

**Granite Lake  
Comprehensive Fish Survey  
2004-2005  
(WBIC: 2100800)**



Mason Disrude and Heath Benike  
Wisconsin Department of Natural Resources  
Northern Region-Barron  
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## **Executive Summary**

Granite Lake, a 154-acre lake located north of Cumberland, Wisconsin in northwest Barron County was surveyed in 2004-2005. The 2005 adult walleye population estimate of 3.9 fish/acre was considerably higher compared to a past survey of 1.4 fish/acre in 1994. Largemouth bass relative abundance has been on the decline since 1989. An inverse relationship exists that suggests a decrease in largemouth bass abundance coinciding with an increase in walleye abundance. Management recommendations include keeping largemouth bass densities low to maintain a healthy adult walleye population.

## Introduction

Granite Lake is an elongate, 154-acre lake with a maximum depth of 34 feet located north of Cumberland, Wisconsin in northwest Barron County. A small inlet enters the lake from the north and there is an outlet on the south end of the lake to Duck Lake. The water of Granite Lake is slightly stained and has an MPA of 25ppm (Sather and Threinen 1964). Moderate to heavy algae blooms can occur. Littoral bottom types are primarily sand, gravel and rubble. Marsh and bog areas are associated with the inlet and outlet.

Granite Lake has 3.4 miles of shoreline. A county owned public access is located on the west shore of the lake. Granite Lake has a diverse, healthy fishery consisting of walleye Sander vitreus, largemouth bass Micropterus salmoides, northern pike Esox lucius, bluegill Lepomis macrochirus, black crappie Pomoxis nigromaculatus, yellow perch Perca flavescens, white sucker Catostomus commersoni and common carp Cyprinus carpio.

A 1975 fish survey of Granite Lake found a naturally reproducing walleye population, a stable northern pike population and a low density largemouth bass population. A 1983 survey indicated a decline in the walleye population and an increase in bass abundance. In an effort to bolster the walleye population, walleye stocking in Granite Lake was initiated in 1984. Walleye stocking from 1984-2004 consisted of small fingerling (< 3 in) stocking except for 1989 and 2000 when large fingerlings (> 5 in) were stocked (Table 1). The objectives of this study were to assess the status of the walleye population and secondary objectives included assessing the status of other important fish species such as largemouth bass, northern pike and panfish.

## Methods

Granite Lake was sampled during 2004-2005. In 2004, a one-night fall electrofishing survey was completed along the entire shoreline. Catch per unit of effort (CPUE) was recorded for sportfish and summarized as fish/hr. In the spring of 2005, Granite Lake was sampled following the Wisconsin Department of Natural Resources treaty assessment protocol (Hennessy 2002). This sampling included spring fyke netting and electroshocking to estimate walleye and largemouth bass abundance. Walleye and

largemouth bass abundance was determined for the adult population. Adult walleye were defined as being  $\geq 15$  in or sexable and adult largemouth bass were defined as  $\geq 8$  in (Hennessy 2002). Data were also collected to estimate relative abundance on other species such as northern pike and panfish.

Data collected during this survey were compared with a previous survey on Granite Lake in 1994 and historic fall electrofishing surveys for juvenile walleye (YOY) in 1975, 1983, 1989, 1993, 1994, and 1996. Population estimates from a 1994 survey were generated by the Great Lakes Indian and Wildlife Commission (GLIFWC) using spring nighttime electrofishing that consisted of one marking run and one recapture run. Growth data for walleye were compared with local (Barron and Polk County) and regional (18 county WDNR Northern Region) means utilizing the WDNR Fisheries and Habitat database. Age assessment for walleye was determined from both scale samples ( $< 12$  in) and dorsal spine sections ( $\geq 12.0$  in). A subsample of the 2004 walleye year class was sampled during the fall of 2004 and spring of 2005 during electrofishing surveys. Stocked fry and fingerlings in 2004 were chemically marked with oxytetracycline (OTC) according to Brooks et al. (1994) at the Governor Thompson State Fish Hatchery prior to stocking. Walleye from the 2004 year class were sacrificed to determine what percent bore an OTC mark on their otolith. Otoliths from the subsample of the 2004 walleye year class were viewed for marks as described by Jennings et al. (2005).

Northern pike relative abundance and size structure was compared to a historic data set from 1985 using spring fyke netting. Size distribution of northern pike and largemouth bass was summarized using proportional (PSD) and relative stock density (RSD) values (Anderson and Neumann 1996).

## **Results**

Walleye. The adult walleye population in 2005 was 605 or 3.9 fish/acre (95% C.I. 445-764). Adult walleye abundance was 184% higher in 2005 compared to 1994 (N = 213; 1.4 fish/acre, 95% C.I. 153-271). Length frequency distribution indicates that the majority of walleye were between 12-16 in (Figure 1). Few (10%; N=33) of the walleye collected were larger than 18 in and 3% (N=9) were larger than 20 in. Legal length walleye ( $\geq 15.0$  in) relative abundance in 2005 (43/hr) was considerably higher when compared to historic fish surveys (Table 2).

Walleye stocking did contribute to the 2004 year class in Granite Lake. OTC analysis of 33 walleye from the 2004 year class revealed that 36% (N=12) of the sampled fish had an OTC mark resulting from small fingerlings stocking efforts.

Growth of walleye in Granite Lake was slow and below the local and regional average (Table 3). Age 7 walleye averaged less than 18 in compared to over 20 in for other local lakes. Historically growth rates have been above the NOR region average.

Largemouth Bass. The adult largemouth bass population ( $\geq 8$  in) in 2005 was 213 or 1.4 fish/acre (95% C.I. 75-351). Most (69%) of the largemouth bass from the 2005 sample were less than 14 in (Figure 2). Largemouth bass PSD was 85 and RSD-14 was 31. Historic fall electrofishing surveys for largemouth bass suggest relative abundance has decreased (Table 2). Largemouth bass CPUE was 14 and 17 fish/hr in 1983 and 1989 respectively. In comparison, in 2004, relative abundance was only 4 fish/hour.

Northern Pike. Relative abundance of northern pike was 5.9 fish/net lift (Table 4). The length frequency distribution indicates that the majority of fish fall between 15-20 in (Figure 3). Northern pike PSD was 10 and RSD-26 and RSD-32 were 4 and 2, respectively.

Panfish. Bluegill were the most abundant panfish sampled in Granite Lake. Relative abundance of bluegill was 17.2 fish/net lift (Table 4). A length-frequency distribution suggested a healthy population of 7.0-9.4 bluegill in Granite Lake (Figure 4). Black crappie and yellow perch were also present. Relative abundance of black crappie and yellow perch was 4.2 fish/lift and 0.4 fish/lift, respectively (Table 4).

## **Discussion**

Walleye. Adult walleye abundance increased from 1994-2004. This is likely related to good natural reproduction as well as supplemental fish stocking that has occurred. With an adult walleye population estimate of 3.9 fish per acre in 2005, the walleye population has responded well.

Walleye abundance in Granite Lake in 2005 was the highest reported for local Barron and Polk County waters (Table 5). One likely reason may be due to low abundance of largemouth bass and northern pike. Brooking et al. (2001) stated that when other top predators such as largemouth bass and northern pike increase in relative abundance in a lake, the likelihood of increased predation on small fingerling walleye is

high and likely hinders stocking success. In addition, Nate et al. (2003) indicated that high largemouth bass and northern pike densities characterized lakes with walleye populations that are maintained by stocking versus natural reproduction. Three other studies on area Polk County lakes (Ward, Half Moon and Big Butternut) suggested a trend of decreasing walleye abundance with an increase in largemouth bass abundance (Benike 2005a; Benike 2005b, Benike 2005c). Fayram et al. (2005) documented that largemouth bass interact strongly with walleye populations through predation as well as, limit stocked walleye survivalship. The authors further suggest that management goals seeking to simultaneously maximize both largemouth bass and walleye populations may be unrealistic. Granite Lake currently has good walleye natural reproduction and a healthy walleye population. In comparison, largemouth bass were low in abundance.

Largemouth Bass. Largemouth bass abundance was low (1.4 fish/acre) in Granite Lake in 2005. Historically, largemouth bass abundance has been low and they have never been the dominate gamefish in Granite Lake. This is contradictory to what is occurring in other lakes in Polk and Barron County where largemouth bass abundance is increasing with some largemouth bass densities as high as 12.3 fish/acre (Table 5). The largemouth bass size structure should provide adequate angling opportunities, and there are some larger fish present for those anglers who target largemouth bass. However, the largemouth bass population should remain a secondary species of importance in Granite Lake with management efforts striving to maintain low densities.

Northern Pike. Northern pike were the second most abundant game fish in Granite Lake, however size structure was poor. Historic surveys of the northern pike population (1985; Margenau et al. 1998) also indicated a relatively low density northern pike population (3.2 fish/acre  $\geq$  14 in), however size structure (PSD = 35) was better than that observed in 2005 (PSD = 10). Northern pike mean catch rates by size range in 2005 were lower for Granite Lake when compared to other lakes recently sampled in Barron and Polk Counties (Table 6).

Panfish. Panfish were present in Granite Lake, however their abundance appears rather low. Bluegill were the most common panfish captured at 17 fish/net lift with many fish in the 7-8 in length range. Black crappie and yellow perch were also present, however data collected was limited and probably not representative of their abundance.

### **Management Recommendations**

1. Adult walleye densities should be maintained between at 3.5-4.5 fish/acre. Walleye stocking should continue at 35 fish/acre on an alternate year basis until the next survey and be re-evaluated to determine if additional stocking is warranted if natural reproduction remains strong.
2. It is recommended that largemouth bass densities remain at 1-2 fish/acre. If largemouth bass densities increase above 2 fish per acre in the future, regulation changes should be considered to increase harvest opportunities in an effort to maintain a low density bass population and minimize any potential secondary impacts on the walleye population.
3. The northern pike and panfish populations appear healthy. No changes are recommended at this time. Future monitoring of northern pike and panfish should occur to document any trends that may be present in northern pike abundance and size structure.

### Literature Cited

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Table 1. Walleye stocking and young-of-year (YOY) fall fingerling catch per unit of effort (CPUE) from electrofishing, Granite Lake, Barron County, Wisconsin. Fall fingerling CPUE may also include naturally reproduced walleye.

Year	Length (in)	Number Stocked	Fall Electrofishing (no YOY/mile)	Walleye YOY Captured
1975		0	56.8	193
1983		0	0.0	0
1989	> 5	11,604	0.3	1
1993		0	23.7	71
1994	< 3	7,700	7.1	24
1995		0	0.0	0
1996	< 3	7,700	7.4	25
1997	< 4	1,540	*	*
1998	< 3	1,908	*	*
2000	< 3	8,098	*	*
2000	9-10	650	*	*
2002	< 3	7,700	*	*
2004	< 3	7,700	2.7	9

\* Walleye were not sampled that year.

Table 2. Electrofishing Catch Per Effort of Gamefish (number/hour), Granite Lake, Barron County, Wisconsin.

Date	Walleye All	Walleye > 15 in	Largemouth Bass	Northern Pike
10/06/1975	117	3	1	12
09/08/1983	7	7	14	18
09/19/1989	23	19	17	25
09/27/1993*	56	3	7	N/A
09/29/1994*	124	6	1	N/A
10/23/1996*	101	20	8	N/A
09/21/2004	50	43	4	6

\*GLIFWC survey

Table 3. Walleye mean length (in) at age, Granite Lake, Barron County, Wisconsin, 2005, compared with local and regional means, Wisconsin. Local and regional mean length information is from WDNR Fisheries and Habitat database.

Age	N	Granite Lake Mean 2005	Barron & Polk County (Local Mean)	Northern Region (Regional Mean)
3	13	13.3	13.4	11.9
4	40	13.6	15.4	14.1
5	41	15.3	17.5	16.1
6	11	16.8	18.8	17.7
7	16	17.8	20.4	19.3

Table 4. Fyke net catch per unit effort (fish/net lift), Granite Lake, Barron County Wisconsin, 2005.

Species	Number of Fish	Number of Sets	Catch Per Effort (fish/net lift)
Northern Pike	112	19	5.9
Walleye	243	19	12.8
Bluegill	86	5	17.2
Yellow Perch	2	5	0.4
Black Crappie	21	5	4.2

Table 5. Adult walleye and largemouth bass population estimates (PE) for Barron and Polk County lakes.

Lake	Year	Walleye PE (fish/acre)	Largemouth bass PE (fish/acre)
Granite Lake	2005	3.9	1.4
Red Cedar Lake	2005	2.0	1.7
Wapogasset Lake	2007	1.3	8.7
Lower Turtle Lake	2004	1.1	5.5
Pipe Lake	2004	1.2	8.9
Balsam Lake	2005	0.8	12.3
Magnor Lake	2007	0.7	5.3
Half Moon	2006	0.5	10.2

Table 6. Northern pike fyke net catch per unit effort (fish/net lift) Barron and Polk County lakes.

Length (in)	Granite Lake 2005	Largon Lake 2003	Bass Lake 2007	Horseshoe Lake 2007	Poskin Lake 2007	Long Lake 2004	Mean
≥ 14	5.7	7.6	0.8	3.6	14.9	9.8	7.1
≥ 21	0.6	5.7	0.6	0.8	3.5	7.1	3.1
≥ 26	0.2	2.6	0.3	0.1	1.1	2.3	1.1
≥ 30	0.1	1.0	0.0	0.0	0.7	1.1	0.5
≥ 32	0.1	0.6	0.0	0.0	0.6	0.7	0.3
≥ 34	0.1	0.3	0.0	0.0	0.5	0.4	0.2
> 36	0.1	0.1	0.0	0.0	0.4	0.3	0.2

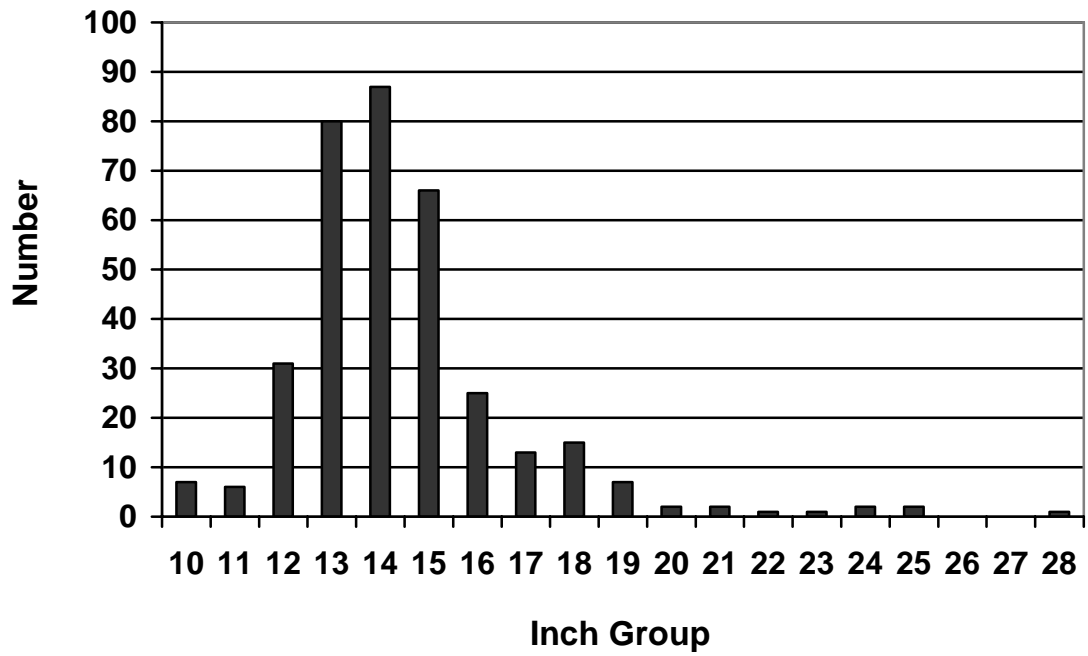


Figure 1. Walleye length frequency distribution, Granite Lake, Barron County, Wisconsin, 2005.

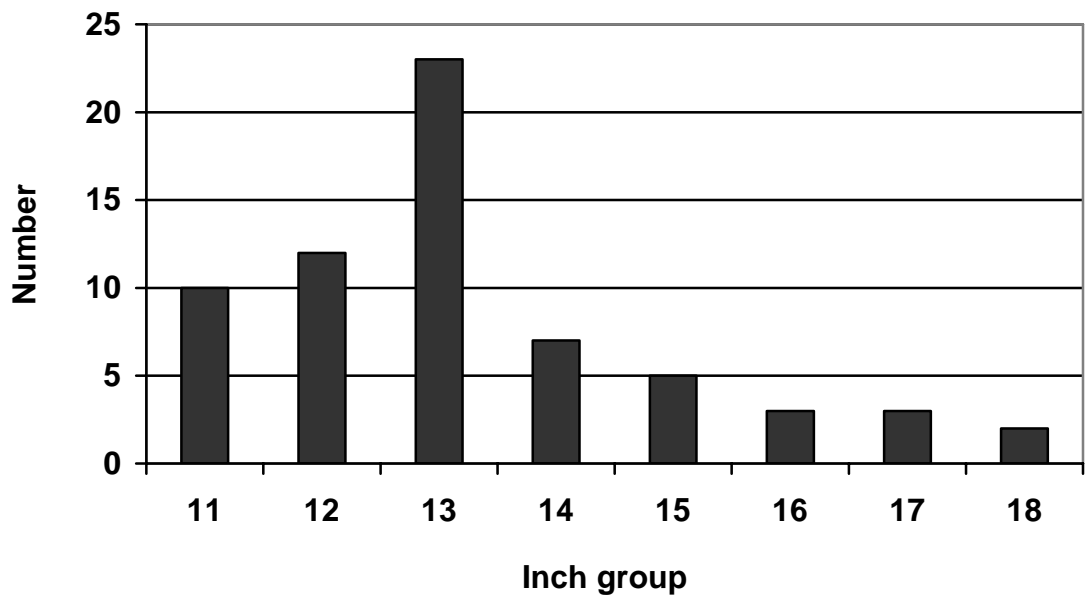


Figure 2. Largemouth bass length frequency distribution, Granite Lake, Barron County, Wisconsin, 2005.

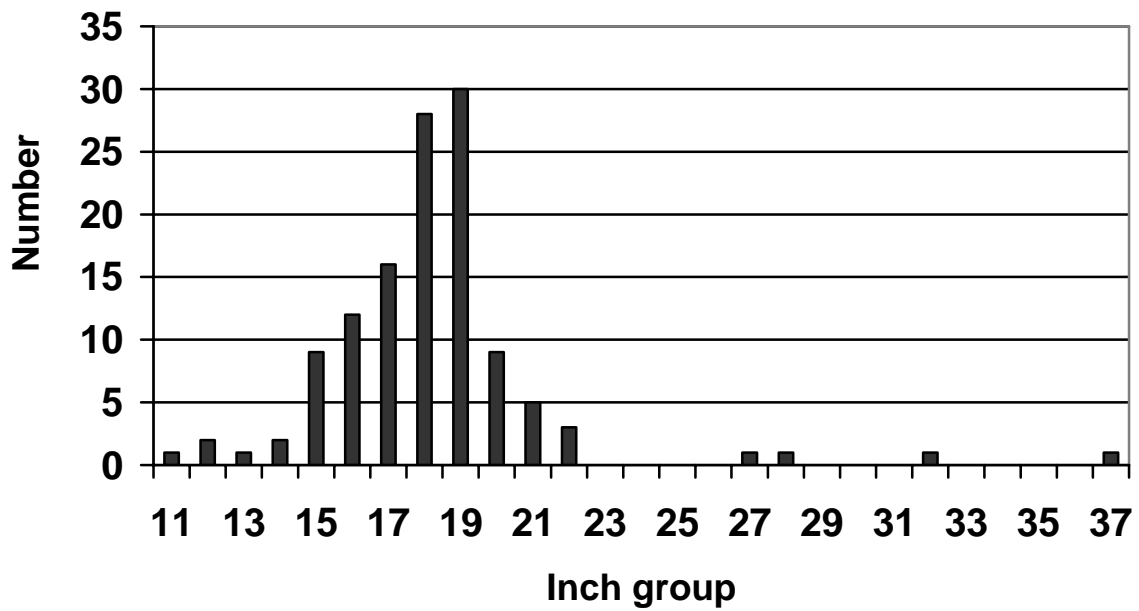


Figure 3. Northern pike length frequency distribution, Granite Lake, Barron County, Wisconsin, 2005.

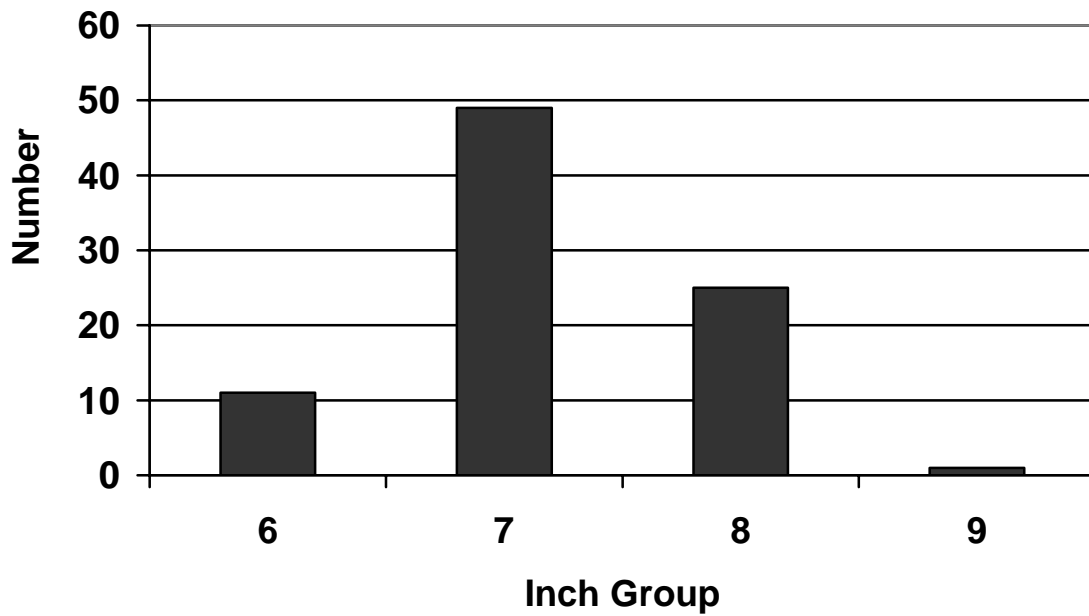


Figure 4. Bluegill length frequency distribution, Granite Lake, Barron County, Wisconsin 2005.