



Fisheries Division
Lake Erie Management Unit

Fisheries Survey
Big Portage Lake
Spring 2009

Water: **Big Portage Lake**
T/R/S: 01S 04E Sec 1
Primary County: Washtenaw
Watershed: Huron River
Status: Approved
Survey begin: 5/18/2009 End: 8/31/2009
Special Regs: None
Purpose: Status & Trends, General Survey

Gear Types

Gear type: Trap Net
Effort date range: 5/18/2009 – 5/21/2009
No. of gear used: 2
Effort quantity: 6 Net Nights
Depth range: 0-6 feet
Temperature range: 63-66 °F

Gear type: Minnow Seine
Effort date range: 5/18/2009-5/20/2009
No. of gear used: 1
Effort quantity: 5 hauls
Depth range: 0-2 feet
Temperature range: 63-66 °F

Gear type: Fyke Net (large mesh)
Effort date range: 5/18/2009 – 5/21/2009
No. of gear used: 3
Effort quantity: 8 Net Nights
Depth range: 0-4 feet
Temperature range: 63-66 °F

Gear type: Boomshocker
Effort date range: 6/02/2009
No. of gear used: 1
Effort quantity: 4, 10-minute transects
Depth range: 1-6 feet
Temperature range: 67-69 °F

Gear type: Inland Gill Net
Effort date range: 5/19/2009 – 5/21/2009
No. of gear used: 2
Effort quantity: 4 Net Nights
Depth range: 10-42 feet
Temperature range: 63-66 °F

Gear type: Limnology
Effort date range: 8/13/2007 & 8/31/2009
Depth range: 0-80 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 Features of Lake:

Big Portage Lake is a 644-acre lake located on the border of Livingston and Washtenaw Counties, approximately 2.5 miles southeast of the City of Pinckney. It is connected to the Huron River system. Six small inlets, including Pinckney Creek, Honey Creek, and the outlet from Little Portage Lake, supply water to the lake. The only outlet is on the south end of the lake and flows only a short distance to the Huron River. A low head dam exists on the Huron River approximately 150 feet downstream of the confluence with the lake outlet and maintains the lake level. This low head dam also prevents upstream fish migration. Big Portage Lake has a maximum depth of 84 feet although 44% of the lake is considered shoal area (5 feet deep or less). The majority of the lake has little cover in terms of vegetation or large woody material. A public access site is maintained by the state on the outlet. Shoreline development is extensive and recreational use by pleasure craft is heavy during peak summer months.

The level of shoreline development on Big Portage Lake is illustrated by several factors derived from the shoreline habitat survey conducted on August 31, 2009. This survey measured a variety of factors such as number of docks, dwellings, and submerged trees in each 1000 foot shoreline segment as well as estimating the percent of the shoreline in that segment that was armored in some fashion. A total of 477 small docks and 131 large docks were counted on the shore of the lake. This averages out to a dock (small or large) every 78 feet. All except three of the survey segments had a portion of the shoreline armored in some fashion and most had more than 80% armored. The estimates totaled up to approximately 80% of the lake shoreline being armored. A total of 63 submerged trees were counted in the near shore area. All of these trees were located in only 8 of the 1000-foot segments with 3 adjoining segments (an emergent wetland area located in the northwest corner of the lake) containing 56 of the downed trees (89%). These same three segments were the ones with no armoring of the shoreline.

Water clarity has generally been fair in the lake with Secchi readings of 7.5 ft in August of 2007 and 12 ft in late August of 2009. While ammonia nitrogen and phosphorus levels in 2007 were low (11 ug/l and 7 ug/l, respectively), nitrate+nitrite and total nitrogen were rather high (620 ug/l and 1200 ug/l). Chlorophyll a was also on the low side in August of 2007 at 3.1 ug/l. Temperature data from the 2007 sampling showed a sharp drop in water temperature beginning at about 15 ft with surface temperatures of 80°F quickly decreasing to 60°F at 24 ft and down below 44°F by 50 ft. Dissolved oxygen decreased starting at about 15 ft similar to temperature, but rebounded with levels above the 4 mg/l preferred by fish to depths slightly beyond 50 ft, but then dropping to less than 1 mg/l by 70 ft.

History:

A number of species were stocked in the late 1930's, including bluegill and largemouth bass from 1937-1942, yellow perch from 1937-39, and walleye in 1937 and 1938. The first fisheries survey was an extensive survey conducted in 1941. Game fish included largemouth and smallmouth bass, northern pike, walleye, various panfish, and a good number of ciscos (a species of whitefish). Rainbow trout were stocked from 1942-44, but this was discontinued due to poor survival. To address the minimal amount of cover in the lake, 200 brush structures were installed in 1949 to enhance fish habitat. Legal sized trout were stocked from 1955-64 (excluding 1957), but switched to fall fingerlings from 1965-70. Tiger muskellunge were stocked on an alternate year basis from 1980-86, at which point the tiger musky program was discontinued in Michigan. Walleye were stocked intermittently in the 1980's and 1990's as well as 2001, 2004 and 2006. Channel catfish were stocked once in 2004. Fisheries surveys in 1967, 1983, 1995 and 1999 documented good fish populations and anglers report good bluegill and largemouth bass fishing.



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Survey Purpose and Methods:

This 2009 survey of Big Portage 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 18-21, 2009, the trap, fyke and gill nets were each set for up to three nights. Five seine hauls were conducted during the netting period. Four electroshocking stations were sampled during the night of June 2, 2009, but one was to collect large predators only.

See the lake map (Figure 1) for locations of the sampling sites for each gear type. Shoreline habitat evaluations and zooplankton sampling were conducted on August 31, 2009 according to 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 2009 as part of the Department of Environmental Quality Lake Water Quality Monitoring Program.

Survey Results:

This survey collected a total of 1,355 fish weighing approximately 471 pounds and comprised of 34 different species. Panfish such as bluegill, pumpkinseed sunfish, rock bass, and yellow perch comprised 84% of the total catch by number (with forage fish not counted) and 35% by weight. Larger game fish such as largemouth bass, walleye, northern pike and smallmouth bass made up only a little over 6% of the total catch by number (forage fish excluded), but 20% by weight. Rough (non-game) fish species such as longnose gar, carp, bowfin and suckers made up 4% of the total catch by number and 34% by weight. Black and brown bullheads totaled over 5% of the total catch by number and 10% by weight. The survey catch also included a wide variety of forage fish species such as bluntnose minnow, brook silverside, Iowa and Johnny darters, logperch, and several others totaling over 300 fish. Several snapping turtles, map turtles and musk turtles were also observed in the sampling gear during the survey.

Panfish

Bluegill were the most numerous panfish collected in this survey with the 417 individuals caught in all gear combined making up almost 35% of the total survey catch by number (forage fish excluded) and 16% by weight. The 264 fish from the combined trap and fyke net catch averaged 6.7 inches with 64% exceeding the minimum size acceptable to anglers of 6 inches, 37% exceeding 7 inches and 11 individuals that were over 9 inches. Growth rates were good with an overall mean growth index equal to the state average. The trap net catch per unit effort (CPE) of 26 fish per net lift was equal to the CPE found in the 1999 survey, but less than the CPE of 46 from the 1995 survey.

The quality of the bluegill population in Big Portage 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 Big Portage 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 higher than the 1999 index of 3.6, but about the same as the indices from 1995 (5.0) and 1983 (4.4).

Other panfish species caught in significant numbers and roughly equal numbers included pumpkinseed sunfish, rock bass and yellow perch. Each of these made up roughly 10% of the total catch by number (with forage excluded). The 110 **pumpkinseed sunfish** averaged 6.3 inches in the combined trap and



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fyke net catch with 57% exceeding the minimum size acceptable to anglers of 6 inches. Growth was good with a mean growth index a half inch above the state average. The 125 **rock bass** caught in the survey averaged 7.5 inches in the fyke and trap net catch with 84 % exceeding 6 inches. While 123 **yellow perch** were collected in the survey, they only averaged 3-4 inches in length with just 2 fish over 6 inches and growth rates well below state average.

The survey catch also included 23 **black crappie** that ranged from 6 to 12 inches long with an average length of over 9 inches. **Redear sunfish** were found in this lake for the first time during this survey. The 29 redear sunfish caught ranged from 6 to over 10 inches with an average length of 8.5 inches. Possible sources for these fish could include movement downstream from the rearing ponds in Camp Dearborn that discharge into the Huron River just above Kent Lake or movement down Portage Creek into Little Portage Lake from the upstream lakes that contain established redear sunfish populations (Silver Lake, Bruin Lake, etc.). Other panfish caught in small numbers included 18 **hybrid sunfish** (4-8 inches), 14 **warmouth** (4-8 inches) and 1 **green sunfish** (7 inches).

Large Game Fish

Largemouth bass were the most abundant larger game fish found during this survey. The 45 caught made up only 4% of the total catch by number, but almost 10% by weight with an average length of almost 12 inches. About 10% were over the minimum legal size limit of 14 inches with the largest just over 20 inches. Growth was better than many lakes in the area with a mean growth index 0.1 inches over the state average. All age groups from age 2 through age 10 were found in the survey indicating consistent reproductive success in this system.

Other large game fish species caught in low numbers during this 2009 survey included 9 **walleye** (9-25 inches) with 6 over the minimum legal size limit of 15 inches, 6 **northern pike** (19-33 inches) with 2 over the minimum legal size limit of 24 inches, and 1 **channel catfish** at 24 inches.

Forage Fish Species

Quite a variety of small, forage fish species were found during this survey. The most common was the **logperch** (166 fish), but good numbers of several other species such as **bluntnose minnow** (52 fish), **Iowa darter** (44 fish), **brook silverside** (25 fish), and **Johnny darter** (14 fish) were also caught. Forage species only caught in low numbers included 5 **Least darter**, 5 **sand shiner**, 4 **mimic shiner**, 2 **blacknose shiner**, 2 **spottail shiner**, and 1 **golden shiner**.

Rough (non-game) and Miscellaneous Fish Species

The most abundant large, non-game species found in this survey was the **longnose gar** (29 fish, 18-37 inches). Others included in the survey catch were **carp** (9 fish, 22-33 inches), **bowfin** (2 fish, 25-26 inches), **white sucker** (2 fish, 17-24 inches) and **northern hog sucker** (1 fish, 10 inches). While these rough fish species only made up 4% of the total catch by number, they comprised over a third (34%) of the total catch by weight.

Bullhead were fairly abundant with 50 **brown bullhead** and 4 **black bullhead** collected during this survey. They averaged 12 inches in length with 85% over the minimum length acceptable to anglers of 10 inches. Also included in the survey catch were 1 **grass pickerel** (6 inches) and 1 **brindled madtom** (about 1.5 inches).

Native turtles found during the survey included 2 **snapping turtles** (13-14 inch shell length), 16 **map turtles** (2-10 inches) and 3 **musk turtles** (3-4 inches).



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Discussion and Management Recommendations:

1. There have been some angler reports of decreasing quality and numbers of bluegill in this lake and others in the chain of lakes (Baseline, Strawberry, etc.). The results of this survey indicate the bluegill population in Big Portage Lake continues to be in good condition and is better than most other area lakes. There are good numbers of bluegill and a high percentage of larger individuals (37% of combined trap and fyke net catch over 7 inches and 21% over 8 inches). Angler reports also indicate there is a significant harvest of panfish in this system during the late summer and early fall.
2. Both black crappie and pumpkinseed sunfish had excellent growth rates with large average sizes. Numbers caught were not large, but enough are present to contribute to the panfish fishery in the lake. The appearance of redear sunfish, which can reach relatively larger sizes than most panfish, may make an interesting contribution to the overall fishery if the population increases.
3. Largemouth bass continue to be the most abundant predator in the lake with numbers and sizes consistent with previous surveys. The stocking of walleye has developed a small population that provides some variety for the fishery although they are not present in large numbers. Northern Pike also provide a significant contribution to the fishery with natural reproduction sufficient to maintain itself despite the high level of shoreline development in the system. **Continued stocking of walleye fingerlings on a regular basis is recommended to sustain the walleye fishery that has developed.**
4. Rough (non-game) species such as carp and longnose gar have significant populations in the system, but not in unreasonable numbers or biomass.
5. The diverse forage fish community found in this survey is likely due to the large amount of riverine habitat connecting the lakes in the chain and the diverse types of lake habitat found throughout the system. This forage base helps to support the variety of larger game fish and maintain the overall excellent fishery found in this lake system.
6. The lack of shallow water fish habitat in this lake is a significant factor preventing the fishery from being even better than it is. The high level of shoreline development on this lake has resulted in removal of woody material along most of the shoreline. Armoring of almost 80% of the banks has changed the natural character of the shore and nearshore areas. In those few bays and shallow areas of the lake where aquatic vegetation manages to take hold, repeated chemical treatments keep important native plants from providing the habitat necessary for a healthier aquatic community. This lake is a typical example of human desires conflicting with nature's needs. It is actually surprising how well the fishery is doing considering the massive changes man has inflicted on the natural ecosystem around this lake.
7. **A program of education to inform lake residents of the importance of restoring the shoreline to its natural condition should be initiated and/or supported by the local lake associations.** The Michigan Inland Lake Partnership may be an organization that can contribute to this effort.

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. Big Portage Lake - 2010 Sampling Locations

