

**The Fish Community and Fishery of Black Lake, Cheboygan, and  
Presque Isle Counties, Michigan with Emphasis on Walleye,  
Northern Pike, and Smallmouth Bass**

**Tim A. Cwalinski**

*Michigan Department of Natural Resources, Gaylord Operations Service Center,  
1732 M-32 West, Gaylord, Michigan 49735*

**Patrick A. Hanchin**

*Michigan Department of Natural Resources, Charlevoix Fisheries Research Station,  
96 Grant Street, Charlevoix, Michigan 49720*

**Introduction**

The Michigan Department of Natural Resources (DNR), Fisheries Division surveyed fish populations and angler catch and effort at Black Lake, Cheboygan and Presque Isle counties, Michigan from April 2005 through March 2006. This work was part of the Large Lakes Program, which is designed to improve assessment and monitoring of fish communities and fisheries in Michigan's largest inland lakes (Clark et al. 2004).

The goal of the Large Lakes Program is to produce statistics for important fishes to help detect major changes in their populations over time. The program has three primary objectives. The first objective is to produce consistent indices of abundance and estimates of annual harvest and fishing effort for important fishes. Important fishes are defined as species susceptible to trap or fyke nets and/or those readily harvested by anglers. The second objective is to produce growth and mortality statistics to evaluate effects of fishing on species that support valuable fisheries. This usually involves targeted sampling to collect, sample, and mark sufficient numbers of fish. We selected walleye (scientific names for all fish species in the report are found in Appendix 1), northern pike, and smallmouth bass as special-interest species in this survey of Black Lake. The final objective is to evaluate the suitability of various statistical estimators for use in large lakes. For example, we applied and compared three types of abundance and three types of exploitation rate estimators in this survey of Black Lake.

The Large Lakes Program will maintain consistent sampling methods over lakes and time subsequently building a database of fish population and harvest statistics to directly evaluate differences among lakes or changes within a lake over time. Black Lake was the fifteenth lake surveyed under the protocols of the program. However, we utilized statistics from all surveyed lakes (n=20) for comparison. The sample size for these types of comparisons varies throughout the report as some statistics could not be estimated for every lake and/or species.

Although the lake sturgeon, a threatened species in Michigan, is a popular fish species found in Black Lake, it is only briefly mentioned in this document. The lake sturgeon population in Black Lake is relatively abundant compared to most other lake sturgeon populations found in Michigan, and the population has been studied and managed aggressively since the 1970s by DNR, Michigan State

University, and Central Michigan University. Readers interested in knowing more about the Black Lake sturgeon population should refer to the following references: Vondett 1957; Vondett and Williams 1961; Baker 1980; Hay-Chmielewski 1987; Baker and Borgeson 1999; Smith and Baker 2005; Smith and King 2005a, 2005b; Scribner and Baker 2007.

Fish stocking in Black Lake originally dates back to 1903 and includes a variety of species, ages, and sizes of fish. Most stocking efforts occurred in the early twentieth-century when fish management relied heavily upon stocking practices. Rainbow and brown trout were stocked at various sizes from 1938 through 1943. Largemouth bass fry were stocked in 1903, smallmouth bass adults from 1940 to 1942, rock bass adults from 1939 to 1942, and yellow perch in various years in the 1920s and 1930s.

The earliest stocking of walleye occurred from 1903 to 1910 when nearly 12 million fry were stocked. Adult walleye were stocked from 1937 to 1942, and in 1947, with fewer than 1,000 walleyes stocked over this time period. Some of these adult stocking efforts were from walleyes transferred from below the Cheboygan Dam and released throughout different parts of the inland waterway and in Black Lake. This management practice was discontinued due to the high expense involved in relation to the number of fish transferred. Stocking of walleye did not resume again until 1989, when the Black Lake Association and Northern Michigan Walleye Association stocked over 50,000 fall fingerlings from 1989 through 1993 (Table 1).

Beyond fish stocking, early fish management consisted of removals of undesirable species and brush shelter installations. Eleven tons of undesirable fish, mainly white suckers, were removed from Black Lake by commercial trapping in 1939 and 1940. Nearly 200 brush shelters were placed in the lake from 1933 through 1953, but their effectiveness was questioned because many washed ashore. Fish community surveys were made by seining and using gill nets in 1937 and 1939. Many of the fish species currently in Black Lake were documented in the late 1930s surveys, including walleye and northern pike.

Low effort fish community surveys conducted by the Michigan Department of Conservation (MDOC) in 1952, 1960, and 1969 provided little insight into fish populations. For example, the 1969 survey employed night electrofishing gear and targeted adult muskellunge in the northern end of the lake and Lower Black River. Only one small muskellunge was observed but northern pike were numerous.

A late May through early June 1970 fish community survey on Black Lake utilizing trap nets and low netting effort captured few game fish. Species captured included northern pike, smallmouth and largemouth bass, walleye, brook trout, pumpkinseed, and rock bass. A follow-up survey the next year using gill nets captured the same species. A total of 86 walleyes were collected, which ranged in length from 14 to 18 in TL reflecting slow growth of walleye when compared to the statewide average. In 1976, a fish community analysis on Black Lake occurred in mid-June and walleye growth was again determined to be relatively slow, as was growth of northern pike, when compared to statewide averages.

Trap nets were used to evaluate the Black Lake fish community in May 1980. Forty-six trap-net lifts captured low numbers of a variety of fish. The collection included 32 walleyes, 208 northern pike, 3 brook trout, 1 muskellunge, and 1 cisco. Northern pike ranged from 15 to 38 in TL, with most less than 24 in. A similar survey with similar effort in May 1982 provided little additional information on the Black Lake fish community.

The most intensive fish community survey of Black Lake prior to 2005 was conducted by DNR Fisheries Division in mid October of 1991. The purpose of the survey was to evaluate the walleye population by tagging adults and collecting data on survival of clipped walleyes stocked by the Black Lake Association and Northern Michigan Walleye Association (Table 1). Thirty-nine Great Lakes trap nets with 300-ft leads were used in the survey. A total of 310 walleyes were captured, but none were from the private stocking effort. No population estimate was derived from the tagging effort.

Another fish community survey during May 1997 consisted of 49 large-mesh trap-net lifts and 11 gill-net lifts. Rusty crayfish *Orconectes rusticus* were established in Black Lake at the time of this survey. The survey results indicated that Black Lake contained a fairly healthy and diverse fish community. Walleye reproduction appeared to be sustaining the population. Walleyes in the 16 to 18 in range dominated the species catch, yet the overall catch was low. The long shoals of such lakes and short leads on trap nets may have led to poor sampling efficiency. Shoals are defined as extensive shallow areas where short net leads may be insufficient. Seven year classes of walleye were found and overall growth was slightly slower than the statewide average. Yellow perch were considered numerous with the majority of the captured fish in the 6–8 in range. Rock bass were numerous with most 5–11 in. Smallmouth bass ranged from 8 to 18 in and over half of the fish were larger than legal size (14 in). Brook trout, cisco, and pumpkinseed were also collected in the survey. Northern pike were considered to be doing well based on the catch and were represented by relatively good numbers of 19–28 in fish. The chances of anglers catching larger pike in Black Lake were considered fair. Results of the 1997 survey presented the picture of a diverse fishery.

Between 1997 and 2008, the DNR evaluated young walleye recruitment in Black Lake seven times (Table 2) using night electrofishing of the shoreline in the fall when young walleyes may enter the shoal area. Varying effort was used annually over different habitats and shoreline reaches. A fair year class was noted for 1997, good year classes were found in 1998 and 2000, and weak year classes were produced in 2005 through 2008. No information was available on year-class strength for 2001 through 2003. The shoreline was also electrofished for lake sturgeon in August 1999, and though walleyes were not collected, field notes indicated that “many young walleye were observed” possibly indicating a good 1999 year class.

The most intensive fish community survey at Black Lake to date is the current study, which was conducted in April 2005. This involved the use of statewide crews from DNR Fisheries Division (see **Methods**).

## Study Area

Black Lake lies along the Cheboygan–Presque Isle county line in the northeastern part of Michigan’s Lower Peninsula and is 6 miles north of the town of Onaway. The lake is the tenth largest inland lake in the state of Michigan by surface acreage (10,113 acres; Breck 2004) and has 18 miles of shoreline. The Black Lake watershed includes more than 350,000 acres representing 38% of the entire Cheboygan River watershed, to which it belongs. Black Lake is fed by a variety of small creeks and rivers (Figure 1). The largest tributary is the Upper Black River, which enters the lake on the west shore. This river provides suitable spawning habitat for various species of fish that live in Black Lake, including lake sturgeon, walleye, and redhorse sucker. Rainy River is the next largest tributary and it enters the lake on the southeast shore. It also provides some spawning habitat for Black Lake fish, particularly for walleyes and suckers. Other tributaries, such as Stony, Stewart, and Fisher creeks, enter the lake at the south end, and Mud Creek enters the lake on the northwest shore. Many of these tributaries are used seasonally by game fish for spawning, and spring fishing closures are in place on both the Upper Black and Rainy rivers to protect spawning fish. Little Mud Creek, Stony Creek, and parts of the Rainy and Upper Black rivers are also considered Michigan designated trout streams. Tower Dam (built in 1922), on the Upper Black River is 10 miles upstream from Black Lake, and Klieber Dam (built in 1949) is 6 miles upstream on the same river. Lower Black River is the lake outlet on the north shore and it flows towards the Cheboygan River and eventually Lake Huron. Alverno Dam, constructed in 1903 on the Lower Black River, prevents upstream fish passage. Black Lake fish are able to migrate freely into the Lower Black River as far as the dam which is approximately seven river miles downstream of Black Lake. Lower Black River also provides some spawning habitat for Black Lake species such as lake sturgeon, muskellunge, walleye, and sucker.