.0	0.0	0.0	8.9	0.6	0.4	0.0
	2000	0.0	0.0	0.0	0.0	0.0	0.0	4.4	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	2001	0.0	1,283.7	188.0	1.2	0.0	0.8	403.9	7.5	0.0	0.0	0.0	0.0	0.4	0.0	0.0
	2002	0.0	1.7	1.7	0.0	0.0	0.0	229.9	20.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0
	2003	0.8	844.6	53.2	0.7	0.0	0.0	89.2	116.8	0.0	0.0	0.0	0.0	0.9	0.0	0.0
	2004	0.0	3.6	1,891.6	0.1	0.0	0.0	954.2	37.8	0.0	0.0	0.0	0.0	0.7	0.0	0.0
	2005	0.0	278.2	493.1	4.4	0.0	3.1	19.1	4.4	0.0	0.0	0.2	0.0	0.1	0.0	0.0
	2006	0.0	60.7	5.0	0.0	8.6	0.0	51.5	9.8	0.0	0.0	0.0	0.0	0.7	0.0	0.0
	2007	0.0	237.0	699.7	3.5	0.0	0.3	936.3	66.3	1.7	0.3	0.0	7.9	0.6	0.0	0.0
	2008	0.2	558.3	253.2	0.4	0.0	0.0	0.7	0.0	0.4	0.7	0.0	53.0	0.7	0.0	0.0
	2009	0.0	0.1	36.7	0.2	0.2	0.0	68.2	60.3	0.0	0.0	0.0	0.0	0.4	0.0	0.0
	Mean[b]	0.3	293.5	430.0	3.6	1.1	0.5	232.0	37.0	0.4	0.2	5.2	5.4	13.7	0.1	0.0

[a] Values from 1990-2001 have been scaled for differences in catchability between previous and current research vessels.
[b] Long term mean CPH (1990 - 2008).
[c] Values have been adjusted with FPC's to compare with trawl equipment used prior to 1995.
[d] 1997 is not comparable to previous years due to limited sampling.
* Round goby values for D1 are reported in Table 6.3.18 as all ages combined. Gobies first sampled in 1994 in the central basin and 1995 in the western basin.

Table 6.3.2. Arithmetic mean catch-per-hectare of age-0 fish for selected species during September trawls in the Ohio waters of Lake Erie, 1990-2009.

District	Year	Walleye	Yellow Perch	White Perch	White Bass	Smallmouth Bass	Lake Whitefish	Rainbow Smelt	Round Goby*	Emerald Shiner	Spottail Shiner	Alewife	Gizzard Shad	Trout-Perch	Freshwater Drum	Silver Chub
1	1990[a]	18.1	310.1	3,802.6	5.7	0.0	0.0	21.4		5,523.2	72.2	44.4	304.2	95.5	22.9	9.1
	1991	15.3	58.1	1,279.6	1.4	0.0	0.0	0.1		126.5	19.9	17.4	54.8	55.9	64.0	12.5
	1992	7.4	90.9	662.1	3.9	0.0	0.0	364.6		46.7	34.3	194.2	613.6	59.8	68.7	18.1
	1993	26.8	256.4	333.9	3.6	0.0	0.0	12.7		227.9	29.5	689.4	694.8	55.0	59.3	1.5
	1994	21.5	287.1	850.5	3.6	0.0	0.0	27.6		27.3	20.9	5.2	276.5	82.7	38.9	0.9
	1995	0.5	82.4	432.2	1.0	0.0	0.0	1.7	--	204.8	43.7	3.5	55.1	126.2	139.6	2.6
	1996	31.8	579.3	675.0	5.7	0.0	0.0	14.9	--	8.7	91.0	11.3	286.9	153.6	260.7	125.2
	1997	15.5	33.7	317.7	3.7	0.0	0.0	274.1	--	429.7	54.6	16.9	129.3	109.5	25.4	16.2
	1998	11.6	250.9	599.9	3.8	0.0	0.0	51.5	--	636.0	79.5	1.5	161.8	224.7	45.0	341.8
	1999	13.0	155.3	557.4	7.1	0.0	0.0	21.5	--	71.6	71.7	1.5	169.5	135.6	293.2	141.1
	2000	2.0	41.5	1,155.0	2.1	0.0	0.0	111.8	--	38.6	2.0	29.4	93.7	52.9	69.2	1.8
	2001	10.1	246.3	2,060.8	3.0	0.0	0.0	14.4	--	60.5	56.6	15.3	87.1	189.3	484.7	0.1
	2002	0.1	30.4	1,152.0	16.4	0.0	0.0	230.8	--	432.5	12.0	17.6	137.2	218.8	126.7	23.0
	2003	56.8	1,111.6	1,495.1	11.4	0.0	0.0	11.9	--	25.3	31.8	0.0	48.8	165.2	260.9	1.7
	2004	1.6	9.3	1,377.7	1.5	0.0	0.0	22.9	--	161.3	10.1	0.2	158.5	328.5	101.5	6.4
	2005	2.3	62.3	1,978.1	4.6	0.0	0.0	48.2	--	425.4	20.9	0.0	6.3	78.4	160.7	0.2
	2006	0.4	121.9	1,887.0	9.7	0.0	0.0	147.9	--	362.3	15.4	0.9	86.2	123.8	218.8	0.0
	2007	22.4	631.5	3,576.9	4.0	0.0	0.0	10.3	--	155.4	13.0	0.0	37.0	127.3	205.7	0.1
	2008	1.9	74.7	1,478.8	8.4	0.0	0.0	32.6	--	461.4	2.7	0.0	104.2	57.9	66.7	0.6
	2009	3.9	69.4	1,607.5	2.3	0.0	0.0	37.1	--	133.3	16.2	0.0	140.8	62.2	131.1	0.9
	Mean[b]	13.6	233.3	1,351.2	5.3	--	--	74.8	--	496.0	35.9	55.2	184.5	128.4	142.8	37.0
2	1990[c]	1.9	52.2	3,086.3	29.0	0.0	0.0	492.0	--	2.9	0.0	0.3	14.9	3.2	23.1	0.0
	1991	3.0	9.3	1,312.4	8.0	0.0	0.0	12.8	--	34.4	0.0	0.5	3.8	6.0	6.5	0.0
	1992	0.9	35.8	183.4	0.6	0.0	0.2	844.0	--	65.6	0.0	18.7	11.0	47.2	0.0	0.0
	1993	0.0	10.6	97.3	36.6	1.0	0.8	27.0	--	1.1	0.1	0.0	3.0	1.2	0.3	0.0
	1994	8.3	71.9	368.0	125.5	0.3	2.5	2,681.8	2.7	20.5	2.6	7.1	16.3	0.0	2.3	0.0
	1995	0.0	2.5	3.5	23.8	0.0	0.3	348.1	15.5	8.9	0.3	9.9	1.2	0.9	0.9	0.0
	1996	16.3	119.1	223.8	42.3	0.3	0.5	421.2	8.0	15.6	13.8	12.7	77.1	1.2	1.1	0.0
	1997	0.8	12.3	267.5	9.2	0.1	0.0	238.2	49.7	160.7	14.6	9.3	12.4	0.0	0.9	0.0
	1998	1.0	69.8	91.9	44.6	0.2	0.1	253.3	130.1	4,928.5	1.4	10.0	33.8	0.3	4.7	0.0
	1999	5.4	73.6	334.1	160.1	0.1	0.0	70.8	95.1	408.4	5.6	37.2	104.3	5.5	10.2	0.0
	2000	0.2	21.9	581.3	16.7	0.0	0.0	150.1	21.7	127.2	0.4	62.1	117.1	1.0	0.9	0.0
	2001	7.2	114.6	779.7	161.0	0.0	0.1	2.3	43.9	50.5	5.9	50.8	60.3	2.0	76.2	0.0
	2002	0.0	6.0	293.0	27.6	0.0	0.0	274.7	37.8	39.4	1.6	59.7	24.6	1.4	17.2	0.0
	2003	45.2	149.0	310.1	106.2	0.0	0.4	1,753.9	22.6	477.6	0.0	0.1	402.6	2.0	5.3	0.0
	2004	0.0	8.7	759.7	1.0	0.0	0.1	352.1	13.9	7.0	0.0	0.0	0.6	20.3	18.2	0.1
	2005	0.5	37.8	1,002.5	77.6	0.1	0.1	10.7	37.2	567.1	0.2	0.0	12.3	0.1	1.0	0.0
	2006	0.5	10.0	440.4	24.5	0.0	0.0	94.3	19.0	587.2	0.0	4.4	32.7	0.2	6.3	0.0
	2007	1.1	167.0	1,381.2	21.6	0.0	0.0	98.1	26.9	52.6	3.1	0.0	195.0	0.8	0.3	0.0
	2008	1.4	37.3	544.9	79.1	0.1	0.0	635.2	17.4	36.3	3.7	0.0	35.7	0.3	1.0	0.0
	2009	2.0	1.3	506.1	24.7	0.0	0.0	293.5	25.9	6.0	0.6	0.0	50.9	0.3	19.1	0.0
	Mean[b]	4.8	50.5	628.4	51.0	0.1	0.3	452.7	35.5	379.9	2.7	14.1	60.5	4.7	9.8	0.0
3	1990[c]	0.9	20.5	1,079.8	39.9	0.0	0.0	1,394.4	--	164.0	1.5	0.3	52.6	14.9	0.5	0.0
	1991	0.0	1.2	1,088.6	12.8	0.2	0.0	14.4	--	96.5	0.1	11.1	1.8	2.2	0.0	0.0
	1992	0.0	31.8	177.9	0.0	0.0	0.5	584.6	--	64.8	0.4	47.5	16.7	18.6	0.0	0.0
	1993	0.0	27.3	98.3	22.1	3.5	1.8	31.7	--	2.8	10.2	0.0	13.5	14.5	0.5	0.0
	1994	3.4	16.1	157.4	105.9	0.2	0.8	640.1	2.9	16.5	9.5	14.2	11.2	0.0	0.0	0.0
	1995	0.0	12.4	69.5	15.8	0.1	0.3	1,693.7	51.8	40.2	2.0	11.2	1.5	13.4	0.1	0.0
	1996	2.4	128.4	539.9	101.4	0.2	3.0	2,944.5	44.5	77.0	24.9	6.3	181.5	35.4	0.1	0.0
	1997	0.1	2.6	2.3	20.1	0.1	0.0	477.2	106.4	4.9	0.1	14.1	7.2	2.6	0.0	0.0
	1998	0.5	38.1	52.3	41.7	0.0	0.2	953.8	186.7	150.5	2.7	0.1	34.8	1.3	0.0	0.0
	1999	0.1	21.0	37.1	84.0	1.0	0.1	282.4	178.2	599.4	3.9	9.2	17.0	4.8	0.0	0.0
	2000	0.0	1.3	4.9	24.5	0.0	0.0	1,070.3	158.2	500.6	0.0	12.4	27.6	0.4	0.0	0.0
	2001	0.0	13.6	57.6	18.0	0.0	0.0	0.0	39.6	2.2	0.7	0.0	1.8	0.0	19.1	0.0
	2002	0.0	2.5	5.9	11.2	0.0	0.0	218.1	64.7	0.5	0.2	1.1	12.3	0.3	0.1	0.0
	2003	3.2	47.5	61.8	90.2	0.8	2.6	2,914.1	57.5	903.1	0.5	0.0	20.4	1.4	0.0	0.0
	2004	0.0	1.9	108.0	0.3	0.0	0.2	388.9	173.9	0.8	0.0	0.0	0.3	1.4	0.0	0.0
	2005	0.4	156.2	2,034.5	58.2	1.1	1.3	44.4	148.1	279.8	1.1	0.0	15.7	1.6	1.3	0.0
	2006	0.0	18.9	46.1	8.1	4.9	0.0	570.7	46.3	1,115.1	0.2	3.6	30.7	0.1	1.2	0.0
	2007	0.0	177.8	1,095.9	13.0	0.3	0.1	702.4	273.1	63.7	0.5	0.0	15.5	5.4	0.0	0.0
	2008	0.2	52.8	91.6	37.8	0.3	0.0	3,997.7	26.3	20.2	0.2	0.0	63.1	0.1	0.2	0.0
	2009	0.0	0.5	34.6	2.5	0.0	0.0	0.2	1.0	1.7	0.0	0.0	3.9	0.2	0.0	0.0
	Mean[b]	0.6	38.6	342.2	35.4	0.6	0.5	946.2	97.5	205.2	2.9	6.6	26.5	5.9	1.2	0.0

[a] Values from 1990-2001 have been scaled for differences in catchability between previous and current research vessels.
[b] Long term mean CPH (1990 - 2008).
[c] Values (1990-1994) have been adjusted with FPC's to compare with trawl equipment used prior to 1995.
* Round goby values for D1 are reported in Table 6.3.19 as all ages combined. Gobies first sampled in 1994 in the central basin and 1995 in the western basin.

Table 6.3.3. Fall relative abundance[a] of age-1 and older walleye from multifilament canned gill net surveys in the Ohio waters of Lake Erie, 1990-2009.

			Age									
District	Year	N[b]	1	2	3	4	5	6	7	8	9+	All
1	1990	9	14.0	26.0	10.6	38.7	4.8	4.8	0.2	2.9	0.2	113.4
	1991	7	17.4	5.8	4.5	2.3	11.9	1.8	1.2	0.0	0.6	49.0
	1992	8	32.4	21.7	3.8	2.6	2.7	9.5	3.3	1.3	0.0	82.4
	1993	2	6.4	85.3	13.0	3.9	3.9	2.2	2.7	0.4	1.2	124.6
	1994	2	45.6	0.7	14.1	6.5	2.2	0.4	0.7	0.7	0.0	71.1
	1995	2	84.7	42.0	4.5	10.4	1.8	0.7	1.0	0.4	0.4	148.2
	1996	8	2.3	35.0	10.7	1.7	3.1	1.0	0.4	0.3	0.0	53.2
	1997	8	13.4	1.1	12.4	3.5	0.5	2.1	0.8	0.3	0.2	35.6
	1998	6	20.8	41.5	0.3	5.1	1.8	0.3	0.2	0.1	0.0	75.7
	1999	7	24.5	30.3	23.3	3.0	2.1	2.5	0.6	0.2	0.1	92.5
	2000	8	59.2	19.5	9.8	6.5	1.1	1.7	0.7	0.1	0.1	104.6
	2001	5	6.6	60.6	10.8	3.6	4.3	0.6	0.6	0.3	0.0	88.8
	2002	7	62.9	6.8	40.7	3.6	1.2	1.9	0.0	0.0	0.0	121.7
	2003	7	0.0	28.1	1.5	3.7	0.3	0.6	0.1	0.0	0.2	35.2
	2004	12	33.4	0.1	9.6	0.3	2.4	0.4	0.3	0.2	0.1	51.2
	2005	12	1.6	50.1	0.1	1.8	0.2	1.3	0.1	0.1	0.2	56.5
	2006	11	11.7	2.4	30.2	0.1	1.4	0.1	0.6	0.0	0.3	47.9
	2007	12	3.6	12.0	0.6	22.3	0.1	0.5	0.0	0.2	0.1	42.0
	2008	10	28.2	2.6	5.3	0.3	9.3	0.1	0.7	0.1	0.7	42.4
	2009	11	15.6	34.6	1.5	2.6	0.1	12.2	0.3	0.5	0.5	72.1
	Mean[c]		24.7	24.8	10.8	6.3	2.9	1.7	0.7	0.4	0.2	75.6
2	1990	14	3.9	11.0	7.6	19.9	2.8	2.2	0.4	0.8	0.1	51.7
	1991	15	7.1	2.7	3.1	1.5	4.6	1.0	1.0	0.0	0.2	18.6
	1992	17	13.7	13.6	2.7	1.5	1.2	5.3	1.4	1.0	0.0	46.7
	1993	5	8.4	29.5	8.1	2.1	1.8	0.8	2.1	0.5	0.4	57.7
	1994	4	16.8	5.4	14.7	9.7	3.9	2.2	1.8	0.3	0.0	60.3
	1995	6	13.7	27.8	12.9	19.6	6.9	2.2	2.7	0.3	0.2	90.4
	1996	6	2.3	56.5	19.5	3.1	7.4	2.8	0.6	1.1	0.4	97.3
	1997	6	29.9	2.5	24.3	5.7	0.8	6.0	0.6	0.1	0.4	81.5
	1998	6	7.9	22.5	0.6	6.2	1.1	0.7	0.9	0.1	0.0	41.7
	1999	7	16.4	21.4	27.6	3.5	4.6	4.0	0.8	0.2	0.2	82.6
	2000	9	15.6	4.1	1.7	2.9	0.2	0.8	0.3	0.2	0.0	25.5
	2001	4	3.5	26.4	6.5	4.2	6.2	0.5	1.3	0.5	0.6	49.5
	2002	6	24.2	2.5	29.4	7.1	2.1	3.0	0.4	0.5	0.0	82.9
	2003	10	0.1	15.5	1.4	4.5	1.2	0.6	0.6	0.0	0.9	26.0
	2004	15	25.7	0.1	6.7	0.3	2.3	0.6	0.3	0.5	0.9	48.0
	2005	29	2.3	68.6	0.1	9.7	0.4	1.4	0.2	0.1	1.3	86.7
	2006	24	8.8	3.8	77.5	0.1	4.9	0.3	1.1	0.3	0.3	99.8
	2007	13	3.5	4.7	2.4	19.5	0.1	1.3	0.0	0.3	0.6	34.1
	2008	18	13.9	2.6	3.3	1.1	11.4	0.1	2.0	0.1	2.1	31.7
	2009	22	6.5	25.7	4.7	6.6	1.1	31.7	0.0	2.9	2.6	86.3
	Mean[c]		11.5	16.9	13.2	6.4	3.4	1.9	1.0	0.4	0.5	58.6
3	1990	17	2.9	2.2	2.4	5.6	1.6	1.7	0.0	1.3	0.0	2.7
	1991	24	2.9	1.1	2.5	1.7	3.1	1.5	1.9	1.0	1.2	2.1
	1992	0	--	--	--	--	--	--	--	--	--	--
	1993	4	0.0	2.1	3.5	0.0	1.0	0.0	1.0	0.0	1.0	1.9
	1994	4	2.7	0.0	1.5	1.0	2.0	1.0	0.0	0.0	0.0	1.6
	1995	0	--	--	--	--	--	--	--	--	--	--
	1996	1	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
	1997	0	--	--	--	--	--	--	--	--	--	--
	1998	1	0.0	2.0	2.0	0.0	0.0	0.0	1.0	0.0	0.0	1.6
	1999	0	--	--	--	--	--	--	--	--	--	--
	2000	0	--	--	--	--	--	--	--	--	--	--
	2001	0	--	--	--	--	--	--	--	--	--	--
	2002	0	--	--	--	--	--	--	--	--	--	--
	2003	2	1.4	7.8	0.4	1.4	0.7	0.0	0.7	0.0	1.2	15.5
	2004	9	13.4	0.2	2.8	0.4	0.5	0.5	0.1	0.5	0.3	18.5
	2005	4	0.7	43.9	0.0	7.8	0.0	0.4	0.2	0.0	0.7	79.9
	2006	9	1.5	0.8	15.1	0.2	1.4	0.2	0.3	0.2	0.3	18.2
	2007	4	1.1	1.4	0.6	12.2	0.2	1.4	0.2	0.3	0.3	18.1
	2008	15	2.3	1.7	1.6	0.5	5.5	0.0	1.0	0.2	0.7	13.1
	2009	15	2.5	6.9	1.8	2.1	0.3	5.4	0.0	0.5	0.9	23.2
	Mean[c]		2.4	5.4	2.7	2.6	1.3	0.6	0.5	0.3	0.5	14.5

[a] Geometric mean of catch per standard 1,300-ft gill net.
[b] N = number of stations sampled.
[c] Long-term mean catch per gill net (1990-2008).

Table 6.3.4. Mean total length (mm) for selected age-0 species, during fall trawl surveys in the Ohio waters of Lake Erie, 1990-2009.

District	Year	Walleye	Yellow Perch	White Perch	White Bass	Smallmouth Bass	Lake Whitefish	Rainbow Smelt	Round Goby*	Emerald Shiner	Spottail Shiner	Alewife	Gizzard Shad	Trout-Perch	Freshwater Drum	Silver Chub
1	1990	188	77	61	109	50	-	60	-	49	77	84	108	73	98	50
	1991	182	92	85	134	91	-	53	-	65	82	77	115	75	112	42
	1992	189	78	63	73	72	127	60	-	54	74	82	95	77	87	44
	1993	171	83	75	105	111	138	59	-	63	83	83	108	73	108	38
	1994	179	83	75	122	107	133	60	-	59	81	111	111	79	123	63
	1995	188	87	87	111	97	-	46	-	63	80	82	112	77	97	41
	1996	166	71	69	110	89	-	43	61	51	71	92	105	71	110	43
	1997	156	74	71	91	71	-	49	59	57	64	74	95	71	103	44
	1998	170	83	77	104	122	-	48	60	63	78	77	108	72	115	38
	1999	172	81	83	113	102	-	44	42	61	77	60	112	73	121	38
	2000	192	78	68	110	-	-	52	59	60	75	71	81	73	100	61
	2001	187	80	71	127	88	-	40	60	58	77	79	108	72	116	41
	2002	170	76	78	114	101	-	48	73	59	75	65	91	69	95	55
	2003	156	82	79	91	-	-	45	63	63	81	-	108	72	109	60
	2004	174	76	64	72	-	-	53	72	53	65	77	96	71	96	59
	2005	183	78	80	106	96	-	40	51	59	76	-	113	66	110	66
	2006	217	89	73	95	83	-	53	47	61	75	38	80	72	104	-
	2007	191	82	74	114	-	-	47	55	57	75	-	105	71	124	43
	2008	170	86	73	88	97	-	50	78	60	71	-	93	66	91	64
	2009	188	85	73	79	79	-	53	55	59	73	-	105	74	105	67
	Mean [a]	179	81	74	105	92	133	50	60	59	76	77	102	72	106	49
2	1990	212	78	70	106	-	-	64	-	60	-	-	112	75	102	-
	1991	215	90	86	164	-	-	69	-	69	-	138	160	84	78	-
	1992	203	73	67	123	-	133	59	-	56	-	96	126	76	124	-
	1993	170	88	74	91	121	125	65	-	67	68	-	114	68	52	-
	1994	196	81	75	130	103	136	63	56	63	76	137	125		136	-
	1995	-	72	88	121	-	126	53	49	61	62	104	129	52	51	-
	1996	180	69	73	120	111	125	53	38	56	69	116	112	68	34	-
	1997	189	76	76	85	60	-	62	40	55	54	92	107	-	63	-
	1998	220	92	101	134	114	123	60	50	67	85	129	119	66	79	-
	1999	188	88	87	125	108	187	53	48	62	73	120	124	76	43	-
	2000	225	89	85	117	-	-	71	54	61	61	106	106	73	53	-
	2001	190	85	78	114	-	135	49	51	73	77	132	121	78	130	-
	2002	-	79	83	149	132	-	54	54	62	74	99	109	78	129	-
	2003	180	76	81	114	-	140	62	45	63	-	120	125	74	93	-
	2004	198	71	64	133	-	102	56	43	59	-	-	116	74	102	77
	2005	212	85	88	135	139	102	42	49	68	43	-	141	67	163	-
	2006	234	76	87	122	-	-	64	49	63	-	98	170	75	59	-
	2007	218	76	85	131	123	-	54	42	64	83	-	128	67	137	-
	2008	204	80	81	125	102	-	57	37	61	33	-	144	75	153	-
	2009	211	85	80	103	-	-	63	44	66	79	-	151	63	132	-
	Mean [a]	202	80	80	122	111	130	59	47	63	67	114	127	72	96	77
3	1990	195	72	64	110	-	-	65	-	59	63	124	107	75	101	-
	1991	225	75	78	145	102	-	65	-	69	79	129	171	77	-	-
	1992	209	69	58	180	-	146	66	-	56	65	94	99	70	-	-
	1993	-	79	71	93	110	130	63	-	65	74	126	105	67	51	-
	1994	195	78	65	132	107	129	63	50	63	66	126	137	-	-	-
	1995	-	68	60	125	86	113	57	46	58	67	115	111	61	74	-
	1996	191	66	64	124	102	133	52	38	53	62	104	100	64	79	-
	1997	113	63	52	83	95	-	61	39	48		104	108	43	-	-
	1998	218	80	85	127	-	130	61	51	68	77	140	121	70	-	-
	1999	178	82	74	130	109	128	69	51	65	66	116	122	70	31	-
	2000	220	85	89	115	-	-	74	53	64	-	88	101	73	-	-
	2001	-	75	73	130	-	-	-	45	60	77	-	142	-	140	-
	2002	-	83	79	161	-	-	54	54	68	73	77	104	67	104	-
	2003	189	68	69	113	131	136	62	49	63	58	-	101	70	-	-
	2004	-	81	68	117	-	105	58	48	49		-	110	70	-	-
	2005	193	81	87	133	141	111	44	51	67	78	-	139	68	163	-
	2006	-	74	85	122	105		64	48	64	77	117	171	66	33	-
	2007	-	65	81	136	128	103	54	42	61	58	-	111	56	-	-
	2008	233	79	80	126	120	-	62	39	58	45	-	132	76	158	-
	2009	-	95	85	117	-	-	79	46	56		-	129	72	156	-
	Mean [a]	197	76	73	126	111	124	62	47	61	68	112	121	68	99	-

[a] Long-term mean (1990-2008)

* District 1 round goby lengths include all ages.

Table 6.3.5. Mean length at age[a] (mm) for walleye collected in October gill nets, 1990-2009.

		Age										
District	Year	1	2	3	4	5	6	7	8	9	10	11+
1	1990	344	412	450	476	513	540	562	573	589	-	-
	1991	348	438	474	497	519	551	578	611	636	629	680
	1992	318	423	467	492	487	514	549	566	-	664	-
	1993	335	399	466	505	520	524	562	616	641	-	713
	1994	323	411	452	488	512	544	553	596	-	752	-
	1995	309	395	458	480	531	537	548	555	592	-	-
	1996	336	414	457	498	504	551	560	554	681	-	-
	1997	313	412	456	488	512	529	581	647	-	-	736
	1998	326	410	441	492	516	499	573	580	-	-	-
	1999	350	427	483	510	537	548	561	603	585	-	726
	2000	332	423	469	491	520	543	576	555	672	-	-
	2001	351	415	472	499	535	536	575	609	-	-	-
	2002	340	424	472	499	530	540	661	736	-	-	-
	2003	-	413	467	496	512	519	495	-	-	620	576
	2004	298	430	468	497	527	519	543	565	511	687	-
	2005	328	397	427	481	521	545	587	537	642	-	-
	2006	335	430	448	-	513	530	550	-	-	546	610
	2007	379	430	459	483	-	511	-	555	-	531	-
	2008	357	452	479	509	519	548	525	543	586	525	540
	2009	345	427	466	498	595	527	541	551	527	565	591
	Mean[b]	335	419	461	493	518	533	563	588	614	619	654
2	1990	352	420	462	489	534	558	562	619	-	-	-
	1991	359	445	475	501	525	565	556	-	598	-	-
	1992	332	430	484	499	502	532	565	598	-	660	-
	1993	346	416	482	523	537	542	559	604	616	-	-
	1994	318	420	466	512	521	551	582	537	-	-	-
	1995	320	419	480	505	538	569	588	630	638	-	-
	1996	363	424	477	507	526	546	599	583	586	-	-
	1997	322	427	477	506	523	554	566	609	686	-	666
	1998	336	429	482	502	535	558	552	-	-	-	-
	1999	363	440	491	518	552	565	566	545	-	674	-
	2000	340	441	492	532	521	570	590	593	-	-	676
	2001	374	434	503	519	545	577	581	592	-	697	-
	2002	349	452	474	533	567	547	593	589	-	-	-
	2003	344	427	468	503	506	546	567	616	590	563	609
	2004	313	431	480	548	542	555	563	570	-	605	604
	2005	340	416	373	477	547	556	584	600	599	-	-
	2006	356	439	470	516	526	583	585	567	605	564	661
	2007	377	432	474	498	-	517	-	570	592	-	594
	2008	371	445	484	508	523	556	553	557	585	584	601
	2009	360	449	501	488	556	544	680	565	606	586	611
	Mean[b]	346	431	473	510	532	555	573	587	610	621	630
3	1990	342	413	458	498	541	532	-	647	-	-	-
	1991	356	-	-	490	580	-	-	-	640	-	-
	1992	320	430	497	506	527	550	581	612	-	678	-
	1993	350	410	497	-	532	523	607	-	655	-	-
	1994	317	385	480	517	519	557	-	-	-	-	-
	1998	-	446	443	-	-	-	638	-	-	-	-
	1999	391	369	-	-	-	571	-	-	-	-	-
	2000	341	-	475	-	582	513	-	-	-	-	-
	2003	352	446	498	543	550	-	564	-	605	538	535
	2004	339	434	506	528	572	586	649	650	-	631	629
	2005	329	424	-	468	-	473	535	-	624	-	-
	2006	363	440	491	528	552	549	609	592	-	572	703
	2007	381	432	482	521	534	568	646	544	-	602	564
	2008	383	454	490	504	543	539	581	581	605	588	633
	2009	373	466	504	518	531	565	-	599	625	647	595
	Mean[b]	351	424	483	510	548	542	601	604	626	602	613

[a] Scales were used to age fish prior to 2003, otoliths from 2003 to present

[b] Long-term mean (1990-2008)

Table 6.3.6. Percent mature, at age, for male and female walleye collected during the 2009 fall gill net survey in the western and central basins of Lake Erie. Number of fish examined for maturity in parentheses.

		Age (years)																	
Sex	Basin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Male	Western	43	96	100	100		100	100	100	100	100	100		100					
		(129)	(379)	(18)	(37)		(171)	(4)	(7)	(1)	(5)	(1)		(2)					
	Central	79	99	100	99	100	100		100	100	100	100	100	100		100	100	100	
		(92)	(443)	(128)	(158)	(15)	(926)		(82)	(4)	(39)	(11)	(5)	(16)		(7)	(1)	(1)	
Female	Western	0	28	56	100	100	100				100		100						
		(96)	(156)	(9)	(11)	(2)	(26)				(1)		(1)						
	Central	1	33	82	96	100	100	100	100	100	95	100		100					
		(128)	(430)	(56)	(82)	(23)	(326)	(1)	(26)	(3)	(22)	(6)		(5)					

Table 6.3.7. Percent mature, at length, for male and female walleye collected during the 2009 fall gill net survey in the western and central basins of Lake Erie. Number of fish examined for maturity in parentheses.

		Total Length (mm)																							
Sex	Basin	≤200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675	700	725	750	775
Male	Western	0	100		0	21	39	53	96	99	96	91	99	100	100	100	100	100	100						
		(1)	(1)		(1)	(14)	(64)	(55)	(48)	(178)	(127)	(43)	(68)	(75)	(56)	(21)	(1)	(1)	(2)						
	Central	0		0	0	50	63	82	88	99	99	100	100	100	100	100	100	100	100	100					
		(1)		(1)	(1)	(2)	(16)	(55)	(42)	(95)	(286)	(180)	(199)	(382)	(384)	(190)	(68)	(19)	(7)	(2)					
Female	Western			0		0	0	0	0	17	25	36	42	100	100	100	100	100	100	100		100			
				(1)		(12)	(45)	(35)	(6)	(24)	(61)	(64)	(12)	(8)	(4)	(9)	(7)	(6)	(6)	(2)		(1)			
	Central	0		0		20	0	2	0	20	31	32	29	76	99	99	100	100	99	100	100	100	100		
		(2)		(2)		(5)	(22)	(66)	(32)	(10)	(64)	(195)	(144)	(66)	(68)	(74)	(94)	(104)	(97)	(40)	(17)	(6)	(4)		

Table 6.3.8. Percent mature female walleye, by age, from fall gill nets in the western and central basins of Lake Erie, 1990-2009.

		Year																			
Basin	Age	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Western	2	20	18	28	10	7	5	22	0	5	9	15	25	15	25	*	7	50	40	23	28
	3	92	89	68	87	80	60	100	94	100	100	91	95	94	*	96	100	84	83	100	56
	4	99	86	40	88	85	100	100	100	100	100	100	100	100	100	*	83	*	98	*	100
Central	2	*	5	6	10	4	6	14	10	15	12	14	13	0	20	*	6	32	34	36	33
	3	*	22	93	84	65	73	86	95	100	97	100	95	95	100	92	57	88	89	88	82
	4	*	77	94	90	98	100	100	100	100	100	100	100	95	100	100	100	100	99	84	96

* Indicates low sample size or no fish.

Table 6.3.9. Fall relative abundance[a] of age-1 and older yellow perch from trawl surveys in the Ohio waters of Lake Erie, 1990-2009.

			Age								
District	Year	N[b]	1	2	3	4	5	6	7	8+	All 2+
1	1990[b]	8	82.0	6.7	4.5	5.9	2.0	1.1	0.0	0.0	20.1
	1991[b]	8	10.7	3.3	3.6	0.8	0.9	0.4	0.2	0.0	9.3
	1992[b]	13	27.7	61.1	22.1	1.3	2.0	3.2	0.7	0.0	90.4
	1993[b]	10	16.9	7.1	5.2	0.4	0.0	0.0	0.0	0.0	12.7
	1994[b]	10	50.9	7.5	4.3	1.7	0.0	0.9	0.0	0.0	14.3
	1995[b]	10	83.2	15.7	0.9	0.0	0.9	0.0	0.0	0.0	17.5
	1996[b]	10	136.4	113.5	26.5	1.2	0.0	0.0	0.0	0.0	141.3
	1997[b]	10	102.4	50.2	36.3	6.2	0.0	0.4	0.0	0.0	93.1
	1998[b]	10	17.5	99.0	26.1	10.2	0.0	0.0	0.0	0.0	135.2
	1999[b]	10	77.0	17.8	41.2	7.1	1.6	0.0	0.0	0.0	67.8
	2000[b]	9	50.1	55.7	15.6	12.8	0.6	0.0	0.0	0.0	84.7
	2001[b]	8	21.7	49.4	36.3	8.9	11.7	0.5	0.0	0.0	106.8
	2002	8	119.3	25.4	53.9	10.8	3.6	3.8	0.0	0.0	97.5
	2003	16	4.1	71.2	4.3	13.9	8.1	1.9	1.1	0.8	101.3
	2004	7	261.4	19.1	27.8	0.6	5.3	3.4	0.0	1.7	57.7
	2005	8	0.5	24.8	0.5	5.8	0.2	0.0	0.0	0.0	31.3
	2006	30	21.0	0.9	27.0	0.4	2.8	0.0	0.0	0.0	31.1
	2007	29	28.5	17.0	0.1	9.7	0.0	1.0	0.0	0.0	27.8
	2008	32	44.6	16.7	3.8	0.5	3.3	0.0	0.1	0.0	24.6
	2009	31	12.4	7.8	1.0	0.2	0.1	0.5	0.0	0.1	9.3
	Mean[c]		58.4	33.5	17.0	4.9	2.1	0.9	0.1	0.1	58.7
2	1990[d]	11	27.9	8.3	3.0	11.4	2.7	1.5	0.0	0.0	26.8
	1991[d]	19	51.1	15.2	2.9	0.7	2.0	1.2	0.9	0.0	22.8
	1992[d]	22	20.6	39.7	7.7	0.2	0.2	0.9	0.1	0.2	48.9
	1993[d]	23	35.8	7.0	21.4	1.6	1.0	1.0	0.6	0.0	32.5
	1994[d]	23	12.1	8.1	4.8	2.5	1.1	0.9	0.2	0.1	17.7
	1995	37	66.6	28.2	16.6	12.4	6.3	2.1	0.2	0.1	66.0
	1996	37	13.2	38.5	15.1	2.6	0.3	0.9	0.1	0.1	57.6
	1997[e]	47	168.2	20.6	22.5	4.3	0.0	0.2	0.0	0.0	47.6
	1998	40	5.3	38.8	18.7	7.4	1.7	0.2	0.0	0.1	66.9
	1999	42	39.1	12.3	40.2	2.8	1.2	0.7	0.3	0.0	57.5
	2000	42	64.5	59.5	11.6	20.8	3.0	3.0	0.2	0.1	98.2
	2001	42	5.4	18.8	17.2	3.5	3.5	0.4	0.1	0.1	43.5
	2002	42	47.4	5.9	24.4	12.1	1.0	1.0	0.1	0.1	44.6
	2003	38	3.1	36.1	2.1	4.7	3.9	1.5	0.4	0.5	49.2
	2004	29	208.3	7.8	43.0	1.1	0.6	1.6	0.0	0.3	54.5
	2005	33	5.0	92.8	6.7	25.7	0.9	2.1	0.5	0.0	128.7
	2006	32	7.7	7.6	56.3	3.1	8.5	1.0	0.4	0.1	77.0
	2007	32	27.6	29.6	11.1	81.2	1.2	4.8	0.6	0.5	129.0
	2008	33	124.9	17.6	14.1	2.1	20.3	2.0	1.4	0.0	57.6
	2009	32	30.9	18.4	3.9	3.0	0.4	3.5	0.5	0.3	29.8
	Mean[c]		48.2	25.5	17.2	10.2	3.0	1.5	0.3	0.1	57.8
3	1990[d]	15	13.7	6.4	2.4	6.6	1.6	4.4	0.0	0.4	21.7
	1991[d]	17	17.1	8.0	3.0	1.8	5.7	2.5	1.6	0.0	22.6
	1992[d]	18	3.0	6.6	3.0	0.7	0.3	1.3	0.2	0.6	12.7
	1993[d]	19	12.0	2.9	7.4	1.7	1.5	0.5	0.5	0.0	14.7
	1994[d]	19	1.8	2.5	2.2	0.5	0.4	0.9	0.5	0.0	6.9
	1995	24	10.2	25.1	5.0	1.9	1.0	0.5	0.2	0.0	33.7
	1996	30	3.1	9.8	3.3	0.8	0.1	0.5	0.1	0.2	14.8
	1997[e]	29	53.8	10.6	15.0	2.7	0.7	0.2	0.2	0.0	29.4
	1998	18	1.5	19.3	7.2	2.2	1.2	1.1	0.1	0.2	31.4
	1999	33	41.2	9.1	21.6	2.5	1.6	1.5	0.8	0.1	37.1
	2000	31	19.5	51.5	10.2	27.5	3.1	3.3	1.4	0.3	97.2
	2001	5	0.4	5.5	10.1	0.9	2.3	0.5	0.0	0.5	19.8
	2002	33	48.8	10.4	42.1	59.6	10.9	3.8	0.0	0.0	126.8
	2003	33	0.8	14.1	1.9	5.9	10.4	3.5	1.4	0.2	37.4
	2004	25	44.5	2.7	59.2	2.1	4.7	8.5	0.3	2.3	79.8
	2005	25	27.9	278.8	7.7	37.9	5.1	17.2	8.4	3.5	358.6
	2006	25	15.1	9.4	45.0	1.9	6.5	4.2	0.8	2.8	70.6
	2007	25	24.3	38.2	5.5	46.6	1.2	8.4	0.2	2.6	102.6
	2008	24	51.3	15.0	7.6	0.6	11.5	3.4	2.2	1.0	41.3
	2009	23	178.0	116.1	84.4	21.5	3.0	9.1	0.9	0.2	235.2
	Mean[c]		28.4	32.1	17.2	11.3	3.6	3.8	1.0	0.7	69.7

[a] Arithmetic mean of catch per hectare.
[b] Values from 1987-2001 have been scaled for differences in catchability between old and new research vessels.
[c] Long term mean CPH, 1990 - 2007
[d] Values have been adjusted with FPC's to compare with trawl equipment used prior to 1995.
[e] 1997 is not comparable to previous years due to limited sampling.

Table 6.3.10. Mean total length, at age (mm), for yellow perch collected in fall assessment surveys, 1990-2009.

		Age							
District	Year	1	2	3	4	5	6	7	8+
1	1990	127	160	176	200	198	226	-	-
	1991	128	170	184	191	231	224	214	-
	1992	144	174	193	219	201	221	236	-
	1993	141	190	207	217	-	-	-	-
	1994	137	176	196	228	236	234	-	-
	1995	145	179	199	225	235	274	274	315
	1996	137	175	-	231	-	-	-	-
	1997	124	163	189	209	-	-	-	-
	1998	129	160	185	195	-	-	-	-
	1999	134	156	183	203	-	-	-	-
	2000	132	166	179	198	-	-	-	-
	2001	133	167	189	196	-	-	-	-
	2002	130	166	192	208	242	220	-	-
	2003	145	177	188	200	210	213	223	216
	2004	136	176	190	200	209	218	-	241
	2005	143	174	192	201	239	212	-	-
	2006	157	183	193	203	221	247	-	219
	2007	155	200	205	216	-	244	-	-
	2008	154	175	210	213	231 .		223 .	
	2009	141	188	218	268	-	251	-	-
	Mean [a]	138	173	192	208	223	230	234	248
2	1990	147	202	224	256	274	297	-	-
	1991	147	194	221	248	276	292	301	323
	1992	157	193	219	257	262	297	299	325
	1993	133	197	209	226	244	272	300	-
	1994	149	176	200	221	248	243	286	326
	1995	152	165	187	208	222	242	297	273
	1996	125	181	203	227	251	291	294	321
	1997	131	166	210	226	283	309	-	-
	1998	141	178	197	226	265	296	276	296
	1999	139	170	199	224	239	312	313	-
	2000	147	192	207	232	251	276	319	323
	2001	140	197	225	227	259	267	292	304
	2002	134	186	216	242	263	284	287	316
	2003	138	197	225	257	267	258	270	267
	2004	136	173	209	240	243	255	-	262
	2005	128	165	179	198	224	233	256	231
	2006	144	177	200	203	213	232	265	263
	2007	143	177	203	214	208	235	232	260
	2008	145	189	221	237	236	243	246	252
	2009	138	179	200	222	207	241	242	232
	Mean [a]	141	183	208	230	249	270	283	289
3	1990	135	198	230	256	281	297	-	337
	1991	139	194	227	242	272	286	309	305
	1992	151	196	225	248	255	284	294	308
	1993	126	191	215	238	278	298	318	-
	1994	140	158	189	189	232	220	273	275
	1995	133	144	188	207	223	271	274	-
	1996	122	174	197	222	251	272	314	324
	1997	125	168	200	219	255	-	293	-
	1998	129	171	189	238	247	300	301	310
	1999	141	177	208	251	272	284	312	345
	2000	144	199	210	230	251	272	292	334
	2001	143	211	243	223	259	-	-	323
	2002	126	188	218	244	264	288	-	-
	2003	133	192	230	254	264	258	267	262
	2004	131	165	212	242	265	261	239	254
	2005	124	159	180	213	205	235	245	264
	2006	138	155	194	199	227	279	254	266
	2007	130	165	178	213	216	244	243	263
	2008	142	173	231	243	248	240	266	283
	2009	140	170	173	207	226	251	254	263
	Mean [a]	134	178	209	230	251	270	281	297

[a] Long-term mean (1990-2008)

Table 6.3.11. Percentage of mature female yellow perch, by age, from fall trawls in the western and central basins of Lake Erie, 1990-2009.

		Year																			
Basin	Age	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Western	2	7	67	65	100	47	89	65	61	50	20	67	62	30	0	53	95	100	55	83	84
	3	88	83	94	*	92	100	96	100	88	82	89	95	90	79	89	*	94	*	86	100
	4	88	*	100	*	100	100	100	100	100	100	100	100	100	100	100	100	*	100	*	*
Central	2	67	63	75	95	24	6	72	48	66	35	89	83	76	77	40	28	51	46	67	62
	3	100	94	96	99	77	53	95	91	87	86	100	100	97	100	91	71	89	75	99	63
	4	98	100	100	100	75	91	100	93	96	100	100	100	99	100	100	96	100	98	96	89

* Indicates low sample size or no fish.

Table 6.3.12. Percent mature, at age, for male and female yellow perch collected during the 2009 fall gill net survey in the western and central basins of Lake Erie. Number of fish examined for maturity in parentheses.

		Age (years)										
Sex	Basin	1	2	3	4	5	6	7	8	9	10	11
Male	Western	96	100	100	100		100					
		(23)	(17)	(5)	(1)		(4)					
	Central	97	100	100	100		100	100				
		(30)	(21)	(5)	(4)		(8)	(1)				
Female	Western	20	100	100	100							
		(10)	(14)	(4)	(3)							
	Central	10	98	100	100	100	100					
		(30)	(57)	(21)	(26)	(2)	(18)					

Table 6.3.13. Percent mature, at length, for male and female yellow perch collected during the 2009 fall gill net survey in the Ohio waters of Lake Erie. Number of fish examined for maturity in parentheses.

		Total Length (mm)																		
Sex	Basin	≤130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310
Male	Western	92	100	100	100	100	100	100	100	100	100	100	100		100	100				
		(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)	(23)		
	Central	93	100	100	100	100	100	100	100	100	100	100			100					
		(15)	(11)	(2)	(3)	(7)	(9)	(7)	(3)	(2)	(4)	(3)			(3)					
Female	Western	50	0	33	0	100	100	100	100	100	100		100	100		100	100	100		
		(2)	(4)	(3)	(1)	(1)	(2)	(2)	(2)	(7)	(2)		(1)	(1)		(1)	(1)	(1)		
	Central	0	0	0	0	50	100	100	100	100	100	100	100	100	100	100				
		(6)	(8)	(5)	(7)	(4)	(1)	(10)	(12)	(15)	(11)	(11)	(5)	(9)	(10)	(15)				

Table 6.3.14. Fall relative abundance [a] of white bass from Ohio canned multifilament gill net surveys, 1990-2009.

District	Year	N[b]	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6+	All Ages
1	1990	9	0.4	0.3	1.3	1.8	0.2	0.0	3.2
	1991	7	0.0	0.2	0.5	0.3	0.9	0.0	1.7
	1992	8	1.4	0.6	0.1	0.1	0.0	0.6	3.0
	1993	2	0.0	0.4	0.0	0.0	0.0	0.0	0.4
	1994	2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1995	2	3.0	0.0	0.4	1.0	0.0	0.0	4.5
	1996	8	0.0	2.8	0.1	0.0	0.0	0.0	2.8
	1997	8	0.6	0.0	1.1	0.0	0.0	0.0	1.8
	1998	6	0.0	0.6	0.1	0.1	0.0	0.0	0.8
	1999	7	1.5	0.2	1.8	0.1	0.5	0.0	3.0
	2000	8	1.6	2.8	0.1	0.3	0.0	0.0	4.1
	2001	5	0.5	3.6	1.2	0.1	0.0	0.0	4.4
	2002	7	3.4	0.5	2.9	0.7	0.2	0.1	7.8
	2003	7	0.8	1.1	0.2	0.0	0.0	0.0	2.0
	2004	11	2.3	2.7	0.9	0.3	0.4	0.1	6.9
	2005	13	0.7	3.3	1.5	1.0	0.0	1.0	7.3
	2006	13	6.4	0.6	1.6	0.7	0.2	0.2	9.1
	2007	18	1.7	10.2	0.8	3.6	0.4	0.8	16.9
	2008	10	2.2	1.3	2.4	0.1	0.8	6.2	6.8
	2009	11	2.0	2.5	0.6	2.6	0.1	0.3	8.0
	Mean [c]		1.4	1.6	0.9	0.5	0.2	0.5	4.6
2	1990	14	0.3	0.2	0.7	1.2	0.1	0.0	2.3
	1991	15	0.3	0.2	0.1	0.0	0.3	0.0	0.6
	1992	17	0.6	0.4	0.0	0.0	0.1	0.1	1.2
	1993	5	0.2	1.0	0.3	0.0	0.0	0.0	1.5
	1994	4	0.6	0.4	0.0	1.4	0.4	0.0	3.1
	1995	6	3.1	0.7	0.3	0.3	0.1	0.0	4.0
	1996	6	0.5	3.8	0.1	0.1	0.0	0.0	4.3
	1997	6	1.8	0.3	2.1	0.0	0.0	0.1	5.3
	1998	6	0.4	10.7	1.0	0.6	0.0	0.1	13.2
	1999	7	14.0	1.4	4.6	0.1	0.3	0.0	21.0
	2000	9	2.8	3.1	0.1	0.2	0.0	0.0	6.4
	2001	4	0.6	7.0	2.3	0.6	0.5	0.2	9.4
	2002	6	6.1	1.2	1.8	0.9	0.3	0.1	8.3
	2003	10	1.1	2.6	0.3	0.4	0.1	0.0	4.3
	2004	15	4.8	3.7	2.0	0.2	0.1	0.1	14.2
	2005	20	1.0	10.0	4.3	1.9	0.0	0.8	18.2
	2006	21	7.4	0.6	1.7	0.3	0.2	0.1	10.7
	2007	13	6.9	51.5	3.1	10.0	0.7	0.5	74.6
	2008	18	10.4	4.6	10.1	2.9	3.0	5.4	28.3
	2009	22	6.0	9.2	0.3	9.0	0.0	1.0	27.9
	Mean [c]		3.3	5.4	1.8	1.1	0.3	0.4	12.2
3	2003	2	20.4	4.0	0.0	0.0	0.0	0.0	24.5
	2004	8	7.9	2.9	1.8	0.1	0.3	0.2	12.6
	2005	4	0.2	9.7	2.5	6.0	0.2	0.0	18.9
	2006	16	21.8	1.4	5.7	1.2	0.5	0.2	30.1
	2007	11	3.9	24.8	1.1	2.7	0.2	0.3	33.8
	2008	15	2.0	0.8	4.5	1.3	1.1	5.2	10.2
	2009	15	2.4	1.0	0.9	3.1	0.1	0.7	9.3
	Mean [c]		9.4	7.3	2.6	1.9	0.4	1.0	21.7

[a] Geometric mean of catch per standard 1,300-ft gill net.

[b] N=number of stations sampled.

[c] Long-term arithmetic mean (1990-2008)

Table 6.3.15. Mean total length[a] at age (mm), for white bass collected in fall assessment surveys, 1990-2009.

		Age							
District	Year	1	2	3	4	5	6	7	8+
1	1990	274	313	332	347	352	-	-	-
	1991	263	331	347	353	355	-	-	-
	1992	266	298	356	343	-	361	-	-
	1993	231	311	345	-	-	-	-	-
	1994	270	338	338	339	308	362	-	-
	1995	251	267	346	378	-	386	-	-
	1996	267	312	323	-	-	-	-	-
	1997	241	289	323	-	-	-	-	-
	1998	270	313	364	356	-	-	-	-
	1999	276	316	339	354	370	-	-	-
	2000	260	317	336	367	-	-	-	-
	2001	266	312	347	370	395	-	-	-
	2002	257	316	338	357	365	-	388	-
	2003	259	308	-	341	-	-	-	-
	2004	245	305	336	354	352	368	-	-
	2005	272	305	332	342	-	356	367	420
	2006	263	283	323	326	346	-	367	-
	2007	255	310	329	343	361	374	356	354
	2008	273	304	331	365	341	357	347	328
	2009	259	313	326	337	352	361	381	-
	Mean[b]	260	308	338	351	356	368	370	387
2	1990	271	301	332	353	361	-	-	-
	1991	262	314	-	371	358	-	-	372
	1992	253	310	345	336	367	369	-	-
	1993	263	319	368	-	-	-	377	-
	1994	245	290	337	340	376	-	-	-
	1995	256	303	364	377	380	-	-	-
	1996	249	304	347	379	-	-	-	-
	1997	244	298	325	-	383	399	-	-
	1998	259	308	322	342	-	383	-	316
	1999	272	302	340	-	352	-	-	-
	2000	250	310	321	349	-	-	-	-
	2001	237	311	345	369	376	-	385	-
	2002	262	298	330	354	358	372	-	-
	2003	260	306	365	339	-	-	396	-
	2004	236	306	323	348	355	373	-	-
	2005	284	310	328	341	394	346	389	397
	2006	264	273	320	323	358	384	372	418
	2007	267	312	329	336	370	377	-	384
	2008	273	290	329	347	342	368	379	408
	2009	258	315	334	346	-	371	366	385
	Mean[b]	258	304	337	350	366	374	380	383
3	1990	-	313	332	350	-	390	-	-
	1991	253	321	337	344	355	-	399	403
	1992	256	301	341	392	388	365	382	-
	1993	-	320	-	-	-	-	-	-
	1994	267	-	338	345	-	-	-	-
	1995	-	-	-	-	-	-	-	-
	1996	170	302	-	-	-	-	-	-
	1997	226	287	324	-	-	-	-	-
	1998	-	302	303	343	-	-	-	-
	1999	261	-	296	-	320	-	-	-
	2000	248	316	324	362	-	-	-	-
	2001	251	309	-	-	-	-	-	-
	2002	242	302	-	342	-	-	-	-
	2003	265	301	340	324	-	388	-	-
	2004	243	304	331	358	355	369	-	375
	2005	278	318	354	315	390	-	-	-
	2006	265	281	328	324	357	-	358	389
	2007	261	309	321	331	366	369	352	333
	2008	275	287	336	347	336	351	363	-
	2009	259	301	339	342	351	353	385	412
	Mean[b]	251	304	330	344	358	369	373	382

[a] Scales were used to age fish prior to 2003, otoliths from 2003-2008

[b] Long-term mean (1990-2008)

Table 6.3.16. Percent mature, at age, for male and female white bass (top) and white perch (bottom) collected in 2009 gill net surveys in the western and central basins of Lake Erie. Number of fish examined for maturity is in parentheses.

White Bass		Age									
Sex	Basin	1	2	3	4	5	6	7	8	9	10
Male	Western	93	100	100	100	100	100	100			
		(15)	(45)	(4)	(50)	(2)	(4)	(1)			
	Central	98	100	100	100		100	100	100		100
		(129)	(172)	(12)	(166)		(13)	(3)	(1)		(4)
Female	Western	44	100	100	100		100	100			
		(16)	(20)	(9)	(28)		(1)	(2)			
	Central	15	96	100	100		100	100	100		100
		(121)	(170)	(18)	(194)		(12)	(1)	(3)		(1)

White Perch		Age									
Sex	Basin	1	2	3	4	5	6	7	8	9	10
Male	Western	100	100	100	100						
		(4)	(6)	(1)	(2)						
	Central	50	100	100	100		100				
		(2)	(18)	(3)	(1)		(2)				
Female	Western		100	100	100			100			
			(4)	(1)	(2)			(1)			
	Central	15	90	88	10	88	100	100	100	100	
		(47)	(61)	(16)	(16)	(8)	(5)	(4)	(2)	(2)	

Table 6.3.17. Percent mature, at length, for male and female white bass collected during the 2009 fall gill net survey in the western and central basins of Lake Erie. Number of fish examined is listed in parentheses.

		Total Length (mm)												*Continued*
Sex	Basin	≤170	180	190	200	210	220	230	240	250	260	270	280	*below*
Male	Western		0					100	100	100	100	100	0	
			(1)					(2)	(2)	(3)	(9)	(3)	(1)	
	Central	50					100	78	100	100	100	100	100	
		(2)					(1)	(9)	(19)	(36)	(44)	(30)	(9)	
Female	Western		0			0		0	100	0	50	50	50	
			(1)			(1)		(1)	(3)	(2)	(2)	(4)	(4)	
	Central	0	0	0		0	0	0	10	0	6	12	70	
		(3)	(1)	(1)		(4)	(4)	(7)	(22)	(14)	(36)	(26)	(20)	

		Total Length (mm)												
Sex	Basin	290	300	310	320	330	340	350	360	370	380	390	400	410
Male	Western	100	100	100	100	100	100	100	100	100	100			
		(2)	(20)	(27)	(12)	(16)	(12)	(8)	(2)	(1)	(1)			
	Central	100	100	100	100	100	100	100	100	100	100			
		(19)	(63)	(64)	(66)	(51)	(50)	(23)	(9)	(5)	(2)			
Female	Western	100	100	100	100	100	100	100	100	100	100	100		
		(2)	(1)	(5)	(11)	(11)	(11)	(4)	(8)	(4)	(1)	(1)		
	Central	100	100	100	100	98	100	98	100	100	100	100	100	100
		(5)	(13)	(38)	(63)	(62)	(49)	(43)	(65)	(36)	(9)	(2)	(4)	(2)

Table 6.3.18. Arithmetic mean catch-per-hectare of age-1 and older fish for selected species during August trawls in all Ohio districts of Lake Erie, 1990-2009.

District	Year	White Perch	Lake Whitefish	Rainbow Smelt	Round Goby*	Emerald Shiner	Spottail Shiner	Alewife	Gizzard Shad	Trout-Perch	Freshwater Drum	Silver Chub	Walleye	Yellow Perch
1	1990 [a]	4.9	0.0	0.4	--	2.0	18.7	0.0	0.0	30.9	204.7	1.9	1.1	20.7
	1991	36.3	0.0	0.1	--	3.9	35.3	0.0	0.0	79.9	61.3	6.4	3.4	27.6
	1992	124.7	0.0	0.0	--	61.6	3.9	0.0	0.0	14.1	126.1	10.1	8.1	9.5
	1993	30.0	0.0	1.1	--	39.0	10.4	0.0	0.0	57.1	141.9	36.6	3.1	14.4
	1994	1.9	0.0	0.2	--	0.5	9.6	0.0	0.0	31.6	18.0	8.0	4.3	57.7
	1995	5.8	0.0	0.0	0.0	0.2	5.5	0.0	0.0	84.0	143.9	6.2	7.9	128.8
	1996	9.2	0.0	0.4	0.0	32.3	28.1	0.0	0.0	86.4	94.7	5.2	0.1	79.9
	1997	13.9	0.0	1.1	2.2	52.5	13.9	0.0	0.0	53.2	62.2	19.8	8.0	121.8
	1998	7.0	0.0	0.0	158.9	6.9	43.5	0.0	0.0	81.6	89.5	30.5	3.2	4.8
	1999	28.7	0.0	0.0	187.1	13.7	23.8	0.0	0.0	95.4	91.7	20.9	1.1	68.5
	2000	51.3	0.0	0.2	140.4	28.8	6.0	0.0	0.0	30.8	283.7	13.0	3.2	85.3
	2001	3.9	0.0	0.0	156.9	20.5	3.3	0.0	0.0	77.9	253.1	12.4	0.1	12.8
	2002	18.8	0.0	0.0	38.6	59.4	9.6	0.0	0.0	46.6	111.5	7.2	3.9	77.1
	2003	54.3	0.0	4.1	69.8	77.3	13.2	0.0	0.0	38.6	218.6	37.0	0.2	3.0
	2004	56.2	0.0	0.0	170.4	21.5	4.9	0.0	0.0	64.5	173.8	6.5	18.5	210.7
	2005	15.5	0.0	0.0	83.4	4.6	23.9	0.0	0.0	53.3	62.5	6.9	0.7	5.2
	2006	55.9	0.0	0.0	48.0	35.8	4.9	0.0	0.0	27.6	100.0	4.2	0.7	6.4
	2007	19.4	0.0	0.1	192.8	20.8	3.0	0.0	0.0	58.8	73.3	2.5	0.1	14.5
	2008	32.2	0.0	0.0	148.9	2.1	3.4	0.0	0.0	22.0	60.2	0.9	1.6	23.5
	2009	40.0	0.0	114.3	81.7	112.5	0.3	0.0	0.0	17.1	124.6	0.0	2.7	83.3
	Mean [b]	30.0	0.0	0.4	99.8	25.5	13.9	0.0	0.0	54.4	124.8	12.4	3.8	52.7
2	1990	109.8	0.0	312.8	--	1.5	0.0	0.0	0.0	1.2	27.0	0.0	0.0	67.4
	1991	361.5	0.0	719.6	--	0.0	0.0	0.0	0.0	0.5	3.5	0.0	1.7	43.5
	1992	35.5	0.0	2.5	--	0.0	0.0	0.0	0.0	1.5	23.2	0.0	2.8	8.0
	1993	0.0	0.0	2,049.5	--	0.0	0.0	0.0	0.0	44.8	11.6	0.0	0.0	29.1
	1994	6.3	0.0	3.2	1.8	7.7	1.3	0.0	0.0	3.5	11.4	0.0	7.1	5.0
	1995	21.2	3.6	3,413.4	12.2	0.1	0.0	0.0	1.1	3.1	12.0	0.0	6.8	151.1
	1996	232.9	0.7	3,638.8	63.5	0.2	127.8	0.0	0.3	8.5	29.6	1.5	0.9	15.7
	1997	25.7	0.0	1,986.4	174.5	0.0	0.7	0.0	0.0	14.7	5.9	0.7	0.4	677.7
	1998	6.7	0.0	7.1	274.2	5.7	48.6	1.6	0.3	11.4	19.2	4.2	3.7	2.9
	1999	48.6	0.1	8.5	328.3	72.3	0.3	0.0	1.2	2.3	22.3	0.0	1.0	19.4
	2000	151.2	0.0	29.2	287.7	0.0	0.0	0.3	0.0	0.5	24.2	0.0	0.5	86.6
	2001	84.2	0.0	70.6	149.6	3.3	72.3	0.0	0.0	20.4	26.3	0.7	0.7	6.4
	2002	373.9	0.3	2,341.3	351.0	1.9	0.3	0.0	1.4	8.1	12.2	1.1	3.4	191.0
	2003	120.7	0.0	21.9	122.3	10.7	1.3	0.0	0.0	18.6	27.4	2.2	0.1	4.2
	2004	330.3	0.0	6.4	161.4	0.4	4.4	0.0	0.2	12.5	105.0	1.7	62.8	323.7
	2005	17.4	0.0	353.6	123.8	78.3	0.6	0.0	26.1	17.9	19.3	4.6	1.6	25.0
	2006	210.7	0.0	0.0	51.4	69.6	0.0	0.0	0.6	1.5	11.5	0.0	1.4	2.2
	2007	27.1	0.0	60.1	136.1	237.7	2.2	0.0	0.0	2.2	29.7	0.1	1.6	25.1
	2008	171.2	0.0	6.1	112.9	362.1	13.4	0.0	0.6	2.1	18.2	0.0	3.3	66.6
	2009	123.8	0.0	8.9	187.3	9.2	0.0	0.0	0.2	0.4	37.0	0.0	1.7	63.1
	Mean [b]	122.9	0.2	752.0	158.6	43.0	13.7	0.1	1.6	8.8	23.8	0.8	5.1	90.7
3	1990	17.9	0.0	98.8	--	0.7	0.0	0.0	0.0	7.5	6.0	0.0	0.1	7.2
	1991	1,003.4	0.0	443.5	--	0.2	0.0	0.0	0.9	2.7	28.8	0.0	6.7	103.4
	1992	105.0	0.0	31.4	--	0.1	0.0	0.0	0.0	1.7	26.2	0.0	4.5	2.7
	1993	5.0	0.0	1,222.7	--	0.0	0.0	0.0	0.0	5.5	7.5	0.0	0.0	16.0
	1994	0.4	0.0	24.1	0.0	0.0	0.6	0.0	0.0	2.0	7.5	0.5	0.0	16.7
	1995	3.8	0.0	1,290.3	0.3	0.0	0.0	0.0	1.4	10.8	12.7	0.0	1.6	18.7
	1996	7.9	0.3	535.8	74.9	0.0	0.0	0.0	0.1	4.1	10.6	0.0	0.0	2.7
	1997 [c]	--	--	--	--	--	--	--	--	--	--	--	--	--
	1998	6.8	0.0	9.9	490.2	0.0	0.1	0.0	0.1	38.5	4.5	0.1	0.4	3.5
	1999	53.8	0.3	2,624.4	781.6	0.0	0.0	0.0	13.5	176.2	7.7	0.0	0.4	63.5
	2000	4.6	0.2	15.4	439.2	0.0	0.0	0.0	0.3	1.0	7.9	0.0	0.5	84.8
	2001	8.7	0.0	3,843.4	376.0	0.0	0.0	0.0	0.0	1.8	4.0	0.0	0.0	10.2
	2002	172.7	2.2	4,493.0	357.5	0.0	0.0	1.2	0.4	2.9	15.7	0.0	1.2	749.6
	2003	33.2	0.0	55.0	187.2	0.3	0.0	0.0	0.0	3.4	15.1	0.0	0.2	1.5
	2004	228.1	0.0	583.9	543.1	0.1	0.0	0.0	0.1	4.6	11.2	0.0	15.5	61.9
	2005	6.9	0.3	1,942.1	369.4	0.0	0.1	0.0	0.0	54.0	11.9	0.1	0.6	82.3
	2006	131.1	0.4	956.5	295.4	0.0	0.0	0.0	0.0	6.5	11.4	0.0	0.0	10.8
	2007	8.1	0.0	1,197.4	312.8	6.1	1.1	0.0	0.1	25.9	10.1	0.0	0.4	40.9
	2008	464.4	0.0	9.9	25.9	0.0	0.0	0.0	0.0	11.7	26.8	0.0	0.7	150.2
	2009	620.0	0.0	361.2	188.0	0.4	0.0	0.0	0.0	0.7	55.2	0.0	1.0	104.3
	Mean [b]	151.7	0.2	1,038.9	296.1	0.4	0.1	0.1	0.9	19.0	14.8	0.0	1.8	80.6

[a] Values have been adjusted with FPC's to compare with different trawl equipment and vessels.
[b] Long term mean CPH (1990 - 2008).
[c] 1997 is not comparable to previous years due to limited sampling.
* District 1 round goby are all ages combined, Districts 2 and 3 are age-1 and older. Gobies were first sampled in 1994 in the central basin and in 1995 in the western basin.

Table 6.3.19. Arithmetic mean catch-per-hectare of age-1 and older fish for selected species during September trawls in all Ohio districts of Lake Erie, 1990-2009.

District	Year	White Perch	Lake Whitefish	Rainbow Smelt	Round Goby*	Emerald Shiner	Spottail Shiner	Alewife	Gizzard Shad	Trout-Perch	Freshwater Drum	Silver Chub	Walleye	Yellow Perch
1	1990 [a]	0.1	0.0	0.0	--	3.7	21.2	0.0	0.0	42.5	48.8	2.0	0.1	--
	1991	3.6	0.0	0.0	--	1.3	12.8	0.0	0.0	14.1	17.8	4.3	1.3	0.4
	1992	9.7	0.0	0.0	--	1.0	6.9	0.0	0.0	15.4	77.7	7.0	3.1	0.7
	1993	5.3	0.0	10.0	--	47.6	11.2	0.0	0.0	14.2	11.6	18.6	0.3	3.7
	1994	8.1	0.0	0.0	--	0.7	6.8	0.0	0.0	22.8	5.8	6.5	1.2	73.1
	1995	0.0	0.0	0.2	0.0	6.1	8.1	0.0	0.0	14.1	28.1	11.3	1.2	0.1
	1996	70.2	0.0	0.4	0.5	2.5	12.9	0.0	0.0	40.8	38.1	6.1	0.3	82.3
	1997	4.1	0.0	0.5	12.7	84.1	29.7	0.0	0.0	57.3	21.0	25.3	4.6	104.9
	1998	2.1	0.0	0.0	207.0	15.0	43.1	0.0	0.0	73.5	59.6	30.8	2.4	16.0
	1999	33.7	0.0	0.0	193.6	17.7	33.6	0.0	0.0	50.6	79.4	19.0	0.4	47.1
	2000	33.8	0.0	0.0	76.6	21.6	4.5	0.0	0.0	25.9	127.1	9.2	1.5	38.0
	2001	14.6	0.0	0.2	104.3	2.8	7.6	0.0	0.0	57.4	166.3	8.3	0.4	10.3
	2002	20.2	0.0	0.0	158.7	59.9	29.1	0.0	0.0	42.2	98.8	14.2	4.2	86.5
	2003	63.9	0.0	0.0	103.0	6.0	11.4	0.0	0.0	39.8	168.4	1.8	0.0	7.1
	2004	83.1	0.0	0.2	56.7	3.6	6.0	0.0	0.0	39.4	179.5	5.5	10.2	127.7
	2005	6.9	0.0	0.0	75.8	0.5	3.5	0.0	0.0	33.8	78.9	6.3	0.5	2.0
	2006	75.1	0.0	0.1	131.2	33.9	18.5	0.0	0.0	60.8	62.4	1.8	1.2	12.5
	2007	14.6	0.0	0.0	196.0	18.7	10.2	0.0	0.0	48.2	43.8	1.2	0.0	23.6
	2008	26.3	0.0	0.0	58.4	19.6	3.9	0.0	0.0	20.4	35.2	1.2	2.3	15.3
	2009	20.2	0.0	1.4	226.9	9.2	5.4	0.0	0.0	17.5	81.1	0.3	1.5	57.0
	Mean [c]	25.0	0.0	0.6	98.2	18.2	14.8	0.0	0.0	37.5	71.0	9.5	1.8	37.4
2	1990 [a]	89.4	0.0	32.1	--	2.5	0.0	0.0	1.5	4.1	89.3	0.0	0.2	23.0
	1991	316.4	0.0	77.2	--	45.3	0.4	0.0	0.0	17.6	38.0	0.0	0.4	50.0
	1992	190.5	0.0	24.4	--	3.6	0.0	0.0	0.8	13.3	15.6	0.0	3.2	14.3
	1993	1.8	0.1	104.8	--	2.8	0.0	0.0	0.8	5.8	46.2	0.3	0.6	49.0
	1994	1.8	1.0	242.9	4.6	4.7	1.4	0.0	0.0	2.0	14.0	0.1	3.2	12.0
	1995	34.9	1.5	242.7	49.8	34.0	5.6	0.0	3.5	5.4	20.5	0.4	4.1	82.3
	1996	22.1	0.2	90.9	138.8	9.1	18.0	0.0	0.0	5.4	38.9	0.6	0.0	11.2
	1997	44.5	0.7	322.6	171.0	226.0	17.2	0.0	0.1	16.5	43.7	1.5	9.5	110.2
	1998	5.6	0.1	71.0	164.9	1,862.1	28.3	0.0	0.2	15.1	31.3	0.8	1.2	6.3
	1999	35.2	0.2	146.2	82.5	515.8	5.8	0.0	0.9	9.2	83.6	1.9	1.0	40.7
	2000	91.1	0.1	65.6	27.5	109.2	8.7	0.6	4.3	17.2	30.9	2.8	7.3	61.6
	2001	21.7	0.0	55.6	54.8	106.3	3.5	0.0	0.1	3.2	16.1	1.1	0.6	5.7
	2002	91.5	0.2	45.3	39.2	233.9	6.6	2.9	1.6	27.2	15.8	4.9	3.8	51.7
	2003	28.2	0.2	29.4	25.4	54.9	1.6	0.0	0.0	12.2	25.0	1.7	0.1	3.2
	2004	83.9	0.7	320.5	27.0	1.5	5.3	0.0	0.1	14.0	22.8	1.7	18.2	216.5
	2005	34.1	0.1	89.8	33.6	233.6	0.3	0.0	0.5	13.5	21.2	2.3	1.2	18.3
	2006	32.4	0.0	8.9	20.4	162.7	1.2	0.0	0.2	3.3	40.5	0.6	0.5	4.2
	2007	27.1	0.0	40.4	26.3	418.7	2.3	0.0	0.0	5.5	38.8	0.2	0.7	19.8
	2008	76.5	0.0	9.6	57.9	495.0	2.3	0.0	0.0	4.8	30.1	0.5	2.7	56.6
	2009	42.2	0.0	419.4	58.0	99.5	3.1	0.0	0.0	0.8	11.0	0.0	1.1	20.7
	Mean [c]	63.5	0.3	122.0	61.4	231.1	5.6	0.2	0.7	9.8	33.7	1.1	3.1	43.3
3	1990 [a]	66.4	0.0	25.6	--	86.8	2.9	0.0	0.0	10.9	24.8	0.0	1.4	14.3
	1991	160.3	0.0	217.3	--	89.8	0.6	0.3	0.4	2.9	10.3	0.9	0.8	18.5
	1992	28.1	0.0	48.9	--	3.7	1.1	0.1	0.0	23.2	17.6	0.7	0.0	3.4
	1993	1.1	0.9	287.7	--	19.5	0.5	0.0	0.2	14.9	15.3	0.0	0.0	12.1
	1994	0.0	0.5	20.4	0.6	4.7	6.3	0.0	0.0	20.8	1.5	0.0	2.1	3.4
	1995	9.4	1.2	174.4	22.1	37.2	16.9	0.3	1.2	19.8	11.1	0.3	1.4	27.3
	1996	4.3	1.6	136.2	76.0	25.6	6.5	0.0	0.1	22.4	9.9	0.0	0.1	3.9
	1997	37.1	0.6	380.6	313.4	2.1	1.8	0.0	0.1	12.8	9.9	0.0	2.2	34.0
	1998	0.2	0.0	58.2	118.6	22.8	5.0	0.2	0.1	14.8	6.8	0.3	1.0	3.7
	1999	14.6	0.2	2,115.1	106.7	502.6	7.2	0.0	0.3	9.3	5.9	0.5	0.0	40.0
	2000	38.6	0.1	150.3	164.5	830.5	8.6	0.1	1.2	15.3	2.8	0.2	0.2	19.3
	2001	0.4	0.0	3.3	88.4	0.7	1.1	0.0	0.0	2.2	14.7	0.0	0.0	0.4
	2002	176.2	2.4	320.9	54.3	133.2	5.9	0.3	1.7	8.5	16.5	0.1	1.0	38.3
	2003	12.0	0.1	370.3	127.1	432.0	1.0	0.0	3.0	2.9	3.2	0.3	0.1	1.2
	2004	27.0	0.6	1,360.2	148.8	0.4	0.2	0.0	0.2	7.7	5.7	0.0	9.8	45.2
	2005	20.1	0.5	30.8	263.0	479.6	3.8	0.0	0.2	76.2	10.2	2.3	0.9	132.3
	2006	38.5	0.1	17.3	78.9	451.1	0.7	0.0	0.1	4.8	15.1	0.2	0.2	12.5
	2007	16.8	0.0	532.4	185.6	27.8	0.6	0.1	0.0	6.7	40.7	0.2	0.1	37.0
	2008	36.6	0.0	64.9	167.8	1,159.4	2.9	0.0	0.0	8.4	3.7	0.0	0.8	26.4
	2009	282.3	0.0	108.6	19.3	167.8	0.0	0.0	0.1	1.5	5.2	0.0	0.0	139.4
	Mean [c]	48.5	0.5	332.4	127.7	226.8	3.9	0.1	0.5	15.0	11.9	0.3	1.2	24.8

[a] Values have been adjusted with FPC's to compare with different trawl equipment and vessels.

[b] Long term mean CPH (1990-2008);

* District 1 round goby are all ages combined, District 2 and 3 are age-1 and older. Gobies first sampled in 1994 in the central basin and 1995 in the western basin.

Table 6.3.20. Percent mature, at length, for male and female white perch collected during the 2009 fall gill net survey in the western and central basins of Lake Erie. Number of fish examined is listed in parentheses.

		Total Length (mm)																	
Sex	Basin	≤ 130	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300
Male	Western	33		100	100	96	100	100	100	100	100	100	100	100	80	100	100	100	
		(3)		(1)	(8)	(31)	(50)	(41)	(18)	(6)	(4)	(15)	(16)	(18)	(5)	(1)	(2)	(1)	
	Central	57	90	93	72	100	100	100	100	100	100	100	100	100	100	100	100		
		(7)	(20)	(15)	(11)	(8)	(10)	(11)	(12)	(9)	(10)	(23)	(52)	(29)	(11)	(5)	(2)		
Female	Western	0			75	83	93	96	100	100	93	100	85	100	91	100	100	100	
		(1)			(4)	(12)	(32)	(57)	(40)	(19)	(16)	(5)	(7)	(20)	(12)	(11)	(3)	(3)	
	Central	0	0	5	0	50	90	100	97	94	100	100	97	100	100	100	100	100	100
		(12)	(15)	(18)	(7)	(6)	(11)	(22)	(40)	(36)	(22)	(21)	(45)	(60)	(65)	(31)	(12)	(5)	(1)

Table 6.3.21. Lake whitefish catch, by sex, age, and mean length-, weight-, and condition (K)-at-age, from Ohio 2009 central basin trawl and gillnet surveys.

Age	4	5	6	7	8	9	10	11	12	14	15	18	N	Means		
Male																
Number			13	10	2	2	1	1	1	4	1	1	36	age	8.67	yr
Length (mm)			515	516	535	579	523	606	565	588	600	584		length	537	mm
Weight (g)			1412	1390	1632	2079	1611	2437	1961	2149	2410	1989		weight	1630	g
K			1.026	1.005	1.066	1.068	1.126	1.095	1.087	1.049	1.116	0.999		K	1.035	
Female																
Number	1	1	10	4	5					1			22	age	6.86	yr
Length (mm)	500	519	517	535	552					627				length	533	mm
Weight (g)	1382	1457	1513	1494	1861					2865				weight	1641	g
K	1.106	1.042	1.086	0.978	1.077					1.162				K	1.067	

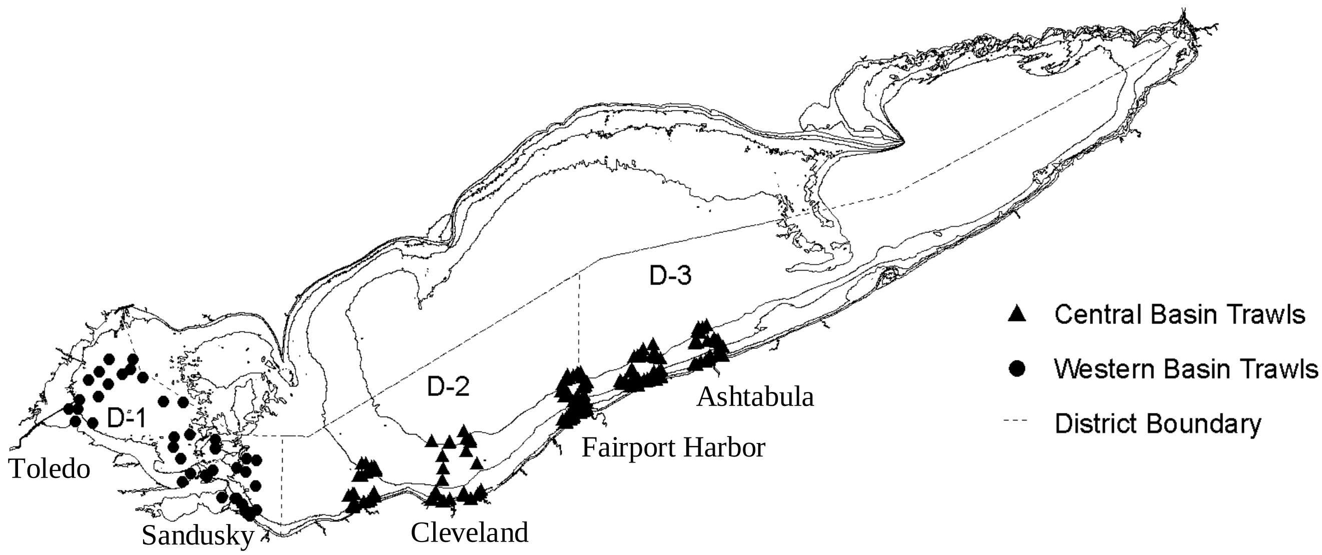


Figure 6.1.1. Stations sampled with trawls in the Ohio waters of Lake Erie during 2009. Western basin sites were sampled with a flat-bottom otter trawl and central basin sites were sampled with a two-seam Yankee trawl with a roller sweep.

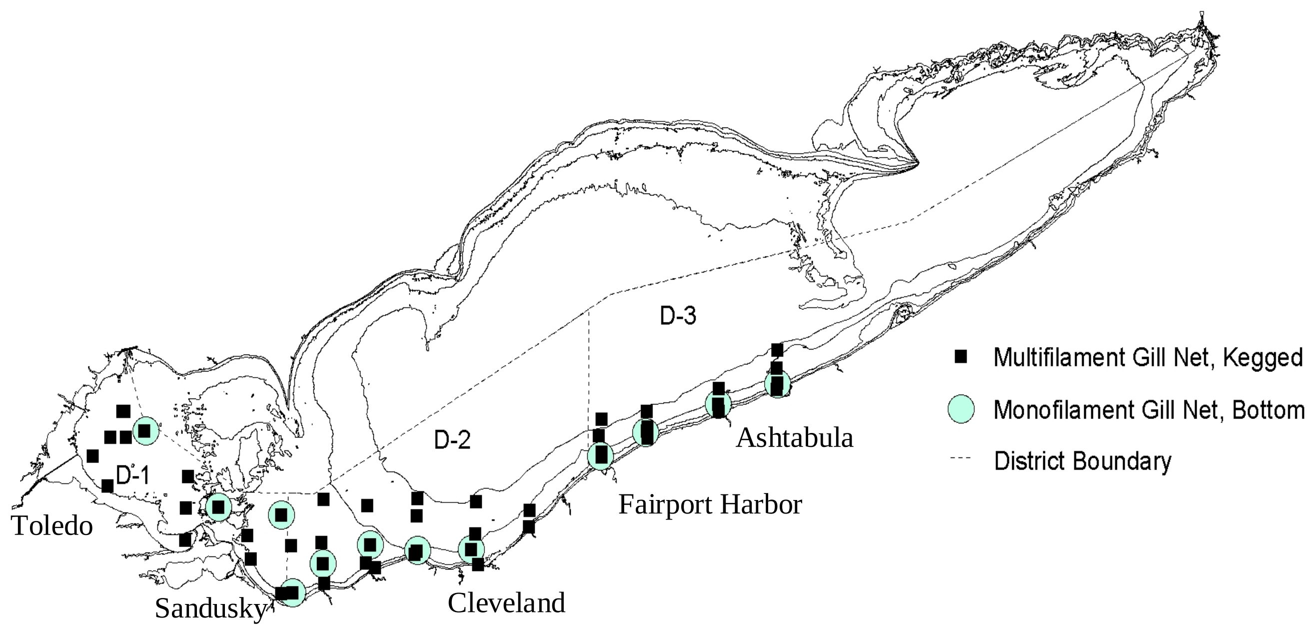


Figure 6.2.1. Stations sampled with gill nets during the fall of 2009. Seven historic sites in the western and west-central basins were fished with both standard kegged 1,300-ft multifilament nets and 600-ft monofilament bottom nets. Auxiliary sites were sampled with standard canned 1,300-ft multifilament nets only.

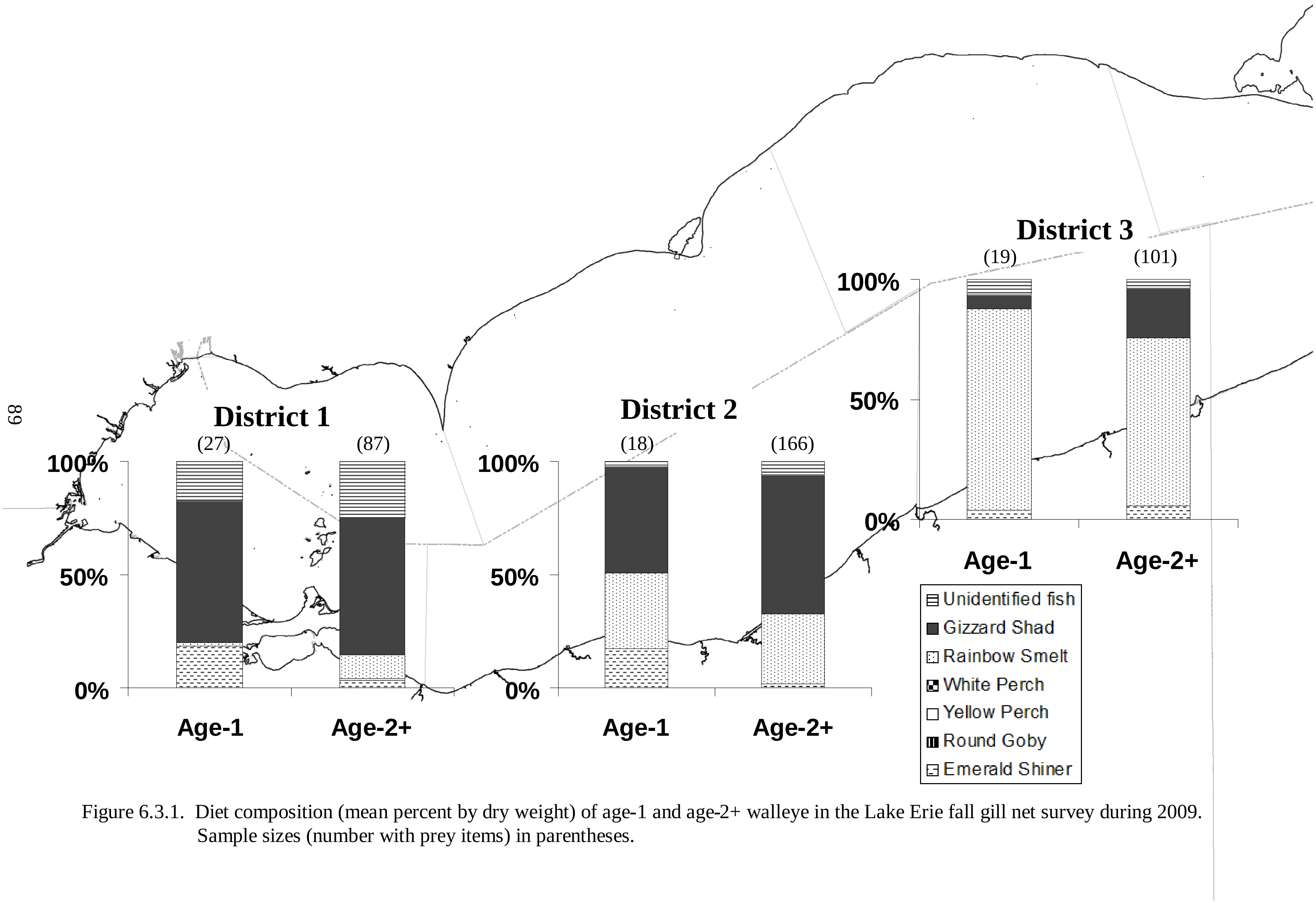


Figure 6.3.1. Diet composition (mean percent by dry weight) of age-1 and age-2+ walleye in the Lake Erie fall gill net survey during 2009. Sample sizes (number with prey items) in parentheses.

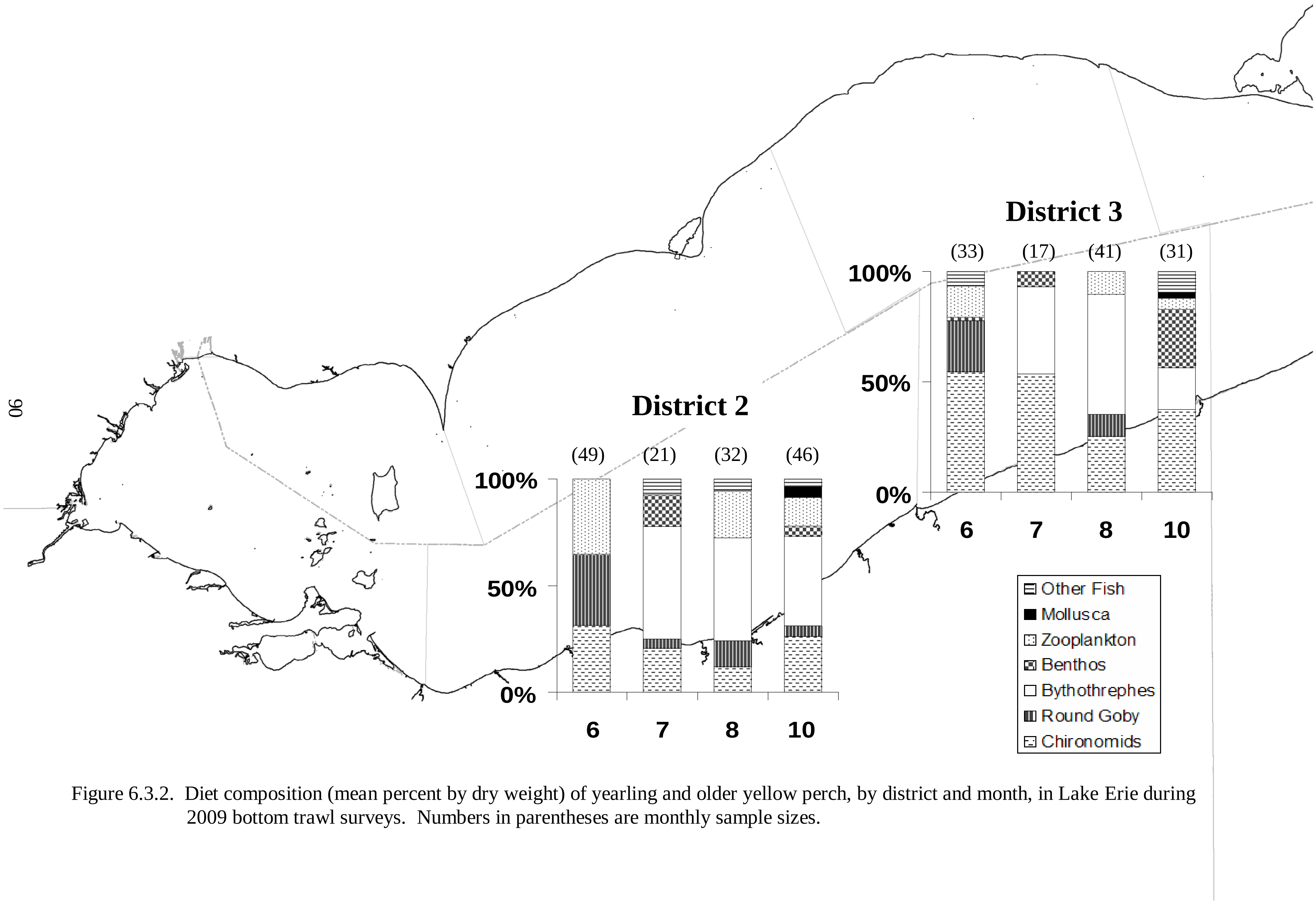


Figure 6.3.2. Diet composition (mean percent by dry weight) of yearling and older yellow perch, by district and month, in Lake Erie during 2009 bottom trawl surveys. Numbers in parentheses are monthly sample sizes.

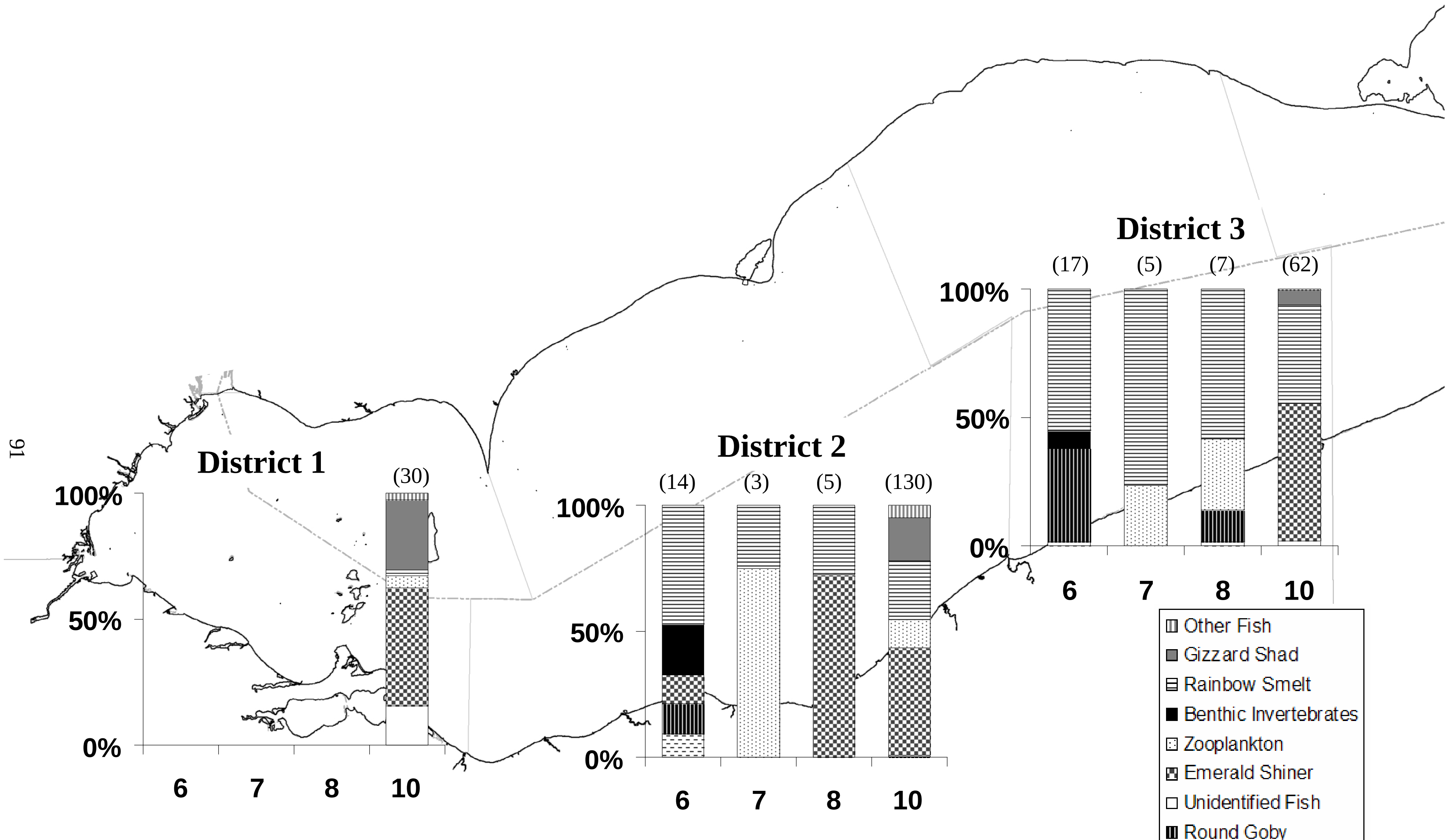


Figure 6.3.3. Diet composition (mean percent by dry weight) of age-1+ white bass, by district and month, in Lake Erie during 2009 trawl and gill net surveys. Numbers in parentheses are monthly sample sizes.

Figure 6.3.4. Condition factor (K) of age-4 and older lake whitefish from fall bottom trawl and gill net surveys in the central basin of Lake Erie, 1990-2009. Dashed lines represent the historic value in 1927 presented by Van Oosten (1949).

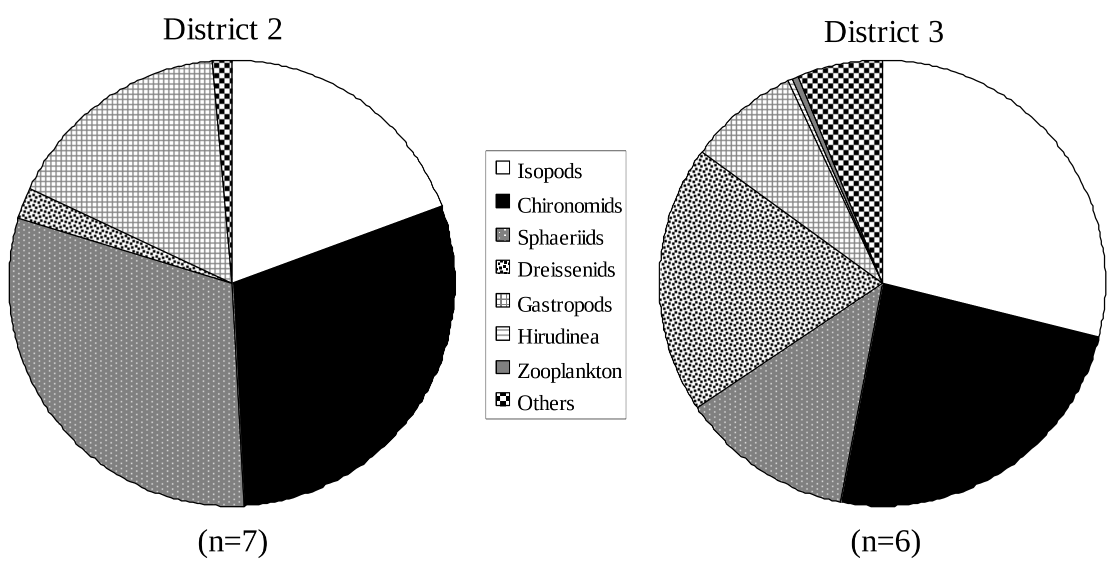


Figure 6.3.5. Diet composition (% dry weight) of lake whitefish from central basin assessment sites in 2009.

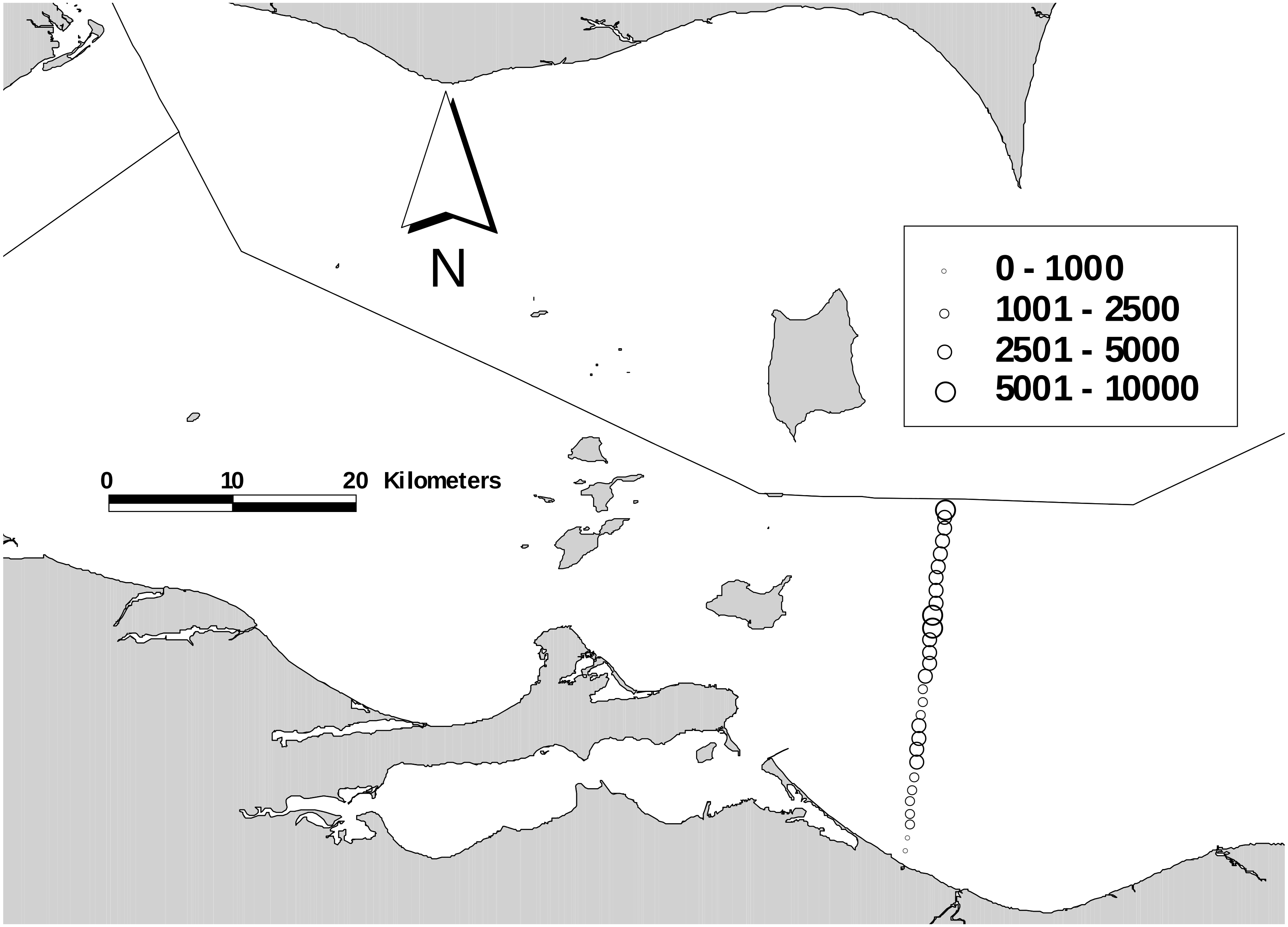


Figure 6.4.1. Spatial abundance of forage fish along one western basin hydroacoustic transect, July 2009. The proposed survey in 2009 was limited to U.S. waters only due to new passport requirements. Equipment failure ended the survey after only one transect. Legend densities are in fish per hectare.

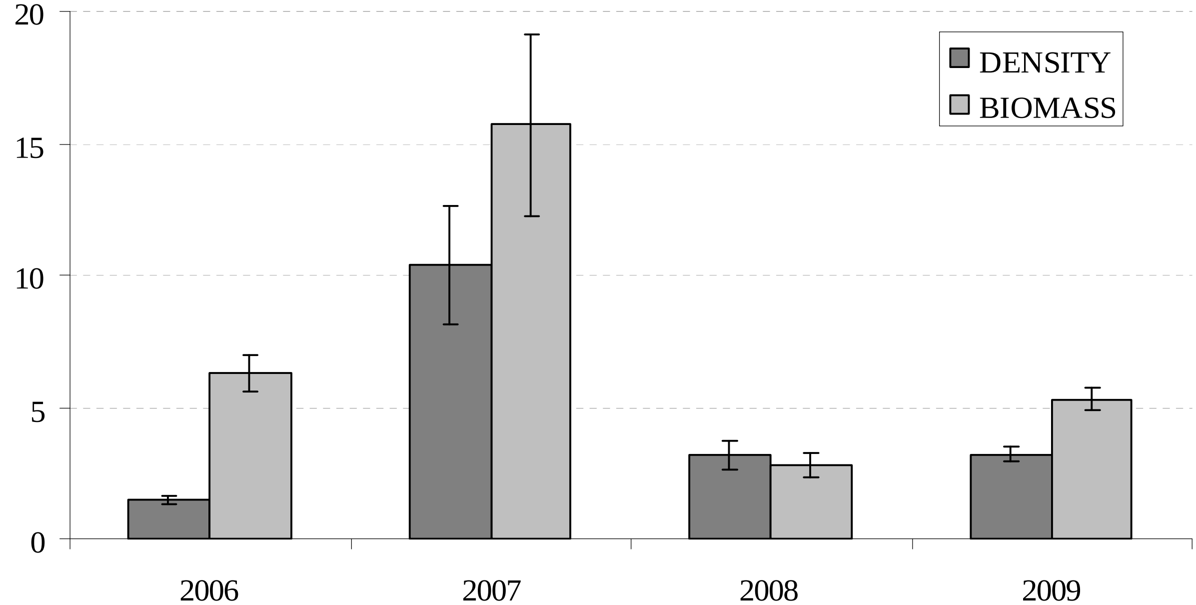


Figure 6.4.2. Estimated mean density (in thousands of fish/hectare) and biomass (kg/hectare) of western basin forage fish from down-viewing hydroacoustic survey data collected July, 2006-09, along one transect. Error bars represent the standard error of the mean.

Figure 6.4.3. Acoustic transect lines and midwater trawl locations in the central basin, Lake Erie, 2009. The solid lines indicate acoustic transects, shapes indicate trawl locations of each respective vessel.

7.0 Current Projects

7.1 Walleye Tagging *(FSDR11)*

Over 53,000 walleye were tagged in Lake Erie and its main tributaries from 1986 to 2007 (Table 7.1.1). During 2009, a total of 28 Ohio tagged walleye were reported. Of these, 18 were recaptured in 2009, and 10 were recaptured in 2008 (Table 7.1.1). Of the total 2009 recaptures, 10 were tagged in the Maumee River, 10 in the Sandusky River, 6 in Sandusky Bay, 1 at Sugar Rock (near Catawba Island), and 1 in Maumee Bay. These values reflect the relative amount of tagging effort expended at these areas in recent years. Approximately half of the recaptures from both the Maumee and Sandusky rivers were from the river fishery during the March-April spawning season. One Maumee River fish, tagged in 2007, was recaptured in the Sandusky River during the 2009 spawning run.

Tag returns from this project have been used as part of an interagency study to generate various rate estimates for the Lake Erie walleye population. The interagency all-year recovery rate, through 2006, was 3.3%. When multiplied by 4.4 (the calculated non-reporting rate from the reward tagging conducted in 2000) this gives a modified recovery rate of 14.5%. Annual mean survival (S) was estimated at 63.2% resulting in an instantaneous natural mortality rate (M) of 0.279.

Distributions of recapture locations for Ohio tagged fish, from all years, are shown in Figures 7.1.2 through 7.1.4. While widespread, males are more likely to be recaptured in the western basin and also make up most of the recaptures from the Maumee and Sandusky Rivers (Figure 7.1.2). Females show a more even distribution and are more likely to be caught in the central and eastern basins than males. They also account for most of recaptures to the north of Lake Erie. Sandusky Bay fish also show a fairly even distribution, possibly due to a large number of females tagged at this site, while fish tagged at Sugar Rock are primarily recaptured in the western basin reef and island areas (Figure 7.1.3). Due to fewer fish tagged there, the Sandusky River has fewer recaptures, yet they are most frequently found in the area from the Bass Islands to Vermilion and rarely traveled north of the lake (Figure 7.1.4). Conversely, the Maumee River fish are predominately caught in the western basin and frequently to the north. While spawning site fidelity appears strong, there is some evidence of mixing between these two stocks. Of 337 Maumee River tagged walleye recaptured during the spawning run, only 2 (0.6%) were reported from the Sandusky River. Straying was slightly higher for the Sandusky River stock where 3 of 135 (2.2%) of spawning run recaptures were from the Maumee River. Four of the five total strays were males, and all Sandusky straying occurred in the mid-1990s, while the two Maumee strays were from the last two years of tagging (2006-2007).

7.2 Smallmouth Bass Research *(FSDR17)*

Tagging

To assess movements, survival and exploitation rates, Lake Erie smallmouth bass were tagged with Monel metal butt end tags attached to the left side of the lower jaw over a five-year period from 1998 to 2002. From April to June, 6,349 bass were tagged at locations from the western basin reef complex to Cleveland, Ohio (Table 7.2.1, Figure 7.2.1). Fish were collected for tagging by ODNR, Division of Wildlife personnel using trap nets, electrofishing boats, and commercial trap nets. Cooperating sport anglers also helped tag large numbers of fish throughout the fishing season.

A total of 593 (577 with matching tag data) recaptures have been reported to date (Table 7.2.1) with only one reported in 2009. Over all years, sixteen tags could not be matched to tagging data due to cooperators who did not report their tagging information. The one 2009 recovery was a male that was tagged in 2000 and based on the angler reported recapture length, grew 126 mm in that time.

Rate estimates were calculated but must be considered crude due to numerous problem areas which affect estimation including, but not limited to: tagging throughout the fishing season, recaptures of both kept and released bass, removal of tags from released fish, non-reporting of tags, failure to report whether a fish was kept or released, and the recent change in fishing regulations (early season closure). Program MARK (Gary C. White, Colorado State University) gave a mean exploitation rate (kept or released) of

10.5% while mean survival for the period from 1999 to 2006 was 0.57 and M was 0.54. Evaluation of this computer program for the analysis of recapture information will continue in an attempt to deal with the problems listed above and generate useful rate estimates.

All-year recapture distributions of bass tagged at general locations are shown in Figure 7.2.2. Most bass movements were minimal with fish recaptured either near the site of tagging or within a few miles. The one fish reported in 2009 was recovered from the same area (American Eagle Shoal off Kelley's Island) where it was tagged nine years earlier. Previous-year recaptures have shown greater movement although site fidelity is strong. Western Basin reef-tagged fish have also been found in the island area and as far east as Lorain, Ohio. Fish tagged in the nearshore area from Port Clinton to East Harbor moved more than fish tagged in the other areas. While they were also found in the reef, Bass Islands, and Lorain areas, fish that were not caught near the tagging location were most frequently recaptured around Kelley's Island. Fish tagged in the Bass Islands rarely moved far before recapture, while fish tagged in the east also tended to stay close to the tagging site. In general, movements during the fishing season appear minimal. While large-scale movement between tagging and recapture sites may represent true movements, there is also the possibility that anglers may have moved some of these fish, especially during tournament weigh-ins.

Population Assessment

Standard annual gill net and bottom trawl surveys have not historically captured sufficient numbers of smallmouth bass to describe population dynamics. Catch and harvest information from creel surveys indicate that smallmouth bass are recruited to the fishery by age-4, thus a reliable population estimate of younger bass would be useful as a recruitment index. Furthermore, the majority of smallmouth bass (~90%) caught by anglers are released and are not available to sample for biological (length-weight, age, and growth) information. In both basins, bottom trawl surveys have only sporadically collected age-0 smallmouth bass and have been inadequate to predict recruitment to the fishery. A pilot gill net project was initiated in the central basin in 2003 and continued through 2005 to explore survey techniques for assessing younger cohorts (Ohio Division of Wildlife 2006).

In 2006, a coordinated smallmouth bass assessment gill net survey was initiated during the first two weeks of September. Sub-adult and adult smallmouth bass were sampled to obtain data on recruitment, length, weight, age, gender, growth, and diet information. Eight sites were sampled in each basin (Figure 7.2.3). Sample sites were at the east side of Kelley's Island in the western basin and at random transects within the central basin that had hard bottom substrate and depths less than 10 m. Substrate types were identified from existing NOAA substrate maps for Lake Erie. We sampled optimal (hard) and suboptimal (soft) substrates in 2006. Since smallmouth bass were not caught in suboptimal substrate, subsequent sampling was only conducted in optimal substrate. Since 2006 we did not sample depths consistently. Each site was sampled with an experimental monofilament gill net set overnight and perpendicular to shore whenever possible. Each net consisted of a gang of 13 randomly ordered sections, each 15.2 m (length) by 2.4 m (height) with stretched mesh sizes from 25-178 mm, in 13-mm increments. Catch rates (CPE) are expressed in number of fish caught per net per hour fished (Figure 7.2.3).

Relative Abundance

From 2006-2009, we have caught a total of 517 smallmouth bass (121, 117, 155, 124, in each year respectively). In District 1 the 2009 gillnet catch rate (0.63) of ages 2 and older (age-2+) smallmouth bass was above the 2006-2008 mean (0.45). In District 2, the 2009 catch rate of age-2+ smallmouth bass (0.38) was below the historical mean (0.47). In District 3, the 2009 catch rate of age-2+ smallmouth bass (0.30) was below the mean (0.63). In Districts 1 and 3, the 2009 gillnet catch rates (0.03 and 0.04, respectively) of age-1 smallmouth bass were below the 2006-2008 mean (0.07 and 0.13, respectively). In District 2, no age-1 smallmouth bass were collected in 2009. In District 1, the 2009 gillnet catch rate (0.01) of age-0 smallmouth bass was below the 2006-2008 mean (0.02). In District 2, the 2009 catch rate of age-0 smallmouth bass (0.03) was above the historical mean (0.00). In District 3, no age-0 smallmouth bass were caught in 2009.

Gillnets are useful for tracking cohorts based on catch at age analysis. Cohorts tend to track well after age 2 or 3 (Table 7.2.2). Generally, cohort strength was similar between Districts. The strongest cohorts since 2000 were 2005, 2006, and 2007. The majority of older fish (before the 2000 cohort) were represented by 1995 and 1998 cohorts. In District 2, more old fish were collected than young fish. Older fish were collected in District 2 (up to 17 years) and District 3 (up to 15 years) compared to District 1 (up to 14 years). The weakest cohort was 2004 in all districts.

Maturity

Overall, the female to male ratio has increased after two successive declines (2006, 1.7:1, 2007, 1.1:1; 2008, 0.9:1; 2009, 1.3:1). In 2009, both males and females were mature by age-2. In the other years more than 90 percent all smallmouth bass were mature by age-3 across all districts. The length at full maturity is similar across years for males (325 mm) and females (350 mm).

Future assessments

Because of the low numbers of age-0 smallmouth bass in the gill nets, it is still uncertain whether this is a valuable method of assessing bass recruitment. Other Lake Erie agencies (New York DEC, Ontario MNR, and Michigan DNR) have demonstrated that smallmouth bass can be collected by seining (as well as gill net surveys). Thus, we performed seining in the central basin in 2007 as an additional method to assess juvenile smallmouth bass recruitment. Seine hauls were employed at eight different locations across a distance of 6.15 km and a variety of habitats (Figure 7.2.3). No seining was conducted in 2008 due to logistical and equipment issues. Although no age-0 smallmouth bass were sampled in 2007, seining did collect about 1000 fish consisting of 15 species, some of which are rarely sampled by bottom trawling (*i.e.* logperch, sand shiner, dace, alewife, etc.), indicating this may be an effective means of assessing the nearshore fish community. In 2009, seining in District 3 failed to sample any age-0 smallmouth bass. This is similar to catches in seen in fall gill nets and trawls, therefore, seining may still be a reasonable method for collecting age-0 smallmouth bass.

Low catches may have been attributed to the depths sampled. Based on previous trawl catches and New York Department of Environmental Conservation gill net surveys, most age-0 fish were caught in depths from 7.6-9.7 m. In ODW sampling (2006-2009), smallmouth bass catches are attributed to variable depths sampled. Higher catches of age-0 were caught in 4-6 m in District 1, 5-7 m in District 2, and 1-3 m in District 3. We collected most age-1 smallmouth bass in 3.5-4.5 m in District 1, 4-6 m in District 2, and 6-9 m in District 3. Adult smallmouth bass were mostly caught in 3-5 m in District 1, 3-8 m in District 2, and 3-8 m in District 3.

Diet

Diet information was collected from age-1 and older smallmouth bass caught in summer and fall bottom trawl and fall gill net surveys in the central basin districts. Of all smallmouth bass analyzed (n=54), 39% had empty stomachs. Round goby was the main prey item in all districts. In District 1 diets (n=6), 83% of the diets were round goby. In District 2 diets (n=16), the majority of the diets contained round goby (62%) and gizzard shad (25%). A small portion of District 2 diets contained rainbow smelt (6%) and emerald shiners (6%). In District 3 diets (n=32), a large portion of the prey items was round goby (43%), emerald shiners (19%), rainbow smelt (19%), and gizzard shad (17%).

7.3 Comprehensive Management of Lake Erie Watersheds *(FSDR18)*

The Sandusky staff was involved in several habitat-related projects in 2009. In support of the Ballville Dam removal project undertaken by the City of Fremont, staff sampled the Sandusky fish community weekly from March through June, and later in July, to assess habitat quality above and below the dam and to assess the potential changes to the migratory and residential fish communities following dam removal in 2012. The migratory fish community was surveyed using 5-minute electro-fishing runs at fixed locations above and below the dam (Figure 7.3.1). Total length, sex, spawning stage, and catch were recorded for walleye and white bass, two key Lake Erie species that use the Sandusky River for spawning. This data will subsequently be used to develop a migratory run-strength index for both species in an effort to characterize the spawning run. Resident fish community sampling was done in conjunction with the Ohio Environmental Protection Agency (OEPA) annual sampling using their electrofishing methodology and sites (OEPA 1987; Figure 7.3.1). Species collected were identified, enumerated, and mean weights (g) were recorded in order to calculate the IBI scores for each site.

The migratory fish survey revealed that neither species was present upstream of the Ballville Dam, indicating no remnant population remains. Downstream, walleye catch-per-transect peaked at 30 walleye on April 6th (Figure 7.3.2), while white bass peaked at 50 fish on April 28th. The results for the first year of sampling (2009) in the resident fish community survey revealed the sites located in the dam pool area (Figure 7.3.1) had much lower IBI scores than the other sites that were sampled. Additional analysis of migratory and residential fish community data and pre-removal sampling will continue in 2010.

Sandusky staff continued working with representatives from the Office of Coastal Management and the Office of Geological Survey to develop the Lake Erie Shoreline Erosion Management Plan (LESEMP). When completed, the LESEMP will provide guidance and expertise to shoreline property owners, both public and private, with a voluntary, incentive-based program aimed at using alternative construction methods to reduce shoreline erosion while protecting and potentially restoring crucial aquatic habitat. A draft of the LESEMP, with Needs Assessment survey, was completed in 2008, and a guidance document for Ashtabula County will be completed by late 2009. Additional guidance documents for the remaining reaches along the Ohio coast will be addressed later. Additional information regarding the LESEMP can be found at:
http://ohiodnr.com/coastal/Coastal_Main_Menu/Programs/LakeErieShoreErosionManagementPlan/tabid/20501/Default.aspx.

This year Sandusky staff participated in multiple outreach events. The 2009 year marked the fifth year that staff participated in the annual Ottawa County 5th Grade Conservation Field Day. This event, held on September 21st, is organized by the Ottawa Soil and Water Conservation District and held at the combined facilities of Crane Creek National Wildlife Refuge and Magee Marsh. It provides 5th grade students from many local elementary schools with a tour of the refuge accompanied by multiple presentations by experts in aquatic and terrestrial conservation. This year, nearly 500 5th graders were instructed on Lake Erie coastal wetlands, their historic role to the Lake Erie fish community, and how anthropogenic influences have resulted in large-scale impacts to both the wetlands and fish community. Staff also attended the East Harbor State Park Conservation Day on August 15th, where they provided materials to and fielded questions from the public on a variety of natural resources issues. Staff provided an aquatic resource presentation to a 1st Grade class at Osbourne Elementary in the Sandusky City Public Schools, where children were introduced to native and exotic fish species and taught about various habitat requirements for each species.

Finally, staff participated in several planning meetings associated with habitat restoration in Lake Erie and the associated watershed. These meetings involved multiple agencies and environmental groups, including the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Ohio Environmental Protection Agency, Ducks Unlimited, and others. Topics discussed during these various meetings included beneficial reuse of dredge material, improving access to coastal wetland habitat for fish, and identifying 'shovel-ready' habitat restoration projects for funding.

7.4 Steelhead Trout Program *(FFDR04, FFDR08 & FPDX09)*

The Division of Wildlife stocked 458,823 age-1 Little Manistee River strain steelhead trout into selected Lake Erie tributaries in 2009. Annual stockings were completed from mid-April to the 1st of May, 2009, in the Chagrin (105,764), Grand (105,058), Rocky (90,063), and Vermilion (82,933) rivers, and Conneaut Creek (75,005). The stocked steelhead averaged 6.0 inches in length. Approximately 75,000 additional yearling steelhead were stocked into Conneaut Creek by the Pennsylvania Fish and Boat Commission above the Ohio-Pennsylvania border. This cooperative stocking program for Conneaut Creek is expected to continue. Target stocking numbers for ODNR Division of Wildlife steelhead will remain at: Vermilion River, 55,000; Rocky, Chagrin, and Grand rivers, 90,000 each; and Conneaut Creek, 75,000. The Division of Wildlife continues to implement capital improvements to the Castalia State Fish Hatchery to meet annual target program demands for 400,000 yearling steelhead trout averaging 150-225 mm in length. Steelhead tributary creel surveys began in fall 2008 on Ohio's Lake Erie steelhead streams (see previous section 4.5) and will continue through spring 2010.

Inadequate numbers of steelhead with diet items in their stomachs were collected from fish houses and assessment surveys to make a summary statement regarding steelhead diets found during the 2009 summer assessment surveys in Ohio's central basin (Districts 2 and 3). Age composition of the steelhead is typically reported in the number of summers the steelhead have spent at-large in the lake following stocking. Steelhead sampled in summer fish house surveys and in September and October gill nets (N=77) were comprised mainly of two-summer fish (68%), followed by three-summer fish (25%), one-summer fish (5%), and four-summer fish (3%). Mean length-at-age for steelhead was 424 mm for one-summer fish, 608 mm for two-summer fish, 636 mm for three-summer fish, and 770 mm for four-summer fish. Growth and returns for the two- and three-summer steelhead was on par with historical catches, but the number of one-summer steelhead seen in the surveys was anecdotally higher than previous years.

7.5 Central Basin Watershed and Habitat Coordination *(FFDM01)*

Within the scope of this project, we participated in watershed groups that focused on habitat issues in the Grand River, Mentor Lagoons, Chagrin River, Cuyahoga River, Black River, Ashtabula River, Rocky River and Conneaut Creek watersheds. Concerns about water levels have caused renewed interest and potential conflicts with dredging and hardening of shore lands; two main sources of nearshore and harbor habitat loss. We continue to work within the U.S. Army Corps of Engineers (USACE) and the ODNR permit review process, providing dredge operation windows and suggesting project restrictions or improvements for projects to enhance and/or protect fish and wildlife species and their habitats.

We continue to support the USACE and the U.S. Fish and Wildlife Service's field operations for monitoring sea lamprey abundance in Ohio's Lake Erie tributaries. We have also provided information and technical assistance to these agencies in the Integrated Management of Sea Lamprey program of the Great Lakes Fishery Commission. Division of Wildlife personnel assisted the Sea Lamprey Control Program staff in fall 2009 in the lampricide TFM treatment of Grand River and Conneaut Creek. Division biologists sampled river stretches, during and after treatment, to collect larval sea lamprey and other non-target species affected by the TFM. USFWS personnel will continue to monitor the success of these lampricide treatments in order to maintain adult sea lamprey abundance levels below targets for several years into the future.

The loss of the Daniels Park dam on the Chagrin River removed a barrier to upstream sea lamprey migration. The concomitant effects of this opening of a pathway to sea lamprey habitat, and the potential for sea lamprey to expand their spawning range and multiply their predatory effects in Lake Erie's central basin, will require continued sampling and monitoring of the Chagrin River and its tributaries above Daniels Park. Survey work, performed during the spring of 2009 in the East Branch of the Chagrin River and the mainstem of the Chagrin River above Daniels Park, sampled only one adult spawning phase sea lamprey. Division of Wildlife personnel have participated in planning discussions with the USFWS, USACE, local governments, and environmental organizations to assess the feasibility of placing a barrier in the location of the former Daniels Park Dam.

7.6 Spawning Behavior of Lake Erie Walleye Tagged in Sandusky Bay (*FSDR21*)

Evaluation of the Sandusky stock of Lake Erie walleye continued in 2009. Since the fall of 2005, radio telemetry has been used to track spawning walleye movement within the Sandusky River and Bay. This data provides managers with an increased understanding of walleye spawning behavior in the Sandusky system, identifies areas used for spawning within the system, and addresses barriers to successful spawning and potential direction for future spawning habitat improvement projects. In total, 61 walleye have been implanted and tracked since the project began.

In 2009, effort focused on walleye spawning in the Sandusky River. Fixed receivers and mobile tracking were used to examine movement patterns and identify spawning locations and habitat of walleyes surgically implanted with transmitters. Fixed station radio receivers were placed at five locations: Ballville Dam, Fremont Spawning Grounds, Ottawa Shooting Club, Bay View Bridge North, and Bay View Bridge South. Fixed station receivers were operational from March through May by collaborative researchers at Ohio State University's Aquatic Ecology Laboratory as a part of a Masters of Science thesis (Thompson 2009). Mobile tracking within the Sandusky River was conducted by boat and by foot several times per week from March-May to identify specific locations of individual fish.

Twelve tagged walleye (65 total locations) were relocated in Sandusky Bay or the Sandusky River between 11 March and 20 May (Figure 7.6.1). This is fewer fish but more locations than in 2008 (25 walleye, 48 total locations), due in large part to focusing on the smaller, river-spawning component of the Sandusky stock. None of these river fish were located further upstream than the historic spawning grounds in downtown Fremont, indicating that these fish are not impeded by the Ballville Dam and that they stop at the first available spawning habitat. This implies that fisheries managers may need to transport spawning walleye to areas above the dam after its removal to stimulate use of upstream spawning habitat.

As 2009 is the final year of this project, a project completion report was written and submitted to fulfill federal aid requirements. This report includes an in-depth analysis and synthesis of data collected, and is available on the walleye telemetry project page of the Division of Wildlife's website at: (http://www.dnr.state.oh.us/Home/FishingSubhomePage/fisheriesmanagementplaceholder/WalleyeTelemetryProject/tabid/19620/Default.aspx).

7.7 Conservation Tactics for Endangered Lake Sturgeon

In 2009, there were 15 Lake Erie sightings of lake sturgeon reported to the Ohio Department of Natural Resources, Division of Wildlife. Seven of the fifteen sightings were from commercial trap net fishermen, five were from recreational anglers, and three were reported by either landowners or public citizens. The three lake sturgeon reported by landowners or private citizens were found dead along the Lake Erie shoreline, two near the Consumers Power Plant, Monroe, Michigan, and one was reported near Allen Cove near Luna Pier, Michigan. Total lengths for those fish measured ranged from 559 to 1,981 mm. Similar to past sturgeon sightings, the majority of fish were observed around the Bass Islands in the western basin (i.e., District 1).

7.8 Assessment of the Nearshore Fish Community *(FSDR21)*

Little is known regarding the status of the nearshore fish community in Lake Erie. Historically, phytophylic fish species (e.g, centrarchids, esocids) were common in the western basin, and even provided a valuable component to the commercial fishery (Baldwin et al. 1995). From the early 1900's until the 1970's, these species have suffered the impacts of increased anthropogenic activity (shoreline development, wetland loss and reduced water quality and clarity) in the Lake Erie watershed (Casselman and Lewis 1996), leading to a severe community decline in the lake.

Following the 1972 signing of the Great Lakes Water Quality Agreement, water quality in Lake Erie has generally improved, especially clarity as influenced by reductions in phosphorus and, later, the introduction of exotic *Dreissenid* mussels (Charlton et al. 1999). This improved water clarity and recent low water levels have stimulated an increase in the production of aquatic macrophytes along the shoreline of the western basin. This has led to increases in the occurrence of phytophylic fish species in ODNR trawling catches at some standardized sites (Division of Wildlife, unpublished data). However, the design of the current trawling program is not extensive enough in nearshore habitat to properly assess this community.

In 2007, Division of Wildlife personnel from the Sandusky office began a trawling survey in the western basin to assess the composition and abundance of the fish community in the nearshore habitats of Lake Erie. Twelve trawling sites that represent a gradient of geomorphologic and anthropogenic influences to nearshore Lake Erie were sampled (Figure 7.8.1). Sites were selected using geomorphologic and shoreline protection variables from the Lake Erie GIS. In 2008, several additional sites in the Maumee Bay area were added to the nearshore bottom trawl survey in an attempt to incorporate habitat with aquatic vegetation. Unfortunately, the 2008 survey was cut short by damaged trawls after only 4 sites. The re-occurring issue of hung and torn trawls during this survey has forced us to evaluate a different survey gear.

In 2009, daytime electrofishing was used to sample nine sites in the nearshore along the Ohio mainland (Figure 7.8.1). Island sites, as well as sites that required extensive travel from access points, were not surveyed in 2009; however, additional sites that were previously unreachable with trawling gear were added. Sampling took place on 8 August, 2 September, and 9 September. A single, 5-minute electrofishing pass was made at each site in 1-2 meters of water. Low range (50-500 volts), DC settings were used on the Smith-Root control box, and every effort was made to maintain 6 amps of current. Two netters were placed on the front of the electrofishing boat, one using a fine mesh dip net to allow the collection of young-of-year (YOY) fish, particularly gizzard shad and various species of shiners. Netted fish were placed in an aerated holding tank until the run was completed, and fish were processed immediately following the electrofishing run. Fish were sorted and enumerated by species and age classification, and total lengths (mm) were recorded for up to 30 individuals.

When compared to 2007, more individuals (289 vs. 1531) and more species (10 vs. 21) were collected during the 2009 electrofishing survey. This is due as much to the efficiency of the electrofishing gear in accessing shallower, more productive coastal habitat as it is due to the gear's ability to sample more effectively. For 2009 data, an Index of Biotic Integrity (IBI) was calculated for each site. We adopted a modified version of the Great Lakes littoral zone IBI developed by Minns et al. (1994) because it uses electrofishing data to index fish assemblages. It was modified by removing the biomass components of their IBI, as that is data we don't currently collect. Overall, the nearshore fish community in western Lake Erie had an IBI score of 61.9 ± 12, which qualitatively represents fairly good integrity. Examining IBI scores by site geomorphology, we find that fish communities within beach and bluff-bank shoreline habitats have lower scores than those in bedrock and wetland habitats (Figure 7.8.2). However, bedrock and wetland shorelines were represented by only one site each in 2009, and additional sites in similar habitats will be added for 2010. IBI scores were significantly higher near unprotected shorelines than in protected ones (Figure 7.8.2), suggesting that human manipulation of shorelines (i.e., bank stabilization, construction of seawalls) have a direct impact on nearby fish communities.

In addition to adding sites in wetland and bedrock habitats, additional locations in Maumee Bay, Sandusky Bay, East Harbor, and around the Bass Islands will be evaluated for inclusion in the 2010 survey.

Table 7.1.1. Number of walleye tagged in Ohio and year recaptured from 1986-2009.

Tag Year	Number Tagged	Recaptures 1986-92	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
1986	2,678	183	6	2	3	0	3	0	2	1	0	1	0	0	0	0	0	0	201
1987	2,465	241	3	4	0	3	2	0	0	0	0	0	0	0	1	0	0	0	254
1988	2,959	246	9	2	2	4	1	2	0	0	0	0	0	0	0	0	0	0	266
1989	2,193	156	11	9	4	1	2	1	0	0	1	0	1	0	0	0	0	0	186
1990[a]	2,829	248	23	11	10	9	5	2	2	0	3	0	1	0	0	0	0	0	314
1991	4,346	160	34	23	23	5	6	2	1	2	0	0	1	0	0	0	0	0	257
1992	4,358	262	48	28	13	7	5	1	2	2	1	1	0	0	1	0	0	0	371
1993	4,150	226	79	43	33	12	8	5	2	2	2	2	0	0	0	0	1	0	415
1994	2,723		97	61	40	20	23	3	5	1	3	2	2	1	0	0	0	0	258
1995	4,021			158	79	40	18	3	5	4	3	4	0	1	0	0	0	0	315
1996	3,495				178	68	26	20	9	8	10	3	1	1	0	0	0	0	324
1997	1,736					55	23	17	7	2	9	2	2	1	1	0	1	0	120
2000[a]	1,643								39	17	6	8	6	1	1	2	1	0	81
2001	2,318									68	34	33	12	16	6	6	6	2	183
2002	2,402										74	67	31	24	6	5	6	2	215
2003	2,443											98	38	21	6	4	4	1	172
2004	1,000												32	13	10	0	1	0	56
2005	1,978													83	34	17	5	2	141
2006	2,020														94	34	16	2	146
2007	1,701															65	33	9	107
Totals	53,458	1,722	310	341	385	224	122	56	74	107	146	221	127	162	160	133	74	18	4,382

[a] Does not include fish tagged or subsequently recaptured as part of the reward tag projects initiated in 1990 and 2000.

Table 7.2.1. Number of smallmouth bass tagged and tag returns reported during calendar years 1998–2009.

Year	Number Tagged	Recaptures [a]												
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
1998	434	20	9	3	1	2	1	0	0	0	0	0	0	36
1999	2,439		123	44	14	13	7	1	3	2	1	1	0	209
2000	1,564			91	23	31	12	3	2	3	0	0	1	166
2001	1,330				28	49	21	5	9	1	2	0	0	115
2002	582					16	21	7	3	2	1	1	0	51
Total	6,349	20	132	138	66	111	62	16	17	8	4	2	1	577

[a] Does not include recaptures with unmatched tagging data.

Table 7.2.2. Mean catch-per-hour of smallmouth bass in September gill net surveys in the Ohio waters of Lake Erie.

			Age										*Continued*
District	Year	N nets	0	1	2	3	4	5	6	7	8	9	*below*
1	2006	4	0.02	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01	
	2007	8	0.03	0.11	0.33	0.01	0.12	0.04	0.04	0.01	0.01	0.02	
	2008	6	0.00	0.02	0.10	0.22	0.01	0.10	0.05	0.06	0.03	0.01	
	2009	8	0.01	0.03	0.16	0.13	0.13	0.00	0.05	0.04	0.03	0.04	
	Mean		0.02	0.06	0.15	0.09	0.06	0.04	0.03	0.03	0.02	0.02	
2	2006	4	0.00	0.04	0.00	0.03	0.03	0.04	0.07	0.12	0.23	0.05	
	2007	4	0.00	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	2008	4	0.00	0.02	0.03	0.05	0.00	0.00	0.00	0.00	0.00	0.00	
	2009	4	0.03	0.00	0.04	0.03	0.04	0.00	0.00	0.00	0.01	0.00	
	Mean		0.01	0.02	0.03	0.03	0.02	0.01	0.02	0.03	0.06	0.01	
3	2006	4	0.10	0.00	0.00	0.04	0.00	0.14	0.00	0.04	0.06	0.06	
	2007	4	0.00	0.28	0.18	0.00	0.03	0.02	0.05	0.00	0.05	0.03	
	2008	4	0.00	0.10	0.36	0.23	0.00	0.00	0.01	0.12	0.10	0.06	
	2009	4	0.00	0.04	0.05	0.07	0.12	0.00	0.04	0.00	0.00	0.01	
	Mean		0.02	0.11	0.15	0.08	0.04	0.04	0.03	0.04	0.05	0.04	

			Age								Sum	Mean	
District	Year	N nets	10	11	12	13	14	15	16	17	Age 2+	Depth (m)	Temp (°C)
1	2006	4	0.01	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.03	5.90	21.20
	2007	8	0.00	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.59	4.80	21.60
	2008	6	0.05	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.59	3.60	22.20
	2009	8	0.02	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.57	4.40	22.13
	Mean		0.02	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.40	4.68	21.78
2	2006	4	0.23	0.18	0.12	0.07	0.00	0.00	0.00	0.00	0.55	3.90	22.30
	2007	4	0.01	0.03	0.01	0.02	0.01	0.00	0.00	0.00	0.03	9.10	23.71
	2008	4	0.02	0.00	0.03	0.02	0.00	0.02	0.00	0.00	0.08	5.80	22.00
	2009	4	0.01	0.00	0.11	0.01	0.07	0.01	0.01	0.01	0.13	5.60	21.70
	Mean		0.07	0.05	0.07	0.03	0.02	0.01	0.00	0.00	0.22	6.10	22.43
3	2006	4	0.00	0.02	0.04	0.02	0.00	0.00	0.00	0.00	0.33	3.30	.
	2007	4	0.00	0.00	0.02	0.05	0.00	0.00	0.00	0.00	0.35	7.70	23.67
	2008	4	0.07	0.00	0.00	0.06	0.04	0.01	0.00	0.00	0.88	6.40	21.00
	2009	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	4.90	22.20
	Mean		0.02	0.00	0.01	0.03	0.01	0.00	0.00	0.00	0.52	5.58	22.29

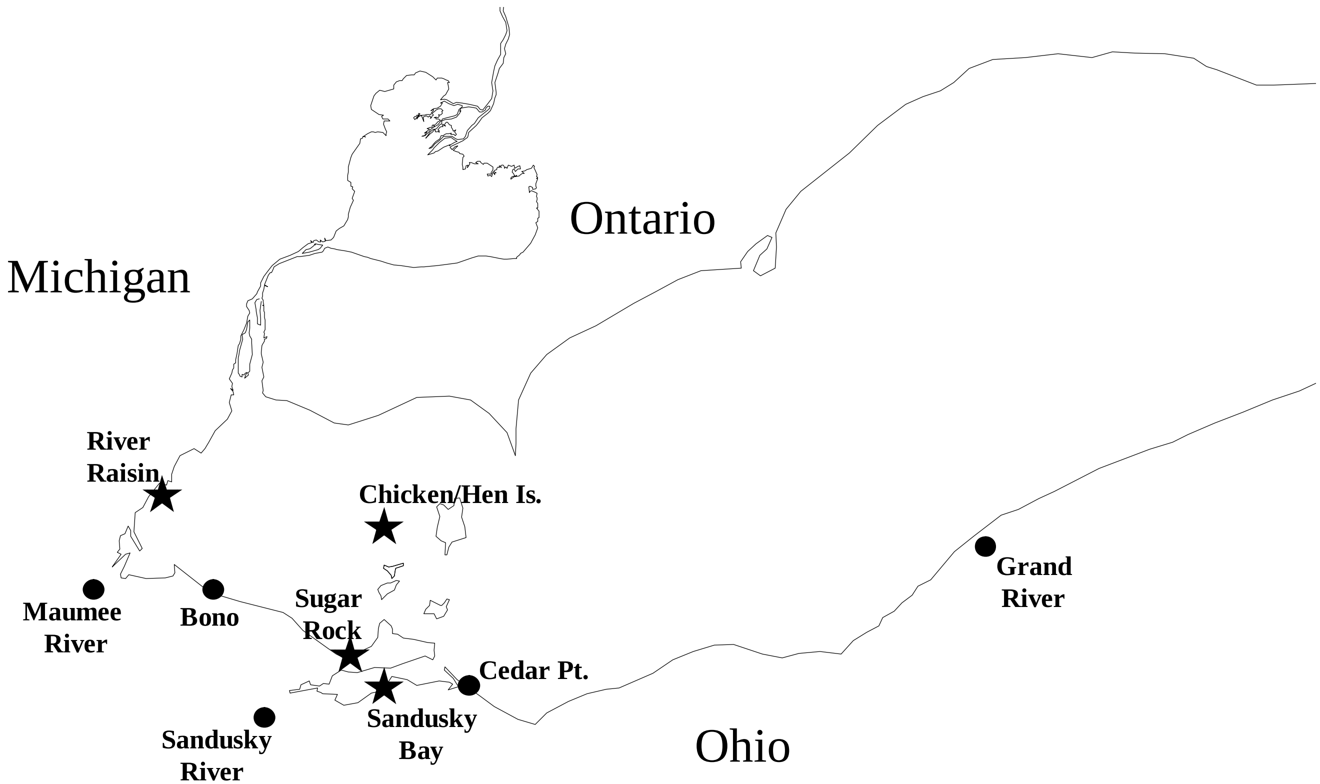


Figure 7.1.1. Walleye tagging locations in the Ohio waters of Lake Erie. Stars indicate sites used in the interagency reward tag project including River Raisin (Michigan Department of Natural Resources) and Chicken and Hen Islands (Ontario Ministry of Natural Resources).

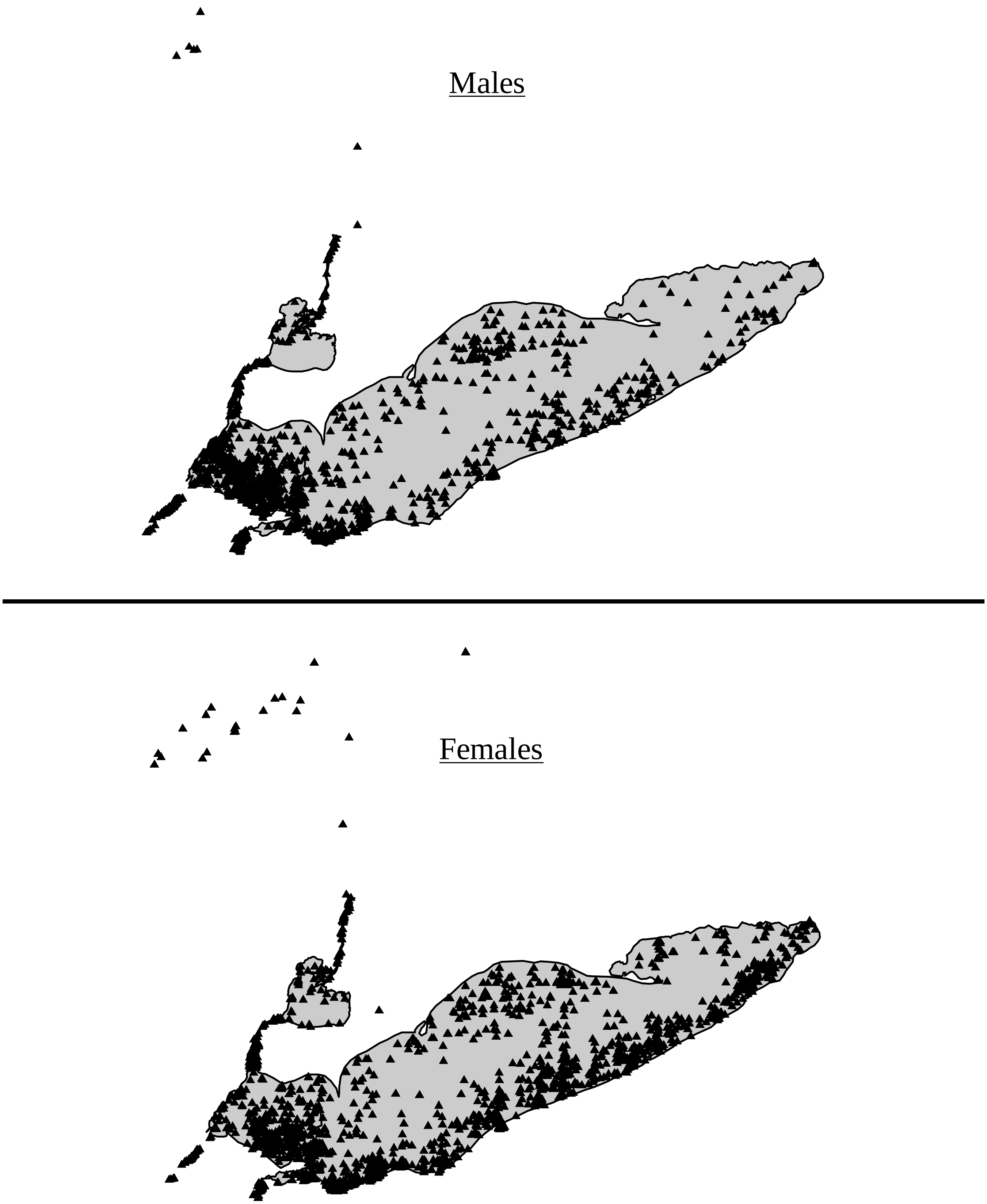


Figure 7.1.2. All-years recapture distributions for male (top) and female (bottom) walleye tagged in the Ohio waters of Lake Erie and its tributaries.

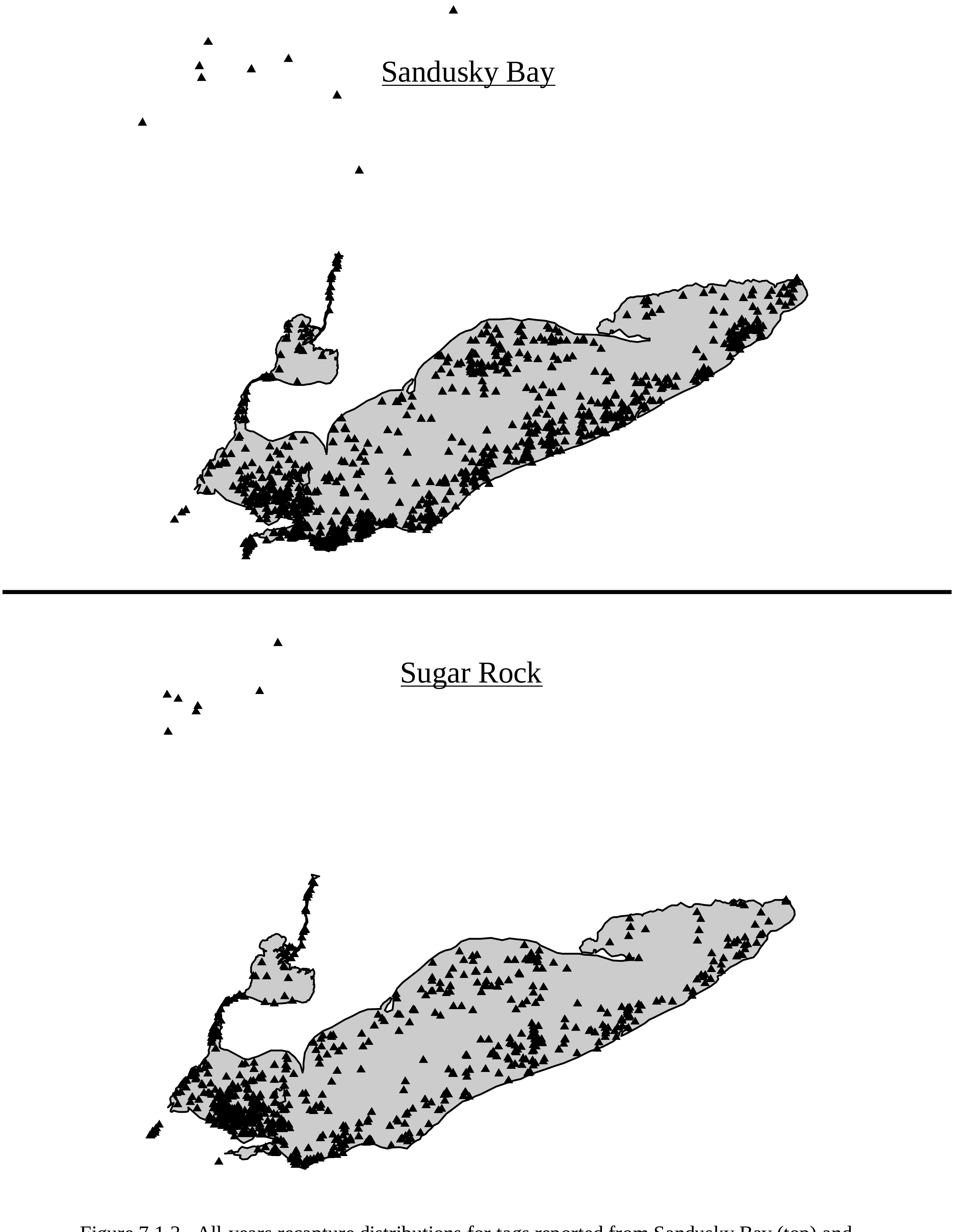
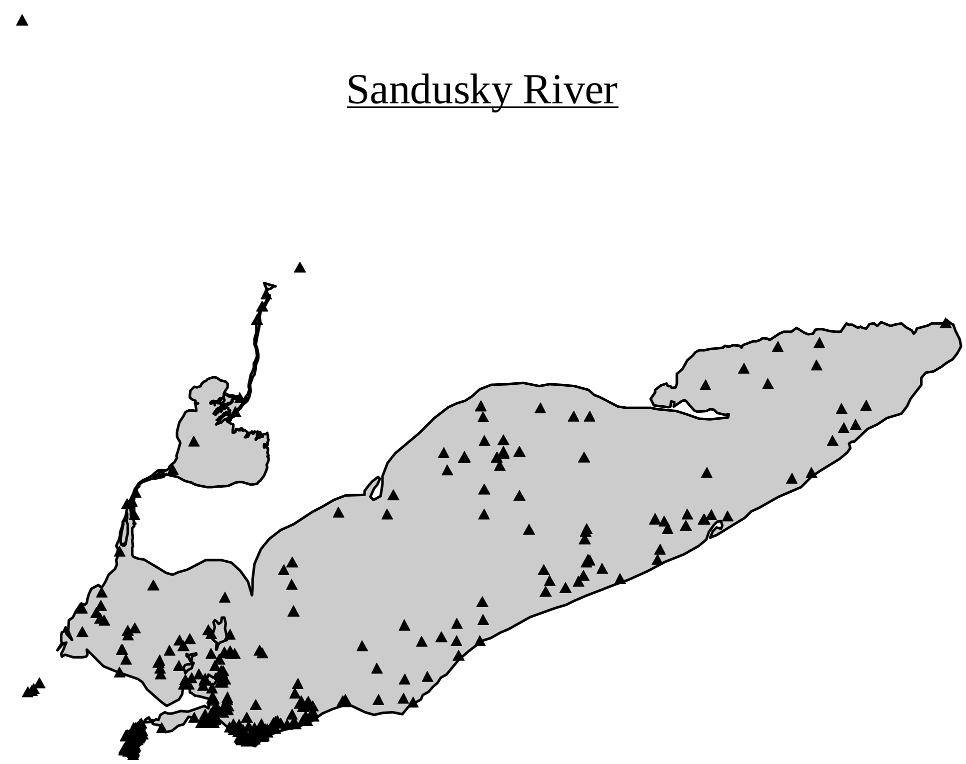


Figure 7.1.3. All-years recapture distributions for tags reported from Sandusky Bay (top) and Sugar Rock (bottom) tagging sites.

Sandusky River



Maumee River

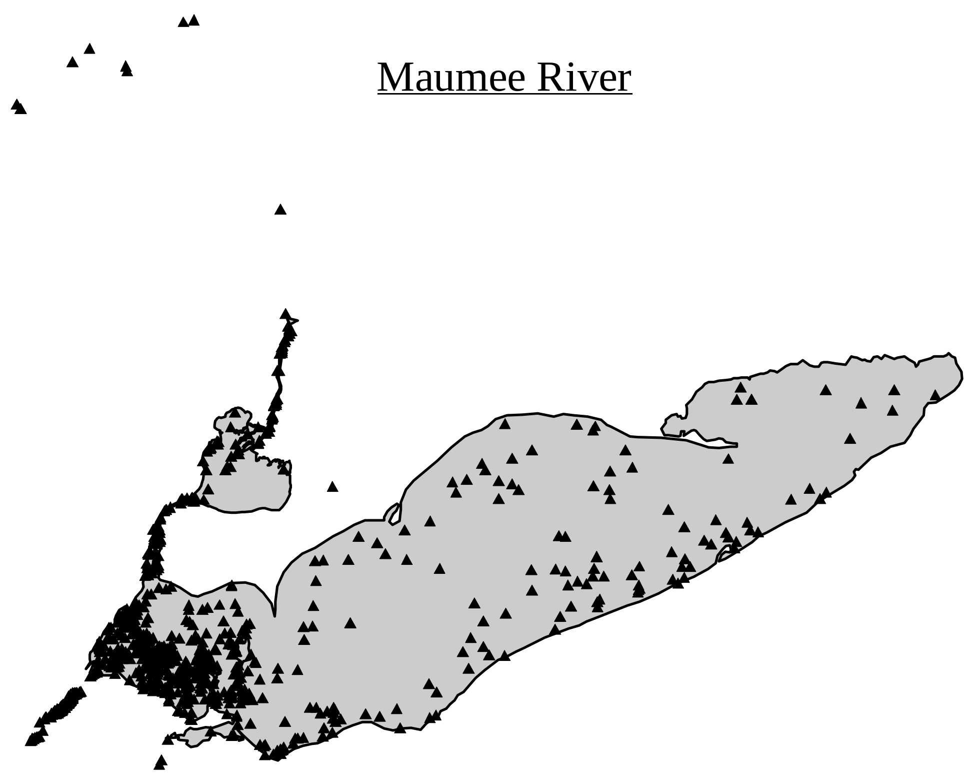


Figure 7.1.4. All-years recapture distributions for tags reported from Sandusky River (top) and Maumee River (bottom) tagging sites.

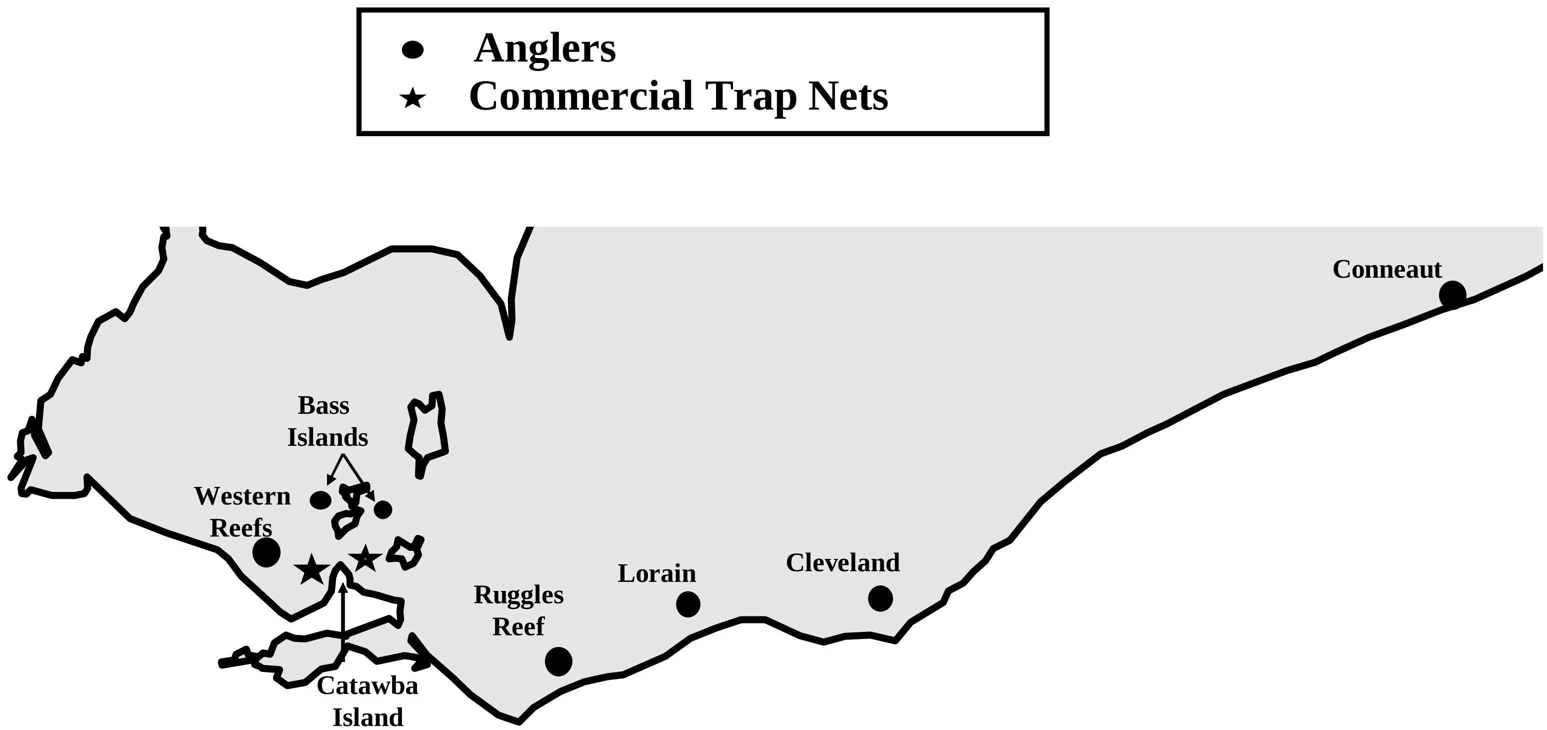


Figure 7.2.1. Primary smallmouth bass tagging locations and capture gear type.

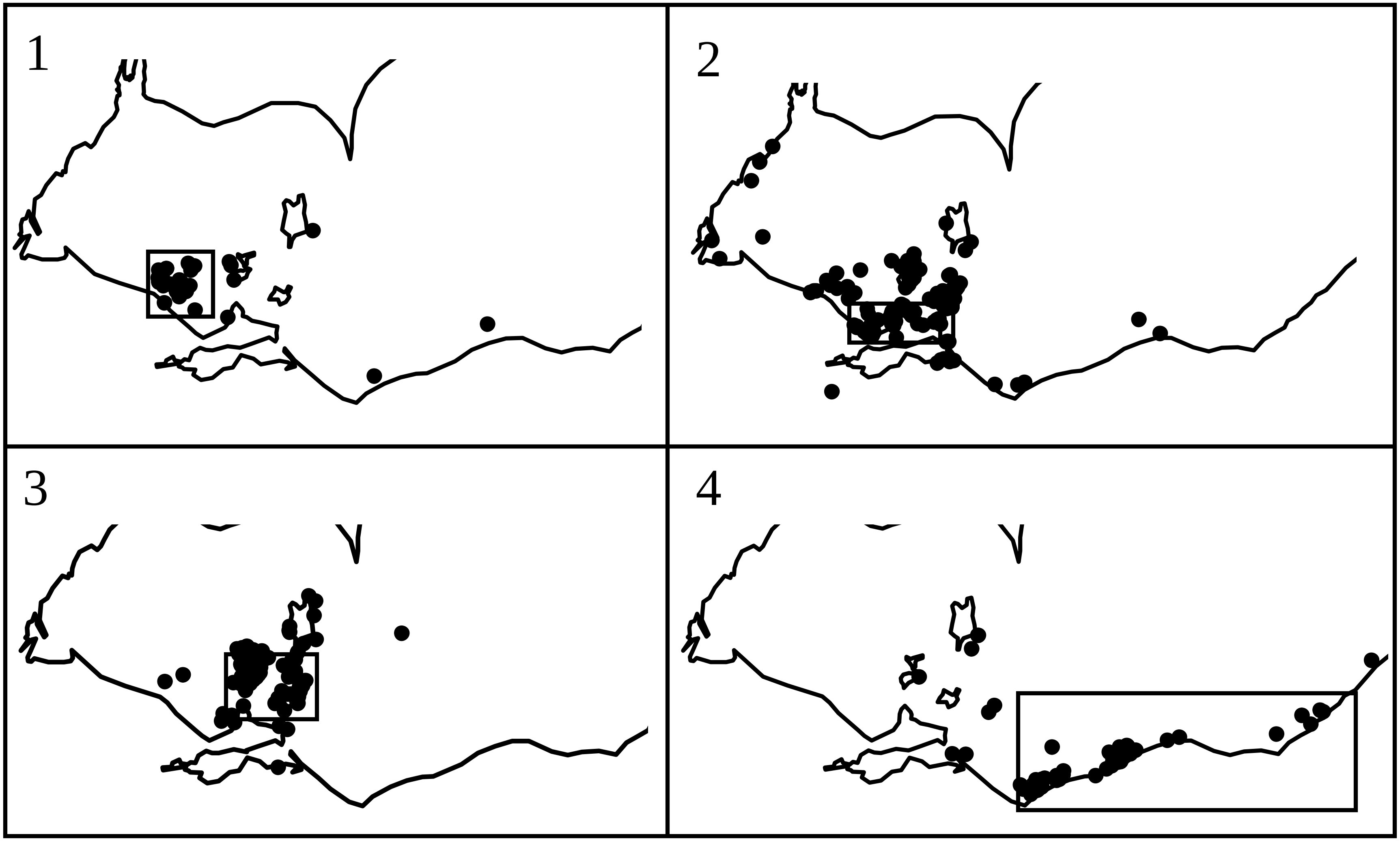


Figure 7.2.2. Smallmouth bass tagging and recapture locations, all years combined, by general tagging area. Tagging areas are boxed and include the western basin reef complex (1), the nearshore area from Port Clinton to Lakeside (2), the Bass Islands & Kelley's Island (3), and the central basin from Huron to Cleveland (4).

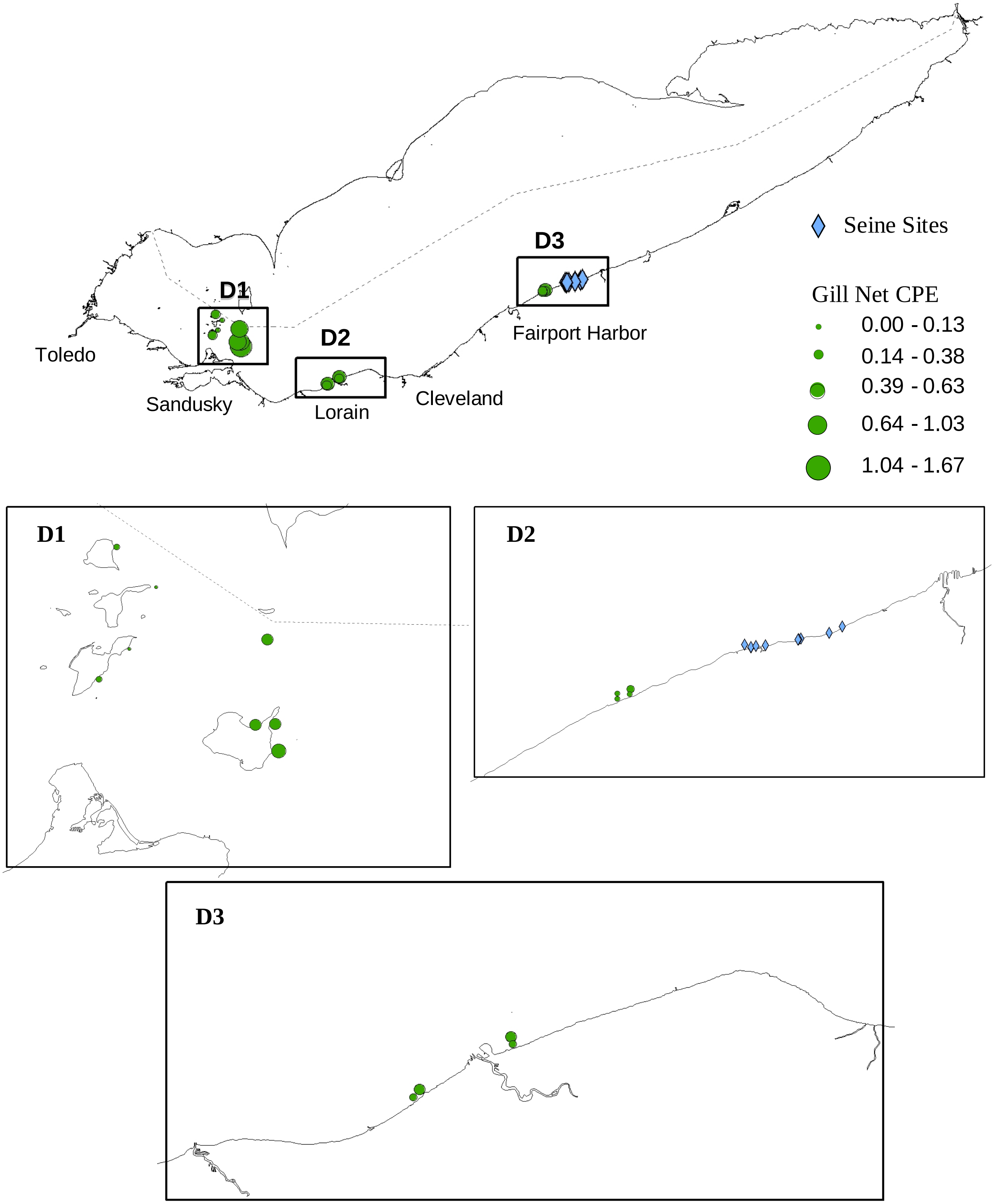


Figure 7.2.3. Locations of September smallmouth bass gill net catch per effort (CPE) and August seine surveys in 2009 (top). Insets show detail by District (D1-D3). No smallmouth bass were captured with seines in 2009.

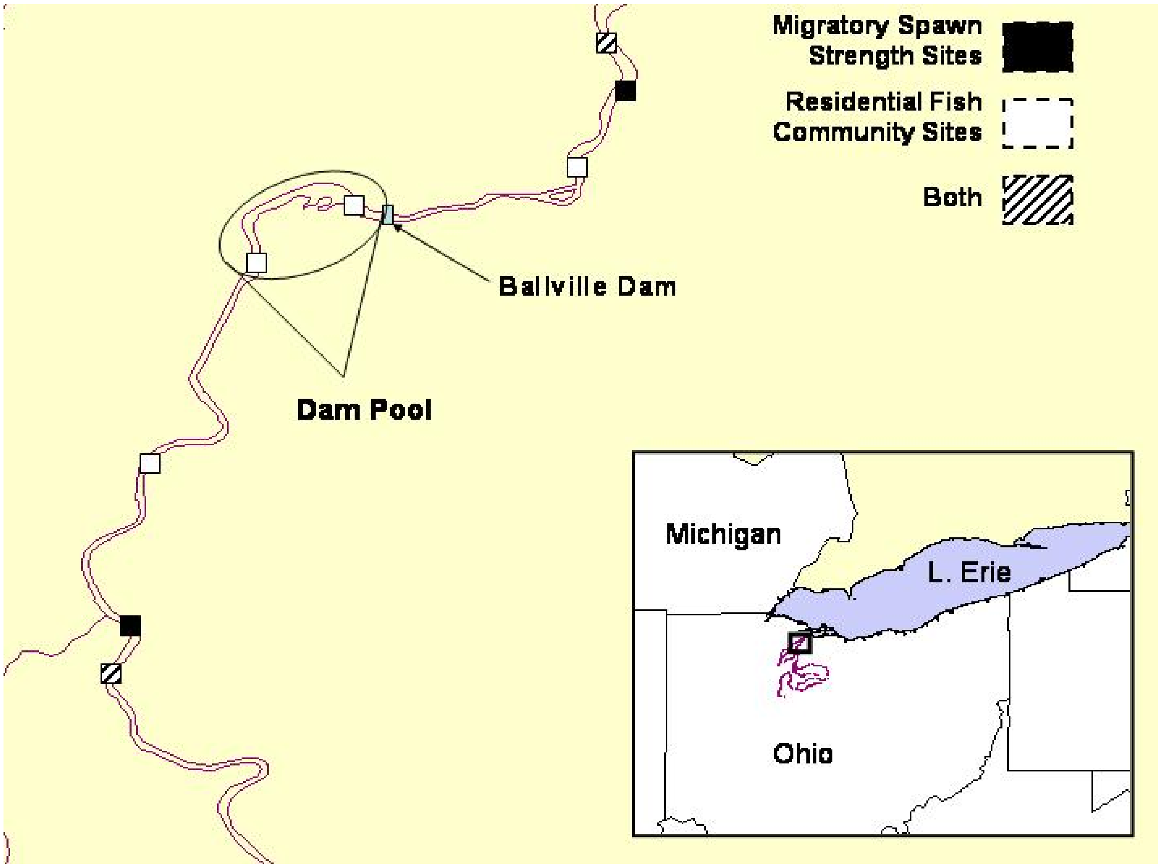


Figure 7.3.1. Migratory and residential fish community sampling locations on the Sandusky River, Ohio.

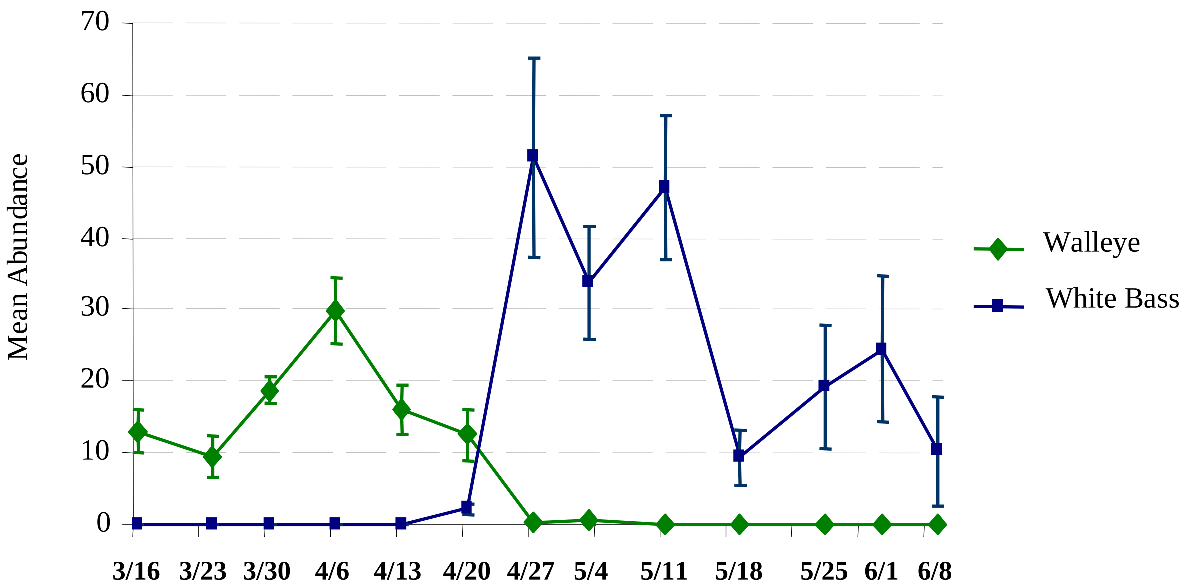


Figure 7.3.2. Mean weekly catch-per-transect of walleye and white bass from the Sandusky River, downstream of the Ballville Dam, 16 March-9 June 2009.

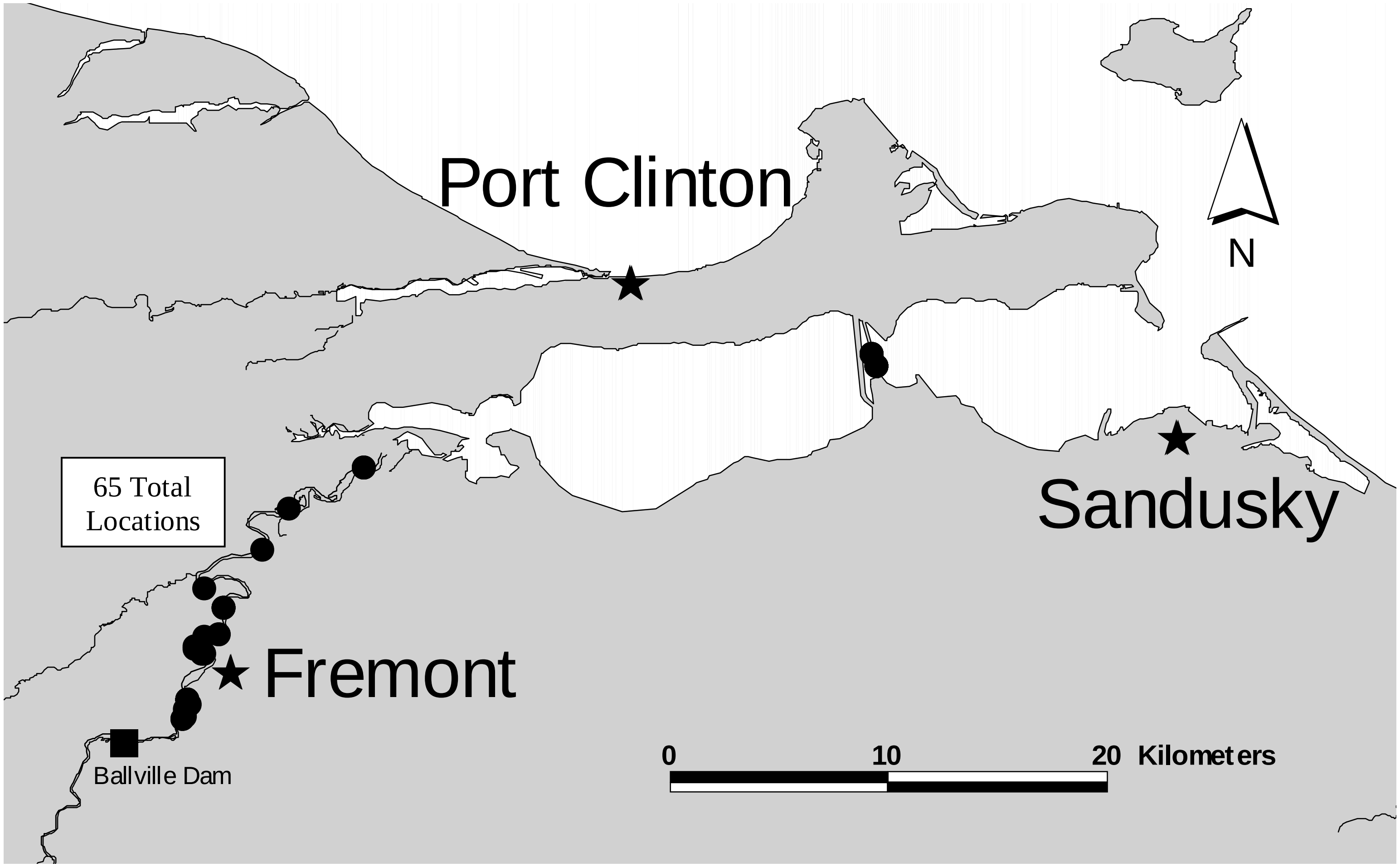


Figure 7.6.1. Walleye locations recorded in Sandusky Bay and the Sandusky River during 2009. Location points were collected using mobile tracking by boat and plane.

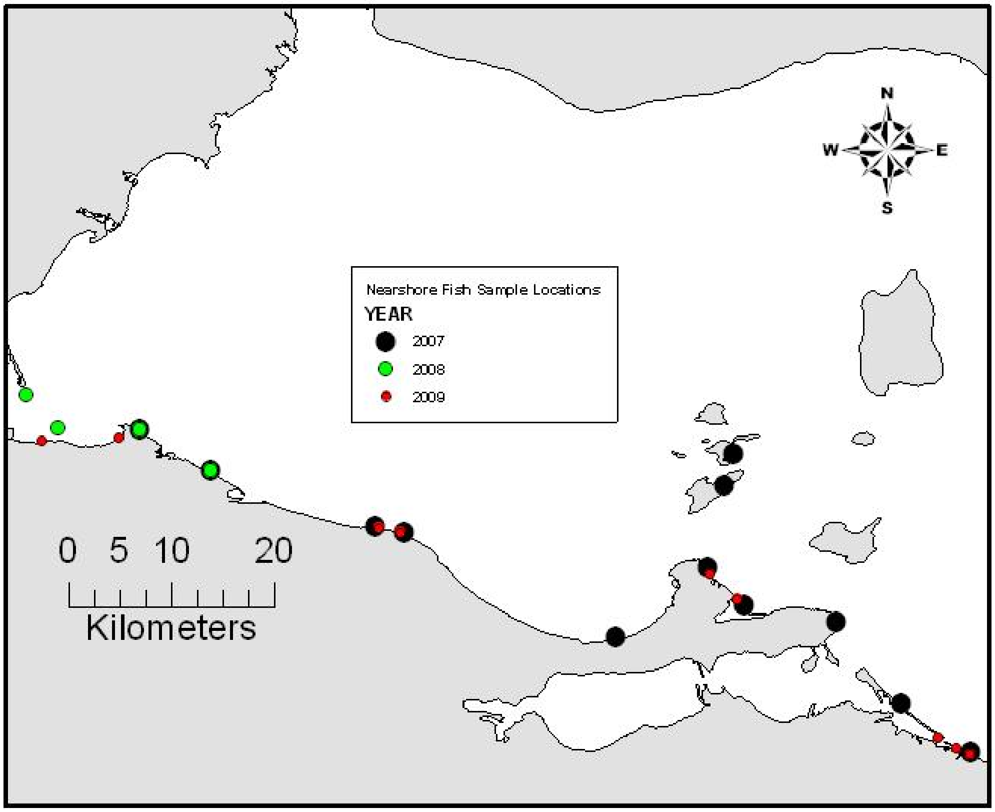


Figure 7.8.1. Nearshore fish community assessment survey sites, 2007-2009. Fish were collected using bottom trawling in 2007 and 2008; fish were collected using daytime electrofishing in 2009.

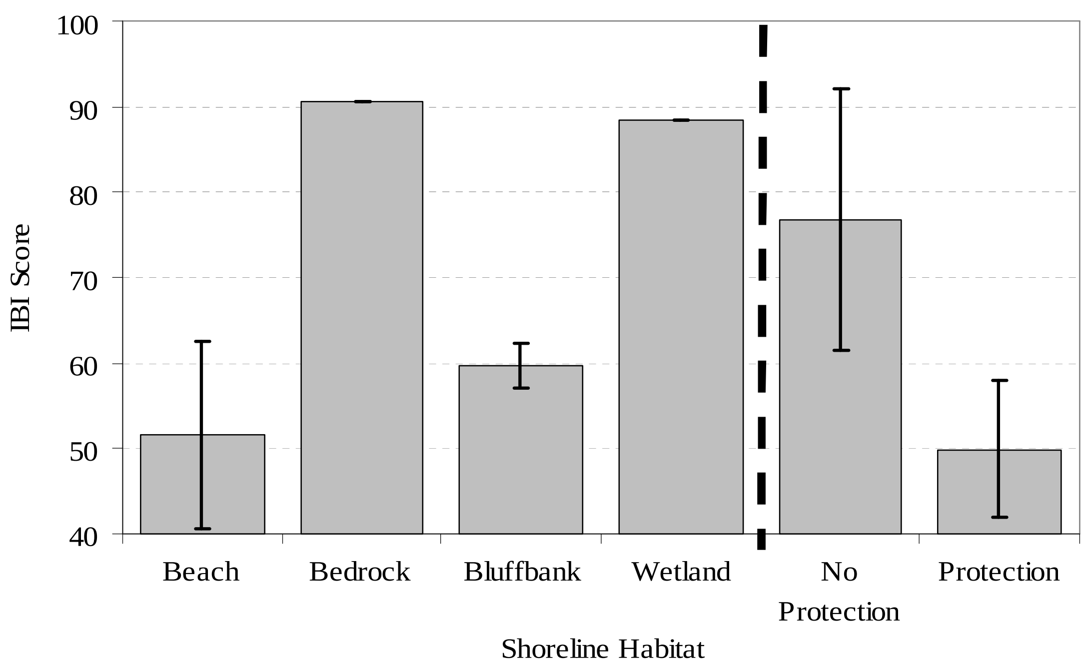


Figure 7.8.2. Comparison of Index of Biotic Integrity (IBI) scores for nearshore fish communities in different shoreline habitats and levels of shoreline protection. Scale bars are 95% confidence intervals; bedrock and wetland habitats had only one representative sample.

8.0 Future Plans

The Division of Wildlife Lake Erie staff will continue to assess Lake Erie fish stocks with standard programs, as in previous years, as well as continue to improve these assessment efforts through new gear development and evaluation, and the ongoing steelhead tributary creel survey project. These data are essential to fisheries management, both within Ohio waters, and across, Lake Erie jurisdictions. We will continue to seek opportunities to restore and enhance fish habitat in the Lake Erie basin through Lake Management Plan initiatives, partnerships with other Department of Natural Resources Divisions, and targeted research to understand where fish species and specific spawning populations occur in the lake and how their populations can be enhanced. We will also assist in the implementation of strategic, tactical, and operational plans on specific topics. We will address the following emerging issues in 2010:

1. Research individual walleye and perch stocks to discern biological differences among stocks for each species, and to evaluate stock contributions to percid populations.

2. Monitor changes in lake productivity and abiotic factors and relate these changes to Lake Erie fish recruitment patterns and its effects on sustainability of fisheries and the forage base.

3. Identify opportunities to protect and restore functional integrity of fish habitat in the coastal areas, including dredge spoil management and remedial activities.

4. Assist in the implementation of integrated management plans for double-crested cormorant and sea lamprey control.

5. Participate in interagency research to develop physical lake models and simulate effects of environmental change (including global climate change) on Lake Erie fisheries and habitat.

6. Continue a project to assess the walleye and white bass run strength and the mid-summer fish community in the Sandusky River above and below the Ballville Dam prior to dam removal. Complete the project assessing fine-scale movement patterns of the Sandusky River walleye population during the spawning season.

7. Continue to provide fish collection assistance for tracking the impacts of Viral Hemorrhagic Septicemia virus on fish populations.

8. Continue to refine the project to assess community composition of the nearshore fish community in the western and central basins of Lake Erie.

9. Implement an assessment project for critical fish habitat and spawning locations in the central basin of Lake Erie.

9.0 References

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Appendix A. Ohio's 2009 sport and commercial harvest (in pounds) of major species. District 1 commercial harvest includes Sandusky Bay and the inland district.

		Sport Harvest			Commercial Harvest			
Species	District	Private Boat	Charter Boat	Sport Total	Trap Net	Seine & Trotline	Commercial Total	Grand Total
Walleye	1	1,353,334	274,580	1,627,914	0	0	0	1,627,914
	2	1,140,331	35,385	1,175,716	0	0	0	1,175,716
	3	366,474	206,035	572,509	0	0	0	572,509
	Total	2,860,139	516,000	3,376,139	0	0	0	3,376,139
Yellow Perch	1	457,655	5,909	463,564	0	0	0	463,564
	2	457,569	5,792	463,361	1,338,616	0	1,338,616	1,801,977
	3	434,887	50,297	485,184	112,030	0	112,030	597,214
	Total	1,350,111	61,998	1,412,109	1,450,646	0	1,450,646	2,862,755
White Bass	1	111,138	1,277	112,415	586,801	79,973	666,774	779,189
	2	24,803	475	25,278	4,307	0	4,307	29,585
	3	3,255	659	3,914	0	0	0	3,914
	Total	139,196	2,411	141,607	591,108	79,973	671,081	812,688
Smallmouth Bass	1	4,798	986	5,784	0	0	0	5,784
	2	4,473	0	4,473	0	0	0	4,473
	3	0	0	0	0	0	0	0
	Total	9,271	986	10,257	0	0	0	10,257
Freshwater Drum	1	1,418	131	1,549	282,167	233,677	515,844	517,393
	2	3,986	84	4,070	27,565	0	27,565	31,635
	3	2,948	72	3,020	0	0	0	3,020
	Total	8,352	287	8,639	309,732	233,677	543,409	552,048
Channel Catfish	1	4,582	1,038	5,620	183,494	162,381	345,875	351,495
	2	9,719	189	9,908	61,511	0	61,511	71,419
	3	244	0	244	0	0	0	244
	Total	14,545	1,227	15,772	245,005	162,381	407,386	423,158
White Perch	1	12,539	1,210	13,749	535,102	9,452	544,554	558,303
	2	25,411	56	25,467	135,528	0	135,528	160,995
	3	3,276	338	3,614	0	0	0	3,614
	Total	41,226	1,604	42,830	670,630	9,452	680,082	722,912
Steelhead Trout	1	0	0	0	0	0	0	0
	2	10,600	8,763	19,363	0	0	0	19,363
	3	13,275	13,412	26,687	0	0	0	26,687
	Total	23,875	22,175	46,050	0	0	0	46,050
Other Species[a]	1	--	--	--	582,446	673,241	1,255,687	1,255,687
	2	--	--	--	6,031	0	6,031	6,031
	3	--	--	--	37	0	37	37
	Total	--	--	--	588,514	673,241	1,261,755	1,261,755
All Species	Total	4,446,715	606,688	5,053,403	3,855,635	1,158,724	5,014,359	10,067,762

[a] Commercial harvest of "Other Species" includes buffalo, bullhead, burbot, carp, gizzard shad, goldfish, quillback, suckers, and whitefish.