

Winslow Lake
Iron County, T46N R36W S35
North Branch Paint River Watershed, 2013

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Environment

Winslow Lake is 258 acres, has a perimeter of 7.84 miles, and is located in the Paint River watershed in Iron County approximately 21 miles northwest of the City of Iron River (Figure 1). Winslow Lake has a maximum depth of approximately 22 feet and has three inlets, Tote Creek (northern shore) and two smaller unnamed tributaries. The outlet is Winslow Creek which is located in the southwest bay and flows to the North Branch of the Paint River. There is a five foot privately owned dam at the outlet which was rebuilt in the early 1980s. The shoreline remains largely undeveloped with approximately 1/3 owned by the United States Forest Service (USFS); however there are approximately 25 cottages along the southwestern basin of the lake.

The substrate of Winslow Lake is predominately rock, gravel, and sand with some silt. Winslow Lake has a rocky cobble shoreline which is excellent spawning habitat for Walleye. Surficial geology is moraines of coarse textured till. The surrounding land cover is dominated by forest that is composed of white pines, cedars, birch and maples. Loons and bald eagles have been regularly sighted in the area as well.

In 2011 the USFS conducted an aquatic vegetation survey of Winslow Lake with the main objective of surveying for the presence of aquatic invasive plants. Results indicated a variety of aquatic plants were present such as Northern watermilfoil, white water lily, bur-reed, pondweeds, sweet gale, and coontail. No aquatic invasive plants were found at that time. Field notes also indicated high recreational boat use during the USFS survey.

History

Stocking History

The Michigan Department of Conservation stocked 50,000 Walleye fry in 1934 (Table 1). In 1937, 100,000 Walleye fry, 300 four month old Largemouth Bass, and 7,000 four-month old Bluegill were stocked in Winslow Lake. Walleye fry were again stocked in 1938 and 1939 with 250,000 and 300,000, respectively. Stocking did not occur again until 1979 and 1980 with 250,000 fry each year. Fingerlings were stocked on a regular basis from 1982 to 1995. Spring fingerling Walleye were stocked biennially from 1982 to 1988 and stocking rates ranged from 24-47 fish per acre with an average rate of 39.5 per acre. From 1989-1995, fall fingerling Walleye were stocked annually at variable rates of 6-39 per acre (Table 1).

Fisheries Management

In 1938, a survey was conducted that reported a fish community of large and numerous Smallmouth Bass sunfish (ranging from 6" to 7") and scarce Yellow Perch and Northern Pike populations. Forage fish included abundant Common Shiners, Bluntnose Darters, Iowa Darters, Central Mudminnows, and

Golden Shiners. Suckers and bullheads were also noted but not identified to species. No survey records were available again until 1962 in which a gill net survey resulted in Bluegill (n=29, 5.6"-7.9" range) Pumpkinseed (n=4, 6.6"-8.1" range), Black Crappie (n=5, 7.2"-11" range), Yellow Perch (n=10, 5.8"-10.9" range), Largemouth Bass (n=3 10.2-12.6 range), Northern Pike (n=6 17.5"-24.5" range), Walleye (n=2, 21.2 and 25 inches), and White Sucker (n=6, 9.2"-18.5" range).

A 1968 USFS survey was conducted using gill nets and trap nets and determined Winslow Lake to have "healthy populations of Black Crappie, Bluegill, Pumpkinseed, and Northern Pike."

In 1977, the Michigan Department of Natural Resources (MDNR) conducted another survey with fyke nets, trap nets, and gillnets. A total of 1,165 fish were captured during this effort. Species captured included Northern Pike (N=10, 17.6"-27.2"), Yellow Perch (N=261, 5.2"-10.3"), Smallmouth Bass (N=3, 5.7-15.3"), Largemouth Bass (N=1, 5.8"), Bluegill (N=509, 3.5"-8"), Pumpkinseed (N=84, 3.5"-6.1"), Black Crappie (N=188, 4"-10.5") White Sucker (N=6, 12.9"-22.5"), Golden Shiner (N=103, 5.3"-7.5"), and Creek Chub (N=1, length not recorded). A fish growth analysis was done on the Yellow Perch (average mean growth index of -0.5) and Northern Pike (good mean growth index of 1.0).

In 1978, a discretionary electroshocking effort (19 minutes) performed by the USFS and MDNR resulted in 317 Yellow Perch (6.1" average), 49 Bluegill, 27 White Suckers, 3 Pumpkinseed, 3 Black Crappie, 16 Largemouth Bass (9.7" average), 13 Golden Shiners (5" average), and 1 Northern Pike. Only Yellow Perch, Largemouth Bass, and Golden Shiners' lengths were recorded.

On May 16, 1979, a fish killing agent called antimycin was applied to Winslow Lake with the objective to reduce Yellow Perch abundance as much as possible and to thin the Bluegills, Pumpkinseeds, Black Crappies, and White Suckers. A follow up survey was conducted and captured a total of 334 fish which included Bluegill (N=219, 6.3" average), Black Crappie (N=70, 8.2" average), Northern Pike (N=31, 21.1" average), Pumpkinseed (N=5, 4.7"-5.9" range), and White Suckers (N=9, 14.2-15.4" range). Records from 1979 mentioned a habitat improvement proposal with a goal to produce "a fishable walleye population".

Another follow up study in 1980 yielded an acceptable growth for Bluegill (0.7" below state average) whereas Black Crappie and Northern Pike had slow growth rates, 2.4" and 3.7" below state average, respectively. However, it should be noted that all three species had no age 1-3 classes captured during the survey. Bluegill had the youngest age group of four years old.

In October of 1982, a stocking evaluation was performed to determine the status of the 1980 and 1982 stocked Walleye. It was reported that the 1980 stocking efforts seemed to have survived well but growth was "below average" and the 1982 stocking was difficult to assess because of the difficulty the crew had in distinguishing Walleye from small Yellow Perch.

The USFS conducted a fisheries survey (fyke net, 1/2 inch bar) and Walleye stocking evaluation in May 1986. Results from the survey indicated there may have been a problem with Yellow Perch growth (N=103, 4.8" average length). The Walleye analysis could not be conducted because sampling occurred after the spawning period which reduced the capture efficiency. Manual removal of Yellow Perch and White Suckers was recommended at the time. Subsequent surveys indicated poor survival of stocked spring fingerling Walleye. In 1988, managers decided to switch to larger fall fingerling Walleye in hopes of improving survival and establishing a naturally reproducing population.

In April 1991, the USFS conducted a survey to evaluate the predator populations (Walleye, Northern Pike) and manually remove Yellow Perch, White Sucker and panfish populations to reduce competition and improve success of Walleye stocking efforts. Ten fyke nets were set for three nights for a total of 30 net nights. An additional 8 fyke nets were set through May 16. During the entire netting period, 831lbs of Yellow Perch, 539lbs of White Sucker, and 65.5lbs of Bluegill and sunfish were removed. The survey resulted in the capture of 156 spawning Walleye adults ranging in size from 15-27 inches.

Beginning in 1992, fishing regulations at Winslow Lake and two additional lakes (Stager Lake, Iron County and Six Mile Lake, Dickinson County) were changed to no possession Walleye lakes. The zero bag Walleye regulations were recommended by Law Enforcement Division personnel after excessive angler extraction of Walleye occurred on Stager Lake and Walleye fishing pressure was building at Winslow Lake. A public notice went out informing anglers about the intended change and the reasoning behind it which included:

1. These lakes have an overabundant and "stunted" Bluegill population which can be best improved through Walleye predation.
2. Normal spring Walleye fingerling (2 inch long) plants have been ineffective in these lakes.
3. Our only chance to create the abundant Walleye population needed for effective Bluegill predation is through planting very limited and expensive large Walleye fingerlings of 6 inches long, or more.
4. Recently anglers have been catching our fall fingerlings as fast as they have reached the minimum size limit. We feel a Walleye harvest ban is necessary to protect the considerable investment in Walleye stocking needed to improve the Bluegill population.

The regulation was to remain in effect for 5 years and would be evaluated throughout that time period and thereafter. Fisheries biologists at the time stated if control over the panfish population was achieved then they would hope to reopen some limited fishing for Walleye in all three lakes. As of 2016, Winslow Lake was still regulated with the zero bag limit for Walleye.

In 1993 and 1995, the USFS conducted a netting survey to evaluate bluegill growth. Bluegill size increased from 5.3" in 1993 to 5.9" in 1995. The catch per unit effort decreased from 11.9 to 5.1. The growth rates improved from a mean growth index of -1.4 in 1993 to -1.1 in 1995.

In 1996, Walleye had been considered self-sustaining in Winslow Lake and stocking was discontinued. The rock and cobble substrate along Winslow Lake's shoreline provides excellent spawning habitat and attributes to Walleye natural reproduction.

An April 1999 survey conducted by Fisheries Division showed a fairly abundant Walleye population with a relatively large size structure. Fifty-four percent of the Walleye were over the minimum size limit. Age growth analysis revealed strong Walleye recruitment. The Northern Pike population was abundant but with a poor size structure that was skewed towards small-sized fish. No legal sized Northern Pike were captured. Age and growth data revealed Northern Pike overall were growing 4.5 inches below state average. Bluegill growth rates improved to above state average levels (+0.4) and an

average length of 7.7 inches. Black Crappies growth rates followed the same trend (+2.4 mean growth) and an average length of 10.2 inches.

Two surveys were conducted by MDNR in May and June of 2000. Netting effort consisted of fyke nets and maxi-fyke nets for the May survey and fyke nets for the June survey. This survey was conducted to evaluate the growth of panfish. Growth patterns were above state average for Bluegill (+0.5), Yellow Perch (+0.4), and Black Crappie (+0.6). No Northern Pike caught were of legal size (N=43). Additionally, 14% of the Pumpkinseeds, ~1% of the Yellow Perch, 2% of the Bluegill, 46% of the Black Crappie, and 69% of the Walleye were legal size. The MDNR Fisheries Division fish management manual suggests that predators should comprise between 20% and 50% of a lake's biomass (Schneider 2000). In the second survey, 215 pounds of predators (65%) were netted compared with only 114 pounds of forage and panfish (35%).

A 2001 USFS survey concluded that panfish populations were limited to small populations of large Black Crappie, Yellow Perch, and Bluegill. Northern Pike again were high in number with very slow growth. Walleye abundance and size structure appeared normal for Winslow Lake. At that time, a management recommendation was made to consider allowing harvest of Walleye. This would provide anglers opportunity to harvest fish while relieving pressure on panfish numbers from abundant predator populations.

In 2004, in response to the chronic slow growth rate of Northern Pike and lack of legally harvestable sizes (>24 inches), the minimum size limit was removed and the bag limit increased to five.

On May 31, 2006, a survey targeting Bluegill was conducted by MDNR. The electrofishing effort was timed to coincide with Bluegill spawning in an attempt to capture as many adult fish as possible. A total of 89 Bluegill were captured ranging from 4-10 inches with an average length of 7 inches and 75% of the catch was considered acceptable size for harvest (>6"). The mean growth index was 1.5 inches above the state average.

Additional results from 2006 indicated that Walleye abundance had dramatically increased between 1999 and 2006. As a whole for 2006, the Walleye population was growing somewhat slowly at 1.2 inches below the state average but considered average for the Upper Peninsula region. It also appeared that during this time the Walleye population was negatively impacting survival of young Largemouth Bass as no bass less than twelve inches were captured during this survey. Additionally, the predator biomass increased from the 2000 (65%) to 2006 (87%) surveys which again was above the MDNR Fisheries Division recommendations (20-50%). It was recommended again to consider removing the zero bag status for Walleye to decrease predation on forage and aid in achieving a better fish community balance. By this time, several anglers throughout the years had expressed their dissatisfaction with the low numbers of panfish in this lake as well as their ability to keep fish for personal consumption.

In 2007, Winslow Lake was selected for a White Sucker study. The study was implemented to determine if White Sucker abundances were related to poor growth rates of Northern Pike in some Iron County lakes, and to additionally evaluate the effects of stocking adult White Suckers on the fish community. Winslow Lake was selected as a control lake, thus no stocking or removal efforts occurred during the study period. The study was conducted through 2013 and collected useful fish data for

management of Winslow Lake. For example, in 2007, Walleye exhibited poor growth (-2.7) but dominated in biomass (62%) and had a calculated population estimate of 4.7/acre (Chapman-Peterson). Bluegill growth was above state average (+1.4) in 2007 but was only 1.6% of the total biomass. Predator biomass was 83% and prey biomass was 17% of the survey catch. In 2008, another Walleye population estimate was estimated to be 5.8/acre (Chapman-Peterson). The Bluegill captures (N=244) ranged from 2-10 inches, averaged 5.2 inches and 24% was considered acceptable size for harvest (>6"). Interestingly, in 2008, Yellow Perch abundance was also very high.

Current Status

Spring 2013 Discretionary Survey

In May 2013, a Walleye population estimate was conducted by the MDNR according to the 1842 Treaty-ceded territory Walleye protocol (Patrick Hanchin, personal communication). The Walleye population estimate calculated was 7.3/acre. This is an exceptional Walleye population estimate and is considered a good to excellent fishery (MDNR 2004). Total Walleye captured (N=595) ranged from 6-28 inches, averaged length of 17.7 inches and 93% were legal size (15 inches, if harvest was allowed). Age classes were well represented (Ages 1- 14). However, Walleye growth was 2.8 inches below state average, which is considered poor growth for Walleye.

A total of 1,605 fish were captured during the spring discretionary survey. In addition to the Walleye, other species captured included: Black Crappie, Bluegill, White Sucker, Golden Shiner, hybrid sunfish, Largemouth Bass, Northern Pike, Pumpkinseed, Smallmouth Bass, and Yellow Perch. Comparing predator to prey biomass, it is still evident that Winslow Lake has too many predators (75%) than what is recommended (20-50%).

Black Crappie (N=242) averaged 8.8 inches and ranged from 3-12 inches in length with 72% of the catch of acceptable harvest size (≥ 7 inches). Age analysis indicated ages 2-8 present and growth was determined to be 1.0 inch above state average.

Bluegill (N=81) ranged from 3-9 inches in length, averaged 6.3 inches, and 68% were of acceptable harvest size (6 inches). Age classes for Bluegill ranged from 1-7 years, all years being represented.

Northern Pike (N=306, Figure 2) averaged 21.2 inches and ranged from 14-36 inches in length with 9% of the catch of legal harvest size (24 inches, although there is no size limit regulation in place). Age analysis indicated ages 2-7 present and growth was determined to be 1.1 inches below state average.

June-August 2013 Management and Regulation Evaluation

A management and regulation evaluation following Status and Trends protocol was completed by staff from the Northern Lake Michigan Management Unit (NLMMU) on Winslow Lake during June 24-27 with large and small mesh fykes, and experimental gillnets and again on August 5, 2013 with seines and limnology sampling. Six (6) 3/4-inch fyke nets were set for 18 net nights (NN), two (2) experimental gillnets were set for 4 NN, three (3) small fyke nets were set for 3 NN, and four (4) seine hauls were conducted. Limnology was collected on August 5, 2013.

A total of 977 fish were captured during the June and August survey efforts. Species captured included: Black Crappie, Bluegill, Common Shiner, White Sucker, Golden Shiner, hybrid sunfish, Johnny Darter, Largemouth Bass, Central Mudminnow, Northern Pike, Pumpkinseed, Slimy Sculpin, Smallmouth Bass, Walleye, and Yellow Perch (Table 2).

Black Crappie (N=68, Table 2) averaged 6.9 inches and ranged from 2-13 inches in length (Table 3) with 46% of the catch of acceptable harvest size (≥ 7 inches). Age analysis was performed but too few individuals were aged to calculate a mean growth index.

Bluegill (N=684, Table 2) averaged 5.6 inches and ranged from 1-10 inches in length (Table 3) with 36% of the catch of acceptable harvest size (≥ 6 inches). Age analysis indicated ages 1-9 present and growth was determined to be 0.3 inches below state average. However, this is still considered good growth for Bluegill.

Walleye (N=48, Table 2) averaged 19.1 inches and ranged from 7-28 inches in length (Table 3) with 94% of the catch of legal harvest size (≥ 15 inches). Age analysis was performed but too few individuals were aged to calculate a mean growth index.

Northern Pike (N=22, Table 2) averaged 20.8 inches and ranged from 15-30 inches in length (Table 3) with 18% of the catch of legal harvest size (24 inches, although there is no size limit regulation in place). Age analysis was performed but too few individuals were aged to calculate a mean growth index.

Yellow Perch (N=33, Table 2) averaged 8 inches and ranged from 2-12 inches in length (Table 3) with 36% of the catch of acceptable harvest size (≥ 7 inches). Age analysis indicated ages 2-9 present (except no age 6 were present) and growth was determined to be 0.3 below state average, which still considered good growth for Yellow Perch.

Temperature, oxygen, and pH levels were recorded at depths ranging 0-21.9 feet (Table 4). Temperature was 66.71°F at the surface decreasing to the last recorded temperature of 58.9°F at a depth of 21.9 feet. Oxygen levels were 8.86 ppm at the surface, decreasing to 0.27 ppm at a depth of 21.9 feet. The pH ranged from 6.92-7.98. Alkalinity was 58 mg/L. Chlorophyll a was 4.3 mg/m³.

September 2013 Discretionary Survey

On September 18, 2013, the MDNR conducted a discretionary survey by electrofishing 3.3 miles of shoreline for a total of 2.5 hours of effort. Total Walleye captured (N=42) ranged from 8-21 inches in length, averaged length of 14.5 inches and 60% were legal size (15 inches, if harvest was allowed). Largemouth Bass captured (N=111) ranged from 2-18 inches, averaged length of 9.2 inches, and 19% of the catch of legal harvest size (14 inches). Smallmouth Bass captured (N=39) ranged from 4-15 inches, averaged 9.3 inches in length, and 13% of the catch of legal harvest size (14 inches). White Sucker captured were 9 inches (N=1) and 20 inches (N=2).

Analysis and Discussion

The current fish community of Winslow Lake can be described as the following: 1) A panfish community dominated by Bluegill whose growth is acceptable but may be on the decline, 2) an

abundant and self-sustaining population of Walleye with slow growth; 3) a Northern Pike population with a small size structure and slow growth rates, and 4) a minnow/shiner and darter population that is low in abundance that has never been well surveyed.

When the no-kill Walleye regulations were first proposed to residents and anglers on Winslow Lake, the main objective was to support an abundant Walleye population to control the overabundant and stunted Bluegill population through predation. Many surveys have shown since the no-kill regulation was put in place (1992) that Bluegill population abundance has decreased while their growth rates increased to an acceptable level. Bluegill growth rates peaked in 2006 at 1.5 inches above state average (Table 5). The last recorded growth rate was calculated from a June 2013 survey to be 0.3 inches below state average, still considered good growth for Winslow Lake.

Natural reproduction of Walleye has also been established in Winslow Lake since 1996. However, Walleye growth rates weren't calculated until 1999 (Table 5). During that time growth rates for Walleye were 1.6 inches below state average. In 2013, growth rates for Walleye decreased even further to 2.8 inches below the state average. The slow growth rates likely can be attributed to intraspecific competition. In other words, too many Walleye competing for food and habitat.

In the late 1990s and early 2000s many concerned citizens voiced their opinions on the management of Winslow Lake. In 1999, a majority of lake residents signed a petition demanding a change in how the fisheries were managed. Many residents expressed frustrations with declining Bluegill abundance (and subsequent decline in the fishery) as well as not being able to harvest the abundant Walleye.

Knowledge gained from other nearby lakes with similar management histories may provide a management template for the fish community and recreational fishery expectations on Winslow Lake. Stager Lake, which began the no-kill regulations at the same time as Winslow, had its no-kill regulation removed in 1999 by allowing one Walleye over 18 inches to be harvested. Typical regulations (5 Walleye over 15 inches) went into effect in 2008. Fisheries surveys conducted in 2012 indicated that Walleye still have good growth rates (-0.8) and a predator biomass of 55.8%. When the regulation was removed, angler effort increased substantially (anecdotal reports) and targeted the available Walleye population. However, this period of increased angling effort was short lived and subsequently returned to typical fishing pressure levels as found on other lakes in the region.

Currently there is an imbalance of predators to prey in Winslow Lake in which there are more predators than what is currently recommended by MDNR Fisheries guidelines. The goal of fish management in Winslow Lake should strive for a balanced predator and prey fish populations which will result in a healthy fish community for all anglers to enjoy.

Management Direction

- 1) Remove the No-Kill Walleye regulation currently in place for Winslow Lake and return to a minimum size harvest of 15 inches and daily possession limit of 5 total. A five-year follow up survey is recommended to monitor changes in fish community.
- 2) Retain the no size limit for Northern Pike. Specifically "up to 5 northern pike of any size may be taken with only 1 greater than 24" allowed in the daily possession limit"

3) Anglers are encouraged to report sport catches of all species to the NLMMU. Reports are useful to track population trends and aid further management of the fishery for current and future managers as well.

References

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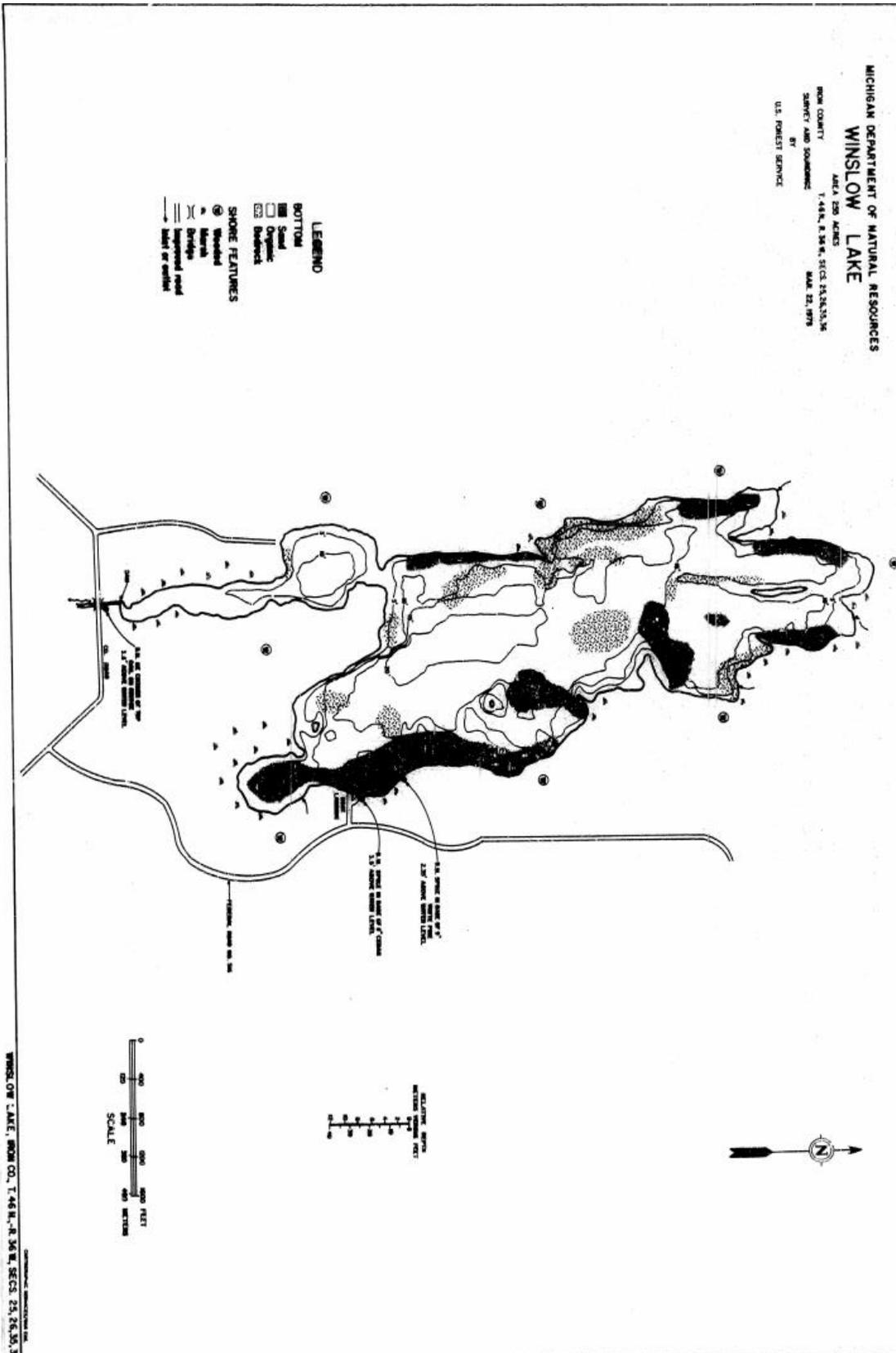


Figure 1: Map of Winslow Lake showing depth contours and bottom substrates.

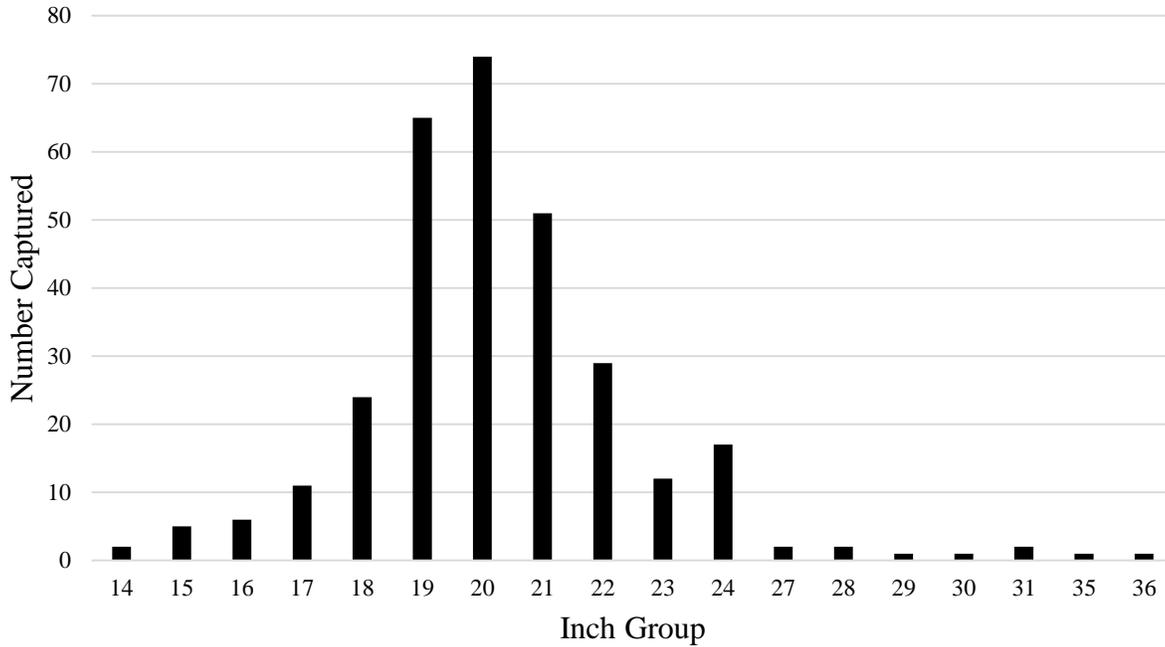


Figure 2: Northern Pike length frequency from data collected from Winslow Lake, Iron County from May 10-June 10, 2013. Data from DNR Fisheries Division records.

Table 1: Known fish stocked into Winslow Lake, Iron County. Data from DNR, Fisheries Division Records.

Year	Species	Number	Rate (#/acre)	Size (inches)
1934	Walleye	50,000	194	fry
1937	Largemouth Bass	300	1.16	4 months
1937	Walleye	100,000	387.6	fry
1937	Bluegill	7,000	27.1	4 months
1938	Walleye	250,000	969	fry
1939	Walleye	300,000	1163	fry
1979	Walleye	250,000	969	0.32
1980	Walleye	250,000	969	0.32
1982	Walleye	6,253	24.2	2.04
1984	Walleye	10,320	40	1.56
1986	Walleye	12,000	47	1.52
1988	Walleye	12,000	47	1.48
1989	Walleye	1,552	6	5.92
1990	Walleye	10,246	39	3.4
1990	Walleye	5,172	20	7.24
1991	Walleye	7,219	28	7
1992	Walleye	5,098	19.8	6.6
1993	Walleye	4,894	19	6.7
1994	Walleye	200	0.78	12.6
1994	Walleye	4,378	17	5.9
1995	Walleye	2,520	9.8	6.3

Table 2: Number, weight, length, and percentages of fishes collected from Winslow Lake, Iron County, in June and August 2013. Data from DNR, Fisheries Division records.

Common name	Scientific name	Number	Percent by number	Total weight (lbs.)	Percent by weight	Length range (in.)	Average length (in.)	Percent legal or acceptable size
Black Crappie	<i>Pomoxis nigromaculatus</i>	68	7	15.7	5	2-13	6.9	46 ($\geq 7''$)
Bluegill	<i>Lepomis macrochirus</i>	684	70	89.8	28.8	1-10	5.6	36 ($\geq 6''$)
Common Shiner	<i>Luxilus cornutus</i>	6	0.6	0.1	0	3-4	3.7	100
White Sucker	<i>Catostomus commersoni</i>	5	0.5	13	4.2	17-20	18.3	100
Goldern Shiner	<i>Notemigonus crysoleucas</i>	9	0.9	0.5	0.2	4-6	5.7	100
Hybrid sunfish	-	42	4.3	5.8	1.9	3-8	6.2	38
Johnny Darter	<i>Etheostoma nigrum</i>	2	0.2	0	0	2-2	2.5	100
Largemouth Bass	<i>Micropterus salmoides</i>	1	0.1	0	0	1-1	1.5	0 ($\geq 14''$)
Central Mudminnow	<i>Umbra limi</i>	1	0.1	0	0	3-3	3.5	100
Northern Pike	<i>Esox lucius</i>	22	2.3	46.6	14.9	15-30	20.8	18 ($\geq 24''$)
Pumpkinseed	<i>Lepomis gibbosus</i>	31	3.2	4.6	1.5	2-8	6	32
Slimy Sculpin	<i>Cottus cognatus</i>	1	0.1	0	0	2-2	2.5	100
Smallmouth Bass	<i>Micropterus dolomieu</i>	24	2.5	22.4	7.2	1-16	11.4	17 ($\geq 14''$)
Walleye	<i>Sander vitreus</i>	48	4.9	105.1	33.7	7-28	19.1	94 ($\geq 15''$)
Yellow Perch	<i>Perca flavescens</i>	33	3.4	8	2.6	2-12	8	36 ($\geq 7''$)

Table 3: Total catch by length range of select fishes collected from Winslow Lake, Iron County in June and August 2013. Data from DNR, Fisheries Division records.

Inch group	Black Crappie	Bluegill	Northern Pike	Smallmouth Bass	Walleye	Yellow Perch
0						
1		57		1		
2	11	74				2
3	10	228		1		3
4		39				7
5	2	39				6
6	14	83		2		3
7	18	97		1	1	
8	3	57				2
9	1	9		2		2
10	3	1		2		1
11	5			1		5
12				5	1	2
13	1			5		
14				1	1	
15			2	2	1	
16			1	1	7	
17			1		6	
18			2		18	
19			5		3	
20			4		3	
21					4	
22			3		1	
23					1	
24			1			
25			1			
26			1			
27						
28					1	
29						
30			1			

Table 4: Limnology profile of Winslow Lake, Iron County recorded on August 5, 2013.

Reading depth	Temperature (°F)	Oxygen (mg/L)	pH
0	66.71	8.86	7.98
1	66.86	8.92	7.85
2	66.85	8.94	7.83
3	66.83	8.95	7.79
4	66.86	8.97	7.77
5	66.86	8.98	7.75
6	66.84	8.98	7.74
9	66.61	8.97	7.68
12	64.96	7.65	7.28
13	64.67	6.57	7.19
14	64.39	6.16	7.15
15	64.13	6.1	7.12
16	63.69	5.61	7.07
17	63.22	4.84	7
18	62.52	3.85	6.98
19	61.57	3.13	6.96
20	60.69	1.63	6.92
21	59.82	0.64	6.94
22	58.9	0.27	7.04

Table 5: Mean growth index rates (inches) for Bluegill and Walleye in Winslow Lake, Iron County, MI.

Year	Bluegill	Walleye
1988	-0.9	-
1993	-1.4	-
1995	-1.1	-
1999	+0.4	-1.6
2000	+0.5	-0.8
2006	+1.5	-1.2
2007	+1.4	-2.7
2013 (May)	+0.7	-2.8
2013 (June)	-0.3	-