Ohio Lake Erie Fisheries Report For 2002

Summary and Excerpts from the March 2003 report by the Lake Erie Fisheries Units of the Ohio Department of Natural Resources, Division of Wildlife

Note: Tables and figures quoted in this summary can be found in the full report. The full report is available as a PDF document on the ODNR web site at: http://www.dnr.state.oh.us/wildlife/PDF/estatus2002.pdf

Overview

The Ohio Department of Natural Resources' Division of Wildlife manages sport and commercial fisheries within the 2.24 million acres of Lake Erie under Ohio jurisdiction. In this report, we summarize research, assessment, and other projects conducted by our fisheries research stations at Fairport Harbor and Sandusky through calendar year 2002. These projects provide fishery harvest and effort information, baseline stock assessment data for important sport and commercial fish species, and information on howvarious parts of the food web are responding to changes in the Lake Erie ecosystem. This report is intended to accomplish several objectives: 1) provide timely fisheries information to user groups, resource managers, and the general public, 2) serve as a repository for fisheries and stock assessment data, and 3) fulfill reporting requirements for our Federal Aid projects on Lake Erie. Below is an overview of thecurrent status of five key fish species, followed by a summary of projects conducted on Lake Erie in 2002.

Walleye

Adult abundance continues below the annual average for the 1990s. The 2002 Ohio sport harvest of just over 702 thousand walleye was lower than expected, due to lower than long-term average angler effort throughout Ohio waters and poor spring weather. Only the western basin anglers had lower catch rates than the previous year. The good 2001 year class will enter the fishery this year, offering hope for improved harvest and catch rates; however, the very poor 2002 year class will not help in the future rehabilitation efforts. As active participants of The Great Lakes Fishery Commission's Lake Erie Committee, we have participated in the Coordinated Percid Management Strategy to reduce walleye exploitation and rebuild walleye stocks. We have implemented research to examine the performance of individual walleye stocks. The daily bag limit for walleye remains at four during March and April and six for May through the following February.

Yellow Perch

Yellow perch fisheries improved again in 2002 relative to previous low years of the 1990s, owing to successful reproduction in four of the last six years and reduced fishing mortality. The strong 1996 and 1998 year classes and the moderate 1999 year class were responsible for this continued increase. With poor reproduction in 2000 and good reproduction in 2001, the numbers of adult fish will be about the same in 2003 compared to a year ago. Ohio's sport and commercial fishermen met their allotted quotas in 2002. The 30-fish daily bag limit for anglers and individual trap net quotas are still in effect for 2003.

Smallmouth Bass

Smallmouth bass populations, and associated sport fisheries, appear to have declined slightly after the increase observed in the late 1990's throughout Lake Erie. Fishing effort for smallmouth bass decreased in Ohio waters to the lowest seen since 1996. Catch rates declined slightly for the second consecutive year. Poor spring fishing conditions may have helped in both of those declines. A 5-fish daily bag limit and a 14-inch minimum length limit were implemented in 2000. They are having the desired effect at reducing exploitation of smaller fish. Research continues to examine factors affecting reproduction and movements of smallmouth bass in

Ohio waters of Lake Erie.

White Bass

Sport fisheries for white bass have improved compared to lows seen in the mid 1990s. Seasonal effort and catch was affected by poor weather. The successful 1996 hatch and moderate hatches in 1998 and 1999 have contributed to the sport and commercial fisheries. The very good 2001 hatch will continue this moderating trend. Older adults (ages 3+) have begun to contribute well to fisheries in recent years.

Steelhead Trout

Steelhead angling has improved dramatically in the open lake during the summer, as more anglers target steelhead while trolling. Lake catches, at 41,347, were the highest recorded and exceptional catch rates for those seeking steelhead were observed. Tributary and lake fisheries will remain very good with continued stockings of yearling Little Manistee River (Michigan) strain steelhead.

Sport Fishery Summary

Boat Fisheries (FFDR01)

Ohio's private and charter boat fisheries were assessed by a direct contact creel survey during 2002. The creel survey was conducted from Toledo to Conneaut at 39 major boat departure sites along Ohio's portion of the Lake Erie shoreline. These sites were grouped into six areas (Figure 1). Areas 1-3 were surveyed from April 2 to October 27, area 4 from May 16 to October 26 and areas 5 and 6 from May 6 to October 29. 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 35 access points. Boat counts were scheduled to include coverage of the busiest hours of the day: 1100-2000 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 to be not 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 boats 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 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 districts (Figure 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.

The angler catch was sampled weekly to obtain fish lengths and scale samples. Mean weights in grams were obtained by using the length-weight regressions presented in Table 2. 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. Private and charter boat estimates of harvest and effort were based on 7,911 interval boat counts and 5,358 boat interviews.

The 2002 total sport harvest, for the private (Table 3) and charter boat (Table 4) fisheries, was 7.6

million fish and 4.7 million pounds (Appendix A). Yellow perch (87%) and walleye (9%) represented the majority of the total harvest in numbers. Total angler effort (4.6 million angler hours) for the two fisheries (Tables 5 and 6) decreased 11% from 2001. The private boat fishery accounted for 92% of the harvest and 89% of the angler effort. The primary target species were yellow perch (47%) and walleye (41%) for the private boat fishery, and walleye (78%) for the charter boat fishery. Characteristics of private boat and charter boat angler trips, by target species, are presented in Tables 7 and 8, respectively. A total of 861 charter guides were licensed in Ohio for 2002. This was a two percent drop from 2001and well below the ten year mean of 998 (Figure 3).

Walleye

The private boat harvest of 0.51 million fish was a 43% decrease from last year's harvest of 0.90 million fish (Table 9). Walleye harvest was the lowest recorded since the first year of the survey in 1975. Targeted walleye effort of 1.7 million angler hours was 33% lower than in 2001 and the third lowest since 1975. The primary fishing method used on walleye trips differed among districts (Table 10). Casting represented 63% of the fishing effort in District 1, but only 32% in District 2, and 0% in District 3. In Districts 2 and 3, the percentage of fishing effort by anglers using depth-control trolling was higher than flat-line trolling. In Districts 1 and 2, harvest rates were higher for the two trolling methods than casting.

The lakewide targeted harvest rate for anglers seeking walleye was 0.29 fish per angler hour, a decrease of 15% from 2001. Boat limit trips decreased from 13% in 2001 to 9% in 2002 (Table 7). The 2002 charter boat fishery harvest of 0.19 million fish was a 26% decrease from 2001. The targeted harvest rate of 0.47 fish per angler hour was lower than last year (0.63) and lower than the tenyear ean of 0.56. Boat limit trips ranged from 4% in District 2 to 16% in District 1 (Table 8). The majority of the walleye sport harvest was from the 1999 (57%) and 1998 (14%) year classes (Table 11).

Age-5 and older walleye constituted 20% of the lakewide catch. Walleye mean size increased across Districts 1 to 3 and averaged 483 mm and 1,080 g.

Yellow Perch

Private boat anglers harvested 6.3 million yellow perch and expended 1.9 million targeted angler hours during 2002 (Table 12). Harvest and targeted effort were the highest since the mid 1980's. Harvest rate remained unchanged at 3.2 fish per angler hour from 2001. Private boat limit trips ranged from 18% in District 2 to 23% in Districts 1 and 3 (Table 7).

The charter boat harvest and target angler hours increased 6% and 27%, respectively, from 2001. Harvest was the highest since 1989 and target effort since 1991. Harvest rates decreased 21% from 4.83 fish per angler hour in 2001 to 3.81 fish per angler hour in 2002. Percent of limit trips by charter anglers remained high at 42% (Table 8).

The 1999 year class comprised 42% of the sport yellow perch harvest followed by the 1998 (38%) and 1996 (9%). Yellow perch mean size increased across Districts 1 to 3 and averaged 236 mm and 172 g (Table 13).

Smallmouth Bass

The private boat effort of 311,553 angler hours was a 25% decrease from 2001. (Table 14). The harvest of 31,458 was a 26% decrease from 2001 and the lowest since 1992. As in previous years, the release rate (0.39 fish per angler hour) was considerably higher than the targeted harvest rate (0.07 fish per angler hour). The Charter boat fishery showed the opposite trend with harvest (49%), targeted effort (38%) and targeted harvest rate (41%) all increasing compared to 2001. The 1996 and 1998 year classes combined constituted 43% of the smallmouth bass harvest in Ohio's waters (Table 15). Fish of age-6 and older comprised 58% of the harvest. Smallmouth bass mean size averaged 414 mm and 1,187 g lakewide.

White Bass

The private boat harvest (-50%) and the targeted effort (-70%) both decreased compared to 2001 (Table 16). As in past years, very few angler trips were targeted for this species; therefore the majority of the white bass were harvested as incidental catch from anglers targeting other species. There were a small number of targeted charter boat trips for white bass during 2002. The majority of the harvest was from the 1999 year class (52%) followed by the 2001 year class (24%).

White Perch

The 2002 estimated sport harvest of 46,623 white perch (Tables 3 and 4) was over a 200% increase compared to 2001. Angler hours targeting white perch totaled 1,638 in 2002 compared to 0 from 2001. The 1999 (42%) and 1998 (40%) year classes comprised the majority of the harvest (Table 18).

Steelhead Trout

The combined private and charter boat harvest of 41,357 for 2002 was a 41% increase compared to 2001, and the highest since the stocking program began. Steelhead trout are harvested primarily from the central basin, with 46% of the catch from District 2 and 52% from District 3. Combined (private and charter) targeted angler hours decreased 35% from 2001. The harvest rate for both the private and charter boat anglers targeting steelhead trout was 0.22 fish per angler hour. During 2000, an additional category was added to the target species list (walleye/steelhead) in order to measure the number of angler trips targeting both walleye and steelhead. Total walleye/steelhead target angler hours for both fisheries increased 41% from 36,631 angler hours in 2001 to 51,474 angler hours in 2002. The targeted harvest rate for the combination trips was 0.28 fish per angler hour for the private boat fishery and 0.15 fish per angler hour for the charter boat fishery. Lakewide, steelhead trout averaged 573 mm and 2,464 g.

Other Species

Private and charter boat anglers harvested 27,252 freshwater drum, channel catfish, and other species in 2002 (Tables 3 and 4). These fish were harvested by anglers as incidental catch while targeting other major species.

Sandusky and Maumee Rivers Tributary Fisheries

A direct contact creel survey was conducted on the Sandusky and Maumee Rivers from March 14 to April 30, 2002. Surveys were conducted from Ewing Island to Waterville on the Maumee River and from Brady's Island to Roger Young Park on the Sandusky River (Figure 4). Three weekdays and both weekend days were surveyed each week. Each survey day included instantaneous counts. Completed and inprogress interviews were made on a roving schedule among survey locations. Survey dates, times of counts, and interviews were randomly selected within strata for month, survey location, weekdayweekend, and shore-boat anglers. Angler interviews were conducted to determine hours fished, target species sought, and the number of each species harvested.

Angler effort was estimated from instantaneous counts during daylight hours, which included 0700-1900 in March, 0730-2030 in April. One count and interview route was employed throughout the survey. Mean counts were expanded to angler hours by constants for daylight hours per day, days per month, and the number of count locations in each river.

On both the Maumee and Sandusky rivers, walleye harvest increased slightly compared to 2001 (Table 19). An estimated 32,889 walleye were harvested from the Maumee River, and 4,620 walleye from the Sandusky River (Table 20). The harvest rate for anglers seeking walleye averaged 0.25 fish per hour on the Maumee River and 0.18 fish per hour on the Sandusky River. Release rates for anglers seeking walleye were 0.70 fish per hour on the Maumee River and 0.46 fish per hour on the Sandusky River.

Estimated white bass harvests (Tables 19 and 20) are just for the survey period and should not be compared to previous surveys which included the traditional white bass run during May. Walleye angler hours observed from angler interviews totaled 3,187 and 2,108 for the Maumee River and Sandusky River, 12 respectively (Table 21). The 1998 year class comprised the largest percentage of all the ages in the harvest in both the Maumee (26%) and Sandusky Rivers (32%) (Table 22). Walleye in the harvest averaged 509 mm and 5.0 yr. in the Maumee River and 553 mm and 5.6 yr. in the Sandusky River. White bass in the harvest averaged 322 mm (N=30) on the Maumee River and 302 mm (N=34) on the Sandusky River.

Commercial Fishery Summary (FSDR06)

Monthly catch reports submitted by licensed commercial operators were summarized to determine harvest (in pounds) and fishing

effort for all species by month, statistical grid, and district (Figure 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.

Major species landings were sampled every two weeks, in spring and fall, from peak harvest areas to determine mean length, weight, and age composition of the commercial harvest. Scale samples, length data, and updated length-weight regression equations (Table 2) were used to estimate harvested age groups in pounds and numbers.

The 2002 commercial harvest from Ohio waters of Lake Erie totaled 4.02 million pounds (Appendix A), up 16% from 3.48 million pounds reported in 2001 (Table 23). Trap nets accounted for 58% of the harvest (Table 24). District 1 (32%) led all statistical areas in total landings (Table 24). Peak harvest occurred in April-May (55%) and total dockside value was estimated at 2.5 million dollars (Tables 25 and 26). Trap net effort of 11,881 lifts peaked in May and September with no lifts reported in District 3 (Tables 27 and 28). Seine effort was highest in April-May in District 1, in April and September in District 4 (Sandusky Bay) and in March and August in District 5 (inland fishing district). Total seine effort has fallen steadily since 1998 and was the lowest on record in 2002.

Yellow Perch

Ohio's yellow perch harvest quota allocations to sport and commercial fisheries, first implemented in 1996, are based on a rolling 5-year sport:commercial harvest ratio (Table 29). The total allocation to Ohio's licensed commercial trap net fishery in 2002 was 1,438,074 pounds, with both the western basin (District 1) quota of 338,427 pounds (337,829 lbs. landed) and the central basin (Districts 2 & 3) quota of 1,099,647 pounds (1,099,971 lbs. landed including 668 lbs. of last lift allowance) the highest under quota management. With quotas filled in both districts, total harvest ranked highest since 1990. Lakewide trap net catch rates were 138.4 lbs./lift, down from 2001 levels (highest on record at 172.9 lbs./lift) (Table 30).

The number of yellow perch harvested from District 2 accounted for 75% of the total, with the 1998 cohort the most abundant of eight year classes in the fishery (Table 31).

White Bass

White bass landings totaled 161,664 pounds in 2002, down from 226,664 pounds landed in 2001
(Table 23). District 1 trap nets annually account for the bulk (77% in 2002) of this primarily spring harvest (Tables 24-25). Lower lakewide unit pricing, heavily influenced by the Canadian market, contributed to a dockside value of $81,242 ranked lowest over the last ten years. Catch rates in trap nets (38.5 lb./lift) were lower while seines catch rates (65.6 lb./1000 ft.) climbed slightly and exceeded the tenyear mean (Table 30). The 1999 year class comprised 73% of numbers harvested (Table 32).

White Perch

White perch landings totaled 269,512 pounds, up from 155,555 pounds in 2001 (Table 23). Catch rates were higher at 38 lbs./lift, up for the third consecutive year and highest since 1992 (Table 30). Most white perch were harvested in District 1 trap nets (Table 24) during April-May (Table 25). The 1999 and 1998 cohorts led six year classes represented in the harvest (Table 33).

Lake Whitefish

Whitefish landings fell to 6,539 pounds (Table 23) with a catch rate of 6.5 lbs./lift, lowest since 1993 (Table 30). Inclement fall weather conditions coupled with more effort diverted toward yellow perch quotas led to the lowest effort expended toward whitefish since the harvest was re-instated in 1987. Historically a late-fall western basin trap net fishery, 72% of 2002 whitefish landings occurred during November (Tables 24-25). The 1996 and 1995 cohorts led eleven year classes in the harvest of whitefish (Table 34).

Other Species

A total of 2.1 million pounds of "other species" were landed, accounting for 53% of the total commercial harvest from Ohio waters of Lake Erie. Carp led all other species with 523,539 pounds (Table 23). Seines accounted for 74% of other species harvested (Table 24). The estimated value was $429,478, or 14% of the total dockside value (Table 26).

Population Assessments

Experimental trawl and gill net surveys were conducted in the Ohio waters of Lake Erie to ascertain relative abundance, growth, and maturity rates of the major predator and forage fish species. Total counts by species and age group, were obtained from both trawl and gill net catches. Relative abundance indices from bottom trawls for all age-0 and age-1+ fishes were computed as the geometric mean catch-per-hour-trawling (CPHT). Western basin relative abundance indices of age-1+ and older walleyes and white bass were calculated from fall gill net catches as the geometric mean of the catch per gill net set. In the central basin, relative abundance of age-1+ and older walleyes, yellow perch, and white bass were calculated from trawl catches as geometric mean CPHT.

Western Basin (FSDR13)

Due to research vessel repairs, trawling surveys were limited to August and September/October. Sampling was conducted on the new R.V. Explorer, therefore, trawl relative abundance data may not be comparable to other data in the series. Comparative trawling exercises are scheduled for late-August 2003 to address potential differences in catchability between vessels. Due to time constraints in August, the number of stations sampled was reduced from the normal 41 stations to 38, however, in the fall survey 40 stations were sampled (Figure 5). 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 otter trawl with a 10.7-m headrope and 13-mm bar mesh in the cod end.

Fall gill net sampling occurred in October/November at two historic and five randomly selected stations in the western basin (Figure 6). One western basin random station was omitted from the original design due to weather/time constraints. Sample stations were stratified by depth with two strata (4–10 m 14 and >10 m) in the western basin. Effort was allocated based on the number of possible sampling units per strata, as for trawls. Overnight sets of standard interagency nylon multifilament gill nets, consisting of a gang of 13 randomly-ordered sections, each 30.5 m (length) by 1.8 m (height) ranging from 51-127 mm stretched mesh in 6 mm increments, were fished two meters below the surface at each station. In addition, canned and bottom sets were fished all seven of the historic sites using modified interagency community monofilament gill nets. 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.

Central Basin (FFDR04)

Bottom trawling was conducted monthly, May through August and October, at 16 randomly selected stations within four depth strata (5-10 m, 10-15 m, 15-20 m, and >20 m) at established transects in each district. Additional transects were established every 20 km from Berlin Heights to the Pennsylvania state line (District 2: Berlin Heights, Vermilion, Lorain, Avon, Cleveland, Chagrin; District 3: Perry, Ashtabula, and Conneaut; Figure 4). Trawling is conducted before, during, and after lake stratification at two stations per depth strata per transect. Bottom trawling included six fixed index stations in District 2 and three fixed stations in District 3 that have been sampled in October since 1969. A 10-minute tow was conducted at each site 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. Fixed station trawl indices prior to 1995 were adjusted with correction factors to account for catchability differences between Biloxi trawls (previously used at fixed stations) and Yankee trawls.

Fall gill net sampling occurred in October/November at five historic and one randomly-selected stations in the west-central basin (Figure 6). Six west-central basin random stations were omitted from the original design due to weather/time constraints. Sample stations were stratified by depth with three strata in the west-central basin (10–15, 15–20 m, and >20 m). Other procedures for central basin gill netting were exactly the same as those for the western basin described above.

Walleye

Relative Abundance

Western basin indices for age-0 walleyes were the lowest on

record during both summer and fall trawl surveys. Age-0 walleye abundance was similar to the extremely poor 1995 year class (Table 35). However, age-1+ abundance was relatively high, similar to the 1997 and 1999 year classes and slightly below the 1996 year class.

Central basin indices for age-0 walleye in 2002 were lowest in the fall in District 2 and District 3 (Table 36 and 37). Age-1 fall indices increased from 2001 values in both districts. District 2 age-1 indices were below the historic mean in both summer and fall while District 3 indices were above the historic mean in both months (Tables 38 and 39). In general, summer and fall trawl indices are higher in District 2 than District 3 during the time series. Historically, District 2 age-0 fall indices have proven the most reliable estimator of cohort strength. Catch rates (Table 40) have typically decline from west to east among transects during the time series.

District 1 fall gill net catches were higher than those in 2001 owing to good catches of age-1 and age-3 walleye. Total catches in District 1 gill nets were similar to those seen in 2000 and 1993 and similar to long-term average catches (Table 41). Catches of age-1 walleye were the fifth highest in the series and similar to those seen in 2000. Catches of age-3 walleye were the third highest in series, but significantly lower than age-3 catches in 1989 or 1985 (the strong 1986 and 1982 year classes, respectively). The results were similar in District 2 where indices for age-1 and age-3 walleye were some of the highest on 15 record and total walleye abundance indices were higher than in 2001, but similar to the long–term average (Table 41).

Growth

Mean length-at-age of walleyes collected during fall surveys declined from 1972 to the early 1980s, and generally leveled off through the 1990s (Figure 7). However, there is indication of an increasing trend in mean length-at-age since the 1997 survey. Inter-basin length and weight differences continue to be evident, with age-1 and age-2 female walleyes from the central basin being larger than those in the western basin (Figures 7 and 8). Mean length and weight of age-1 female walleyes in the western and central basins were lower in 2002 relative to 2001; however, mean lengths of age-1 females were near the highest on record in the past 20 years in both basins. Mean length and weight of age-2 female walleyes in the western basin were similar to those seen in 2001 and near historic highs. For the second consecutive year age-2 walleye mean length and weight-at-age in the central basin was at a historic high. Mean lengths of age-0 walleyes in the western and central basins were slightly lower than those observed in 2001; however it should be noted that only 1 age-0 walleye was collected during the fall trawl survey in 2002.

Maturity

Walleye length-at-maturity was similar to that of recent years and did not differ between basins (Figure 9). The majority of male walleyes were sexually mature at 400 mm (age-2), although significant numbers of age-1 male walleyes were mature in 2002. The majority of female walleyes were sexually mature at 475 mm (age-3). In 2002, 15 and 0% of age-2 female walleye were mature in the western and central basins, respectively, similar to past years (Table 42). The vast majority (>94%) of age-3 and older female walleyes were sexually mature in both basins. There was no spatial trend in sexual maturity of female walleyes collected from the western or central basins.

Diet

Diet information was collected from age-1 and older walleyes caught in both fall trawls and gill nets in the western, west-central, and central basins of Lake Erie in 2002. Consistent with previous years, there is an apparent shift in walleye diets from clupeids in the western basin to clupeids/shiners in the west-central basin to smelt/shiners/goby in the central basin. In 2002 (Figure 10), clupeids again dominated the diets of western and west-central basin walleye (96% and 67%, respectively), with gizzard shad dominating the clupeid component in both the west (68%) and west-central (90%) basins, similar to 1999. Emerald shiners comprised only 4% of the diet in the western basin. In the west-central basin, there were significant contributions to walleye diets from emerald shiners (23%) and alewife (7%). Frequency of occurrence of round goby in walleye diets initialized in 1996 (1%) and increased to 11% by 1998 and has ranged from 7% to 12% since with a 9% value in 2002 (Figure 17).

Yellow Perch

Relative Abundance

Summer and fall western basin age-0 indices were down significantly in 2002, with abundance indices being similar to the poor 1997 and 1987 year classes (Table 35). Summer age-1 indices in both surveys were the highest on record due to the good 2001 year class. Both summer and fall catches of age- 2 and older yellow perch were down relative to 2001, but near their long-term average.

The overall index from fall District 1 sites selected for age composition was slightly higher than that in 2001 due to relatively high catches of age-1 yellow perch (Table 43). As expected the 2001 and 1999 year classes comprised the majority of the catch. Surprisingly, the 2000 and 1998 contributed 16 significantly to the catches as well, with a few of the 1996 year class fish still in the population. While the contribution of older age classes to the population is increasing in the west, the contribution is still well below index values seen in the early-1980s. This information still indicates a need for conservative management strategies.

The 2002 summer and fall age-0 indices were some of the lowest on record in the central basin for both districts (Tables 36 and 37). Fall central basin indices for age-0 yellow perch were higher in District 3 than District 2. Overall, the fall age-0 indices suggest a very weak year class, similar to the 1991 and 2000 year classes. The summer and fall age-1 indices increased from 2001 in both districts, reflecting the strong 2001 cohort. Overall, the yellow perch fishery in the central basin should continue to be good due to strong year classes in 1998, 1999, and 2001. Catches of age-0 and age-1 were higher from Cleveland west than east of Cleveland (Table 40). The age composition of the fall trawl indices were primarily from the 1998, 1999, and 2001 cohorts in both District 2 and District 3 (Table 43). The overall index shows a lower number of older fish (age>4) yet a substantial number of age-5 and age-6 yellow perch.

Growth

Fall mean size-at-age declined from 1970 to the early 1980s in both basins, but increased thereafter for most age groups through 1994 and has remained relatively stable since (Figure 11). Mean lengths of age-0 and age-1 yellow perch were slightly lower in the western basin but higher in the central basin than in 2001. Since 1998, mean lengths of yellow perch have been higher in the central basin than the west basin, a reversal of what was seen from 1991 to 1997. Since 1990, the age-1 central basin yellow perch mean lengths have been higher than the west basin except on 3 occasions (1992, 1995, and 1996).

Mean lengths of age-2 yellow perch decreased slightly in 2002, relative to 2001 in both basins (Figure 12). Since 1990, age-2 yellow perch mean lengths have been higher in the central basin than the west basin except for 1991, 1992, and 1993. This follows a scenario that has been depicted historically since the 1960's. In 2002, annual growth increments (mm/year) of age-2 yellow perch were similar to those in 2001 (Figure 13) and higher growth rates have been exhibited in the central basin since 1996.

Maturity

Yellow perch length-at-maturity in 2002 (Figure 9), was similar to that of recent years. The majority of males were sexually mature at 150 mm (age-2), females at 190 mm (ages 2 and 3). In 2002, the sexual maturity rates of age-2 yellow perch were lower than those seen in 2001 in the west basin (30%) but similar in the central basin (75%; Table 44). Across the series, sexual maturation rates in the western basin tend to be higher in the 1990s than in the 1980s, while sexual maturation rates in the central basin were similar between periods.

Diet

Yearling and older yellow perch diets in the central basin during 2002 varied seasonally (Figure 14). Benthic invertebrates (60%) were the primary diet item in the spring. The majority of the benthic items consumed were chironomids (68%). As the summer progressed, yellow perch additionally consumed Bythotrephes (36%) along with chironomids (27%). In the fall, fish (49%) were consumed along with, chironomids (26%), and Bythotrephes (17%). Round goby were the primary component of the fish consumed (80%). The frequency of occurrence of round goby in yellow perch diets was first noticed in 1996 (6%) and increased to 36% by 1998, and has remained constant over the last three years (14% to 16%).

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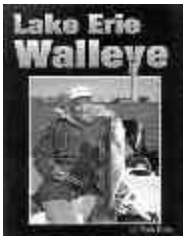

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