



Fisheries Division
Lake Erie Management Unit

Fisheries Survey
**Base Line Lake
Spring 2009**

Water: **Base Line Lake**
T/R/S: 01S 05E Sec 5
Primary County: Washtenaw
Watershed: Huron River
Status: Approved
Survey begin: 5/05/2009 End: 8/31/2009
Special Regs: None
Purpose: Status & Trends, General Survey

Gear Types

Gear type: Trap Net
Effort date range: 5/05/2009 – 5/08/2009
No. of gear used: 2
Effort quantity: 5 Net Nights
Depth range: 0-6 feet
Temperature range: 61-63 °F

Gear type: Minnow Seine
Effort date range: 5/06/2009-6/04/2009
No. of gear used: 1
Effort quantity: 4 hauls
Depth range: 0-3 feet
Temperature range: 61-71 °F

Gear type: Fyke Net (large mesh)
Effort date range: 5/05/2009 – 5/08/2009
No. of gear used: 3
Effort quantity: 8 Net Nights
Depth range: 0-7 feet
Temperature range: 61-63 °F

Gear type: Boomshocker
Effort date range: 6/04/2009
No. of gear used: 1
Effort quantity: 3, 10-minute transects
Depth range: 1-8 feet
Temperature range: 68-71 °F

Gear type: Inland Gill Net
Effort date range: 5/06/2009 – 5/08/2009
No. of gear used: 2
Effort quantity: 4 Net Nights
Depth range: 10-42 feet
Temperature range: 61-63 °F

Gear type: Limnology
Effort date range: 8/13/2007 & 8/31/2009
Depth range: 0-60 ft
Temperature range: 71 °F

Collection by: LEMU
Identification by: LEMU
Analysis by: Jeffrey Braunscheidel
Date approved: 3/05/2010



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Physical and Biological Lake Features:

Base Line Lake is 254 acres in size and straddles the boundary between Washtenaw and Livingston Counties. The Huron River flows through the lake. A county-operated dam located below the confluence of Honey Creek and the Huron River controls the water level. It is possible to travel by boat from Baseline Lake into the Huron River, downstream to Honey Creek then upstream into Big Portage Lake. It is also possible to travel upriver from Baseline Lake to access a chain of lakes (listed in order) consisting of Whiteford Lake, Gallagher Lake, and Strawberry Lake. The only public boat access on the chain is located on Big Portage Lake near where Honey Creek exits into the Huron River. There are a couple of private launches where the public can pay a fee to launch boats. One of these is on the Huron River between Baseline and Big Portage Lakes and the other is on Zukey Lake which is connected to Strawberry Lake.

The lake has a maximum depth of 64 feet with a mean depth of 30 feet. It is characterized as having a limited littoral zone and sharp drop-offs with only about 22% (just over 55 acres) of the lake 10 feet deep or less. Most of the lake shore is developed as residential housing with 157 dwellings counted along the 13,800 feet of shoreline (1 house for each 88 feet or about 60 dwellings per mile of shoreline) and 151 small and large docks. Approximately 62% of the lake shore is armored in some fashion with only 27 trees counted in the water (14 of which were along the undeveloped 1,800 feet of shoreline near where the Huron River exits the lake). Aquatic vegetation is generally sparse in the lake with filamentous algae observed in many areas and aquatic plants such as chara, coontail, curlyleaf pondweed and largeleaf pondweed also observed during the survey. Historical limnological sampling has found a thermocline sets up from about 18 to 25 feet with dissolved oxygen quickly dropping below the 4.0 ppm needed to support fish.

Water clarity is usually good in this lake as evidenced by Secchi readings of 17.1 ft in August 2007 and 16 ft in August 2009. Water samples collected on August 13, 2007, for chemical analysis found nutrient levels rather low with mid-depth samples showing total phosphorus at 15 ug/l, total kjeldahl nitrogen at 720 ug/l, ammonia nitrogen at 54 ug/l, nitrate+nitrite nitrogen at 46 ug/l and chlorophyll a at 1.9 ug/l. A thermocline was present in August 2007 from 15-20 ft where dissolved oxygen dropped sharply from around 8 mg/l to less than 1 mg/l within this narrow band. Water temperature started a steady decline at about 15 ft dropping from 80⁰F in surface waters down to 67⁰F at 20 ft and about 44⁰F beyond 40 ft.

History:

Previous fish community surveys of Base Line Lake were conducted in 1995 and 1985. Panfish and largemouth bass populations were considered to be in good condition with a better than average bluegill fishery. Walleyes were also present in the 1995 survey having been introduced into the chain of lakes in 1982 at Big Portage Lake. Stocking of walleye continued there regularly through 1987 then was halted until 1994. Regular stocking in the chain of lakes was then reinstated with the last stocking of walleye in the chain conducted at Big Portage Lake in 2006. Channel catfish were introduced to the chain of lakes in 2004 with stockings at Big Portage and Zukey Lakes. A fall survey to evaluate survival of the spring fingerling walleye stocked in the chain of lakes that spring was conducted in September of 1999. Enough young of the year walleye were captured to show adequate survival of the stocked fingerlings and support continuation of the stocking program.



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Survey Purpose and Methods:

This 2009 survey of Base Line Lake was conducted as part of the statewide, random lakes, Status & Trend Program. According to the protocols of this program, sampling gear used for this survey included 3 large-mesh fyke nets, 2 standard inland trap nets, 2 experimental gill nets, a boom shocker, and a 25-foot minnow seine. During May 5-8, 2009, the trap, fyke and gill nets were each set for up to three nights. One seine haul was conducted during the netting period and three more during the electroshocking period. Three electroshocking stations were sampled during the night of June 4, 2009.

The lake map (Figure 1) shows the locations of the sampling sites for each gear type. Shoreline habitat evaluations were conducted on August 31 of 2009 per sampling protocols for Status and Trend surveys (see Lake Limnology Sampling report for details). Water samples for chemical analyses and temperature and dissolved oxygen profiles were collected in August 2007 as part of the Department of Environmental Quality Lake Water Quality Monitoring Program. Ten carp and ten adult largemouth bass were sent to the DEQ lab for contaminant analysis while 60 each of bluegill, rock bass and brown bullhead were collected for VHS analysis at the MSU testing facilities.

Survey Results:

This survey collected a total of 1,168 fish weighing approximately 505 pounds and comprised of 28 different species. Panfish such as bluegill, rock bass and yellow perch made up almost 75% of the total catch by number and 37% by weight. Larger game fish such as largemouth bass, northern pike and walleye comprised almost 11% of the total catch by number and 32% by weight. Rough (non-game) fish species such as carp, suckers and longnose gar made up 3% of the total catch by number and 20% by weight. Bullhead species were 7% of the total catch by number and 10% by weight with various smaller fish species (forage fish such as minnows and darters) comprising about 5% of the total catch by number. Several native turtles were also captured including spiny softshell, map, painted and musk turtles.

Panfish

Bluegill were by far the most numerous panfish collected in this survey with the 648 caught in all gear combined making up 55% of the total catch by number and 27% by weight. The 516 fish from the combined trap and fyke net catch averaged 6.9 inches with 73% exceeding the minimum size acceptable to anglers of 6 inches. Growth rates were good with an overall mean growth index 0.2 inches above the state average. Trap net catch per effort (CPE) was about half that found in the 1995 survey (65 fish per net lift in 2009 vs. 135 per net lift in 1995), but almost double the 1985 CPE of 35. The two previous surveys also had slightly larger average sizes (7.0 inches in 1985 and 7.1 inches in 1995) and better mean growth indices (1.4 and 0.6 inches above state average, respectively).

The quality of the bluegill population in Baseline Lake was also evaluated using Schneider's Index (Schneider 1990). This index provides a ranking system that describes the quality of a bluegill population in a lake using a scale of 1 to 7 primarily based on the percent of bluegill in the trap net catch in the 6, 7, and 8-inch size ranges. The index calculated for Baseline Lake based on the combined fyke and trap net catch from this 2009 survey was 4.8 which corresponds to a "satisfactory-good" rating. This is lower than the index of 5.6 (good-excellent rating) calculated for the 1985 and 1995 surveys. The lower growth index found in 2009, and the slightly lower percentage of bluegill over 6 and 7 inches in this survey, were both factors in the lower Schneider Index calculated for 2009.



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Rock bass were the next most abundant panfish caught with the 140 fish comprising 12% of the total catch by number and 8% by weight with an average length of 7.5 inches in the combined trap and fyke net catch. **Yellow perch** were also found in significant numbers with the 66 fish caught ranging from 1 to 7 inches. Other panfish found in small numbers included 5 **redear sunfish** (5-9 inches), 4 **warmouth** (5-8 inches), 3 **pumpkinseed sunfish** (5-8 inches), 3 **longear sunfish** (4-5 inches) and 3 **black crappie** (6-11 inches). Both black crappie and pumpkinseed sunfish were caught in larger numbers during the 1985 survey (17 and 15 individuals, respectively), but neither have historically been present in large numbers.

Large Game Fish

Largemouth bass were by far the most abundant larger game fish species found during this 2009 survey. The 90 individuals caught made up almost 8% of the total catch by number and 14 % by weight with an average length in the combined trap and fyke net catch of just over 12 inches. Almost 17% (15 fish) were over the minimum legal size limit of 14 inches. Growth rates were poor with a mean growth index a full 2 inches below the state average. All age groups from age 1 through age 10 were present in the survey indicating consistent reproduction success despite the low numbers. Largemouth bass are usually difficult to catch and the rather low numbers of larger individuals caught in this survey are typical of most lakes with an adequate and fishable population.

Good numbers of **northern pike** spread over a wide size range were also caught in this survey. A typical survey usually catches around 10 pike when a good population is present. This survey caught 21 northern pike ranging from 13 to over 31 inches in length with an average length of over 21 inches. Only 5 of these exceeded the minimum legal size limit of 24 inches and growth was only fair with a mean growth index 0.6 inches below state average. There appears to be consistent reproductive success since all age groups from age 2 through age 6 were found in the survey, but the lack of older fish may indicate significant angler harvest.

The stocking program at other lakes in the chain seems to have established a walleye population in Baseline Lake as well. A total of 10 **walleye** were caught during this survey ranging in size from 17 to 27 inches with an average length of almost 22 inches. Although enough fish were not caught to determine actual growth rates, most of those aged were over the state average length for their age.

Miscellaneous Fish

The two most common rough fish species (larger, non-game fish) caught during this survey were **longnose gar** (18 fish, 21-35 inches) and **white sucker** (13 fish, 11-23 inches). Other rough fish species caught included 2 **bowfin** (18-24 inches), 1 **carp** (36 inches) and 1 **golden redhorse** (13 inches). Carp are known to be more abundant in this lake system than this survey indicates, but the relatively cool water temperatures (low 60's) during this survey likely reduced the movement of these fish.

A fair variety of small, minnow-like and darter species comprised the forage fish observed during this survey. The most abundant species was **logperch** (32 caught) with other species only captured in small numbers. These included 9 **mimic shiner**, 5 **sand shiner**, 4 **brook silverside**, 3 **blackstripe topminnow**, 1 **bluntnose minnow**, 3 **Johnny darter** and 1 **least darter**. One large **golden shiner** was observed gilled in one of the trap net leads.

All three species of bullheads were caught during the survey although **brown bullhead** was the most abundant with 72 individuals ranging from 6 to over 13 inches. Only 4 **black bullhead** (11-13 inches) and 3 **yellow bullhead** (8-11 inches) were collected.



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A variety of turtles were observed during this survey as well. They included 7 **map turtles** (shell lengths of 3-5 inches), 7 **musk turtles** (3-4 inches), 1 **painted turtle** (4 inches) and 1 **softshell turtle** (6 inches).

Discussion and Management Recommendations:

The lower trap net CPE of 65 bluegill per net lift in this survey seems to indicate a decline in numbers compared to the 1995 survey (CPE of 135), but it is almost double the catch from the 1985 survey (CPE of 35). This variability in trap net catch rates may be due to the different number of nets used between years (4 in 1985, 4 in 1995, and 2 in 2009) as well as the varying lengths of the surveys (2 nights in 1985, 1 night in 1995, and 3 nights in 2009). Whether there is really a drop in bluegill numbers or not, the catch rates from the 2009 survey are still at or above those found in surveys of other area lakes during the past 5 years (CPE range of 15-91 with an average of 40 for 12 area lakes surveyed from 2005-2009).

There also seems to be a trend towards decreasing bluegill growth rates over the past 3 surveys (20+ years) with mean growth indices dropping from +1.4 in 1985, to +0.6 in 1995, and down to +0.2 in this 2009 survey. Bluegills are heavily dependent on zooplankton for food during their early and middle years. Many invertebrates that are food to larger bluegills also utilize zooplankton and algae for their sustenance. Zebra mussels became established in this portion of the Huron River system in the mid 1990's and their filter feeding tends to reduce the density of small algae and zooplankton in systems where they are found. Further analysis of zooplankton samples may show there is a correlation between the zebra mussels and the reduced growth of bluegills in this system.

The relatively large average size of the bluegills (about 7 inches) found in all three surveys and the continuing good growth rates (still over the state average) indicate this fishery is still in good shape and better than many other area lakes. Continued monitoring of the bluegill population in this chain of lakes is needed to determine if the decline in numbers recently reported by area anglers is representative of the actual population or simply due to changing fish locations and angler susceptibility.

Larger game fish, including largemouth bass, northern pike and walleye, continue to be present in good numbers and size ranges through all surveys. The walleye fishery will begin to drop off soon unless the stocking program for this lake chain, which has been on hold since 2006 due to disease concerns, is reinstated as soon as possible. The channel catfish stocking has been dropped after the single stocking in 2004 to reduce any additional pressure on the bluegill population.

The results from the bluegill and rock bass samples taken for disease testing were negative for VHS, but the brown bullhead results were positive. **This is only the second inland lake in Michigan where fish have been found positive for this virus.** Additional testing will be necessary to verify this result and monitor if the VHS virus is spreading into other fish species or connected water bodies.

No additional management actions beyond continuing the walleye stocking program are recommended at this time. Fish surveys on other waters in this lake chain should also carefully evaluate the bluegill and panfish fishery to determine if significant changes may be occurring.

References:

Schneider, J. C. 1990. Classifying bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Division Technical Report 90-10, Ann Arbor.



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Figure 1. BASELINE LAKE 2009 SAMPLING LOCATIONS

