Lincoln Lake
Kent County
Grand River Watershed, Last Surveyed in 2023

Addie Myers, Fisheries Management Biologist

Environment

Lincoln Lake is a 411-acre lake located approximately 7 miles northwest of the city of Greenville in Montcalm County (Figure 1). Lincoln Lake is the lowermost lake in a chain of lakes stretching between Montcalm and Kent counties. Other lakes in the chain include Little Lincoln, Black, Frant, Muskellunge, Maston, Cedar, and Blue. In addition to the inlet from Little Lincoln Lake, Lincoln Lake also has one other unnamed tributary that flows into the lake. There are two outlets: Black Creek and Clear Creek. Approximately 1,500 feet downstream of the outlet of Clear Creek, there is a dam which controls the water levels in Lincoln Lake. Black Creek eventually joins with Clear Creek and flows southeast before joining the Flat River upstream of the city of Greenville.

The Lincoln Chain is located in the interlobate area of the Lake Michigan and Saginaw glacial lobes. They are within an outwash plain, most likely from glacial origin (Van Deusen 1943). The first Secchi depth recorded on Lincoln Lake was in 1943 at 12 feet. At this time, the shoreline of Lincoln Lake was swampy with low ridges (Van Deusen 1943).

Lincoln Lake has a maximum depth of 64 feet with much of the lake at least 30 feet deep. The bottom substrate is dominated by marl, with the deepest areas of the lake being a mix of marl and muck. The shallow littoral habitat is predominantly sand flats extending outward into the lake creating wide shelves along much of the east shoreline. For a lake in south central Michigan, the amount of shoreline development on Lincoln Lake is low, with only 35% developed. Much of the development is in the northeast corner, where a resort is situated on the lake and channel from Little Black Lake, the furthest south shoreline, and near the middle of the lake on both the east and west shorelines. Approximately 50% of the shoreline remains undeveloped and completely natural.

The Lincoln Lake lakeshed is dominated by agriculture (58%) and wetlands (19%; Figures 2 and 3). Smaller landcover types within the lakeshed include forest (11%), urban (8%), water (2%), and grasslands (1%). There are few areas of high intensity development within the Lincoln Lake lakeshed. The largest pockets are on the northeast corner of Lincoln Lake, around Muskellunge Lake, and the villages of Sand Lake, Pierson, and Coral.

Lincoln Lake has one public boat launch which is located on the western shore. The boat launch is operated by the Michigan Department of Natural Resources (DNR). The launch has parking for 16 vehicles with trailers, a gravel-surfaced ramp, and one skid pier. There is also a fully accessible pit toilet.

History

Initial historical surveys indicate that a dam was constructed "during the lumbering days" across the Clear Creek outlet of Lincoln Lake. This account was recorded in March 1940 and included the following

statement: "This dam has been removed some 40 years ago, but the level now is higher than it was before [the] dam was put in." The next record related to the water control structure is from June 1968. The record describes the "Lincoln Lake Water Control Dam" as a structure approximately 40 feet wide and constructed of steel and concrete with a head of 16 inches. There is no indication of when the structure was built or by whom. On June 15, 1962, a legal lake level was ordered at an elevation of 836.50 feet. The lake level was set based on a construction drawing which depicted that when the dam gates were fully open the crest elevation was 836.30 feet. An amended legal lake level was ordered on May 12, 2023, to set the water surface elevation for Lincoln Lake at 835.25 feet, matching the elevation at which the lake level was historically maintained. Additionally, the amended lake level order also established a special assessment district to finance maintenance of the lake level control structure.

In 1953, a 0.84-acre parcel of land was purchased by the State of Michigan from a local resident to install a public boating access site. This property is where the current DNR boat launch is located today.

Stocking

A wide variety of fish species have been stocked in Lincoln Lake since the late 1800s. The earliest records indicate that Lake Whitefish, Lake Trout, and American Eel were stocked in the 1870s and early 1900s (Table 1). There is no rationale in DNR files for these stocking programs in Lincoln Lake, but they were similar to other deeper lake stocking patterns in central Michigan. From 1929 through 1941, fish stocking switched from coldwater fish species to warmwater native species including Bluegill, Largemouth Bass, Smallmouth Bass, Walleye, and Yellow Perch. Stocking of these popular game species was common throughout Michigan during that time period. Survival of Walleye (stocked as fry) and Smallmouth Bass generally was poor. Natural reproduction of the Bluegill, Largemouth Bass, and Yellow Perch was found to be sufficient to maintain fishing quality without supplemental stocking, and stocking for all of these species was largely discontinued after 1945 (Cooper 1948).

There were no stocking events for over 20 years until Tiger Muskellunge were introduced into Lincoln Lake in 1970. Historic records referenced Muskellunge as a present gamefish within Lincoln Lake and other lakes in the Lincoln Chain; thus, Lincoln Lake was a logical choice for Tiger Muskellunge stocking. Stocking was discontinued in 1984 in favor of Walleye stocking which began in 1986 and continues through present day. Walleye stocking efforts were mostly spring fingerling fish, but a few fall fingerling Walleye were stocked from 1987 through 1990. Following the 2014 survey, fall fingerling Walleye became the preferred lifestage for stocking and fish were stocked at a rate of 4/acre in 2015, 2016, 2017, 2019, and 2022 (Table 1).

Surveys

The first survey of Lincoln Lake was completed on July 22, 1891, by the Michigan Fish Commission. A gill net was used during the survey to capture 18 fish including: "Black Bass" (probably Largemouth Bass and/or Smallmouth Bass), "Blue-gills", "Perch", "Speckled Bass" (probably Black Crappie), and "Bull-heads". The notes from the survey indicate that "Salmon Trout were stocked a number of years ago, also 1890". This is most likely referring to the stocking of Lake Trout in Lincoln Lake, which was known to occur in 1909 (Table 1). The notes also mention that nearly all of the lake was surrounded by cedar swamp and that the water had been raised in the lake 9 feet by the dam, which is overflowing into the cedar swamp. Overall fish from the 1891 survey were "in good condition" and stocking Wall-eyed Pike and Eel were recommended (Sargeant et al. 1891).

A comprehensive survey of the Lincoln Chain was completed in 1942 by the Institute for Fisheries Research (Van Deusen 1943). The aquatic vegetation community of Lincoln Lake was diverse with 25 different species of emergent, floating, and submergent vegetation. Of particular note, Wild Rice was observed in Lincoln Lake. Although the diversity of aquatic vegetation was high, the overall abundance was low, hypothesized due to the large amount of marl substrate (Van Deusen 1943). Gamefish species present in 1942 included: Bluegill, Black Crappie, Pumpkinseed, Rock Bass, Smallmouth Bass, Largemouth Bass, Northern Pike, Walleye, and Muskellunge (Table 2). Recommendations following the 1942 survey included: 1) stop all fish stocking, 2) conduct additional surveys to assess the Walleye population, and 3) consider taking a dissolved oxygen profile to determine if the lake is suitable for coldwater fish species (Van Deusen 1943).

In accordance with the recommendations from the 1942 survey, three gill nets were set in August 1943 to try to evaluate the Walleye population in Lincoln Lake. No Walleye were captured, but similar gamefish species were collected as in 1942 (Table 2). Additionally, a dissolved oxygen check was also performed. The thermocline was between 20 and 27 feet of water and there was no survivable oxygen levels for coldwater fish below 27 feet of water (Carbine and Brown 1943). Managing the lake for Walleye or trout species was not recommended; rather future fisheries management was to focus on Largemouth Bass and panfish species.

Two fisheries surveys were completed in 1971. The first was in July and utilized three trap nets, three fyke nets, and three gill nets. The fish community composition was similar to previous surveys with Bluegill and Black Crappie dominating the catch. Other game fish species were also observed (Table 2). The survey in October 1971 utilized boat electrofishing and surveyed the littoral habitat of Lincoln Lake. More forage fish species were captured in the fall survey, but gamefish composition was similar to the July effort (Table 2).

To assess the Tiger Muskellunge stocking, a June trap net and gill netting survey was completed in 1984. Eight trap nets and three gill nets were set for one night. Bluegill dominated the catch with 498 individuals ranging in size from 3.0-8.9 inches long. Gars, not separated by species, were the next most abundant taxa captured with 67. These were most likely dominated by Longnose Gar, as some were mentioned as caught in the field notes, but Spotted Gar may have been present. Only one Tiger Muskellunge was captured, and the Tiger Muskellunge stocking program was discontinued. Overall fishing was noted as being poor, and DNR staff advised that a Walleye pond rearing program should be started with the lake association.

In September 1988, three trap nets and two inland gill nets were set for one night in Lincoln Lake. The catch included 23 Walleyes, varying in length from 12-17 inches. Angler postcard creel surveys were conducted in 1992 and 1993 with anglers reporting consistent catches of Walleye between 14-24 inches. Four trap nets were set for one night in September 1997. Bluegill was the dominant fish species captured, but six Walleye were also collected ranging in length from 14-29 inches. Age and growth samples were taken from most gamefish species. Black Crappie and Bluegill had enough samples to make comparisons to statewide growth rates. Bluegill in Lincoln Lake were growing similarly to statewide growth rates, whereas Black Crappie were growing slightly faster than average. In 2003, a Serns Index survey was conducted by electrofishing along approximately 75% of the shoreline of Lincoln Lake for Walleye. Only one Walleye, 14 inches in length, was captured.

The most recent survey, prior to 2023, on Lincoln Lake was conducted in April 2014 with an objective of generating population estimates for Northern Pike and Walleye. Trap and large-mesh fyke nets were set on April 14, 2014 and checked daily until April 18, 2014. On April 23, 2014, the entire shoreline of Lincoln Lake was boat electroshocked. All Northern Pike and Walleye were measured for total length and dorsal fin rays were removed for aging purposes, and this partial fin clip also served as a mark. The estimated adult Walleye population in Lincoln Lake was 133 fish with 95% confidence intervals between 5 and 262. The estimated Northern Pike population was 373 adults with a 95% confidence interval between 317 and 453 adult Northern Pike. Growth of both species was rapid in Lincoln Lake, with Walleyes typically 2 inches and Northern Pike over 1 inch larger than statewide averages. It was noted that during the 2014 survey, water levels were high in Lincoln Lake and numerous Walleye were observed downstream of the water control structure on Clear Creek. Presumably, these Walleye had been in Lincoln Lake but were swept downstream over the water control structure.

Current Status

A trap netting survey was conducted immediately following ice off in the spring of 2023. The netting survey objectives were to generate population estimates for Walleye and Northern Pike in Lincoln Lake. Five trap nets were set on March 8 and six additional trap nets were set on March 12 (Figure 1). The eleven trap nets were checked either daily or every other day between March 12th and April 2nd, 2023. On April 2nd, six of the trap nets were removed from Lincoln Lake and on April 3rd, the remaining five trap nets were removed. The total effort of the survey was 278 trap net nights.

All Northern Pike and Walleye netted were measured to obtain total length, and dorsal fin ray (pike) or spine (Walleye) samples were collected from each fish for age and growth analyses. This partial dorsal fin clip also doubled as a mark, and all fish were inspected for dorsal fin clips after the initial day of netting. Sex of Northern Pike and Walleye was determined by examining expressed fluids (milt for males and eggs for females). Weighted age frequencies for Walleye and Northern Pike were calculated using the methods described by Schneider (2000). In addition to the data collected on Northern Pike and Walleye, other fish species captured during the trap net sampling were identified and measured to inch bin from March 8th until March 25th. After March 25th, data was only recorded for Northern Pike and Walleye caught in the nets.

A total of 47 individual Walleyes were captured during the 2023 spring trap netting survey. The Schumacher/Eschmeyer population estimator utilizes multiple marking events and recapture events (netting and electrofishing survey pooled). Only seven Walleye were recaptured over the netting survey. The Schumacher/Eschmeyer Walleye population estimate was 350 Walleye with a 95% confidence interval of 206 to 1,179 Walleye. The density estimate for Walleye was 0.9 fish per acre. Walleye population estimates were not separated by sex due to the low number of Walleye captured across the surveys.

Total lengths for Walleyes ranged from 9.4 inches to 26.6 inches (Figure 4). Age-4, 6, and 8 Walleye were most abundant in the catch which correspond to the 2019, 2017, and 2015 fall fingerling stocking events (Figure 5). Over 70% of the Walleye were from these three stocked year classes. Not surprisingly, all but three individual Walleye were from a stocked year class. Across all year classes Walleye in Lincoln Lake were nearly two and a half inches larger than statewide averages (Figure 6; Table 2).

A total of 271 unique individual Northern Pike were captured and 60 were recaptured during the 2023 spring survey on Lincoln Lake. Northern Pike varied in length from 9.0 inches to 39.8 inches. Forty percent of Northern Pike captured were at least 24 inches in length making them legal for harvest (Figure 7). A Schumacher-Eschmeyer population estimate was calculated with an estimated Northern Pike population of 999 fish with 95% confidence intervals from 803 fish to 1,320 fish. This estimate equates to a population density of approximately 2.4 Northern Pike per acre in Lincoln Lake. The Northern Pike population was dominated by age-3, age-4, and age-5 fish (Figure 8). Mean lengths at age for Lincoln Lake Northern Pike across all year classes were above statewide average growth indices (Figure 9). There were enough Northern Pike captured to assess age and growth across year classes by sex. Female Northern Pike were growing faster than male Northern Pike from age 2 through age 5 and all Northern Pike 30 inches in length or longer were females (Figure 10).

Bluegill were not a target species during the 2023 spring netting survey; however, they were the most abundant fish species with 1,060 fish collected (Table 4). Most of the Bluegill captured were between 4.0-5.9 inches in length (Figure 11). A Schneider Index score was calculated for the Bluegill population (Schneider 1990). The Schneider Index uses average length and the length frequency distribution from the Bluegill catch to provides a score for the Bluegill fishery in a lake that ranges from 1 (very poor) to 7 (superior). The Schneider Index score for Bluegill in Lincoln Lake was 3.3, falling between acceptable and satisfactory.

Black Crappie (n = 563) was the second most abundant fish species captured during the 2023 netting survey. Crappies varied in length from 4.0-13.9 inches. Only six Black Crappie were at least 10 inches in length, with most of the catch between 5.0-6.9 inches (Figure 12). Pumpkinseed (n = 123) were also captured. Pumpkinseed varied in length from 3.0-8.9 inches with 50% being at least 6 inches.

Seventy-one Largemouth Bass were caught in the 2023 netting survey (Figure 13). Sixty-one percent of the Largemouth Bass were of legal size for harvest (i.e., 14 inches or larger). The largest Largemouth Bass sampled was in the 19-inch bin.

Other game fish species captured during the 2023 netting survey included Hybrid Sunfish (n=53), Rock Bass (n=145), Warmouth (n= 4), and Yellow Perch (n=7). Nongame species captured included Bowfin, Brown Bullhead, Brook Silverside, Common Carp, Golden Shiner, Grass Pickerel, Northern Hog Sucker, White Sucker, and Yellow Bullhead. Most of these species were captured in low abundance (Table 4).

On July 31, 2023, a dissolved oxygen and water temperature profile was recorded at the deepest basin of Lincoln Lake. Lincoln Lake was stratified when the profile was recorded with a surface water temperature of 76.9F and bottom water temperature around 45F (Figure 14). Dissolved oxygen concentrations remained above 3 ppm to a depth of 16 feet, then dipped below 3 ppm from 17 feet to 26 feet. From 27 feet to 30 feet, dissolved oxygen concentrations were again above 3 ppm, but fell below that threshold from 30 feet to the bottom of the lake. The Secchi depth of Lincoln Lake was 8.5 feet, indicating that the water was quite clear.

Analysis and Discussion

Wehrly et al. (2012) classified inland lakes in Michigan based on a variety of variables including lake size, thermal regime, and fish assemblage patterns. The lake classification includes six classes of lakes (1-6). Lincoln Lake is similar to many lakes in southwestern Michigan and is classified as a class 1 lake. Class 1 lakes have high degree-days, high mean water temperatures, small surface areas, and have intermediate depths. Class 1 lakes are not a top priority for Walleye management statewide, but some key class 1 lakes near population centers have highly utilized Walleye fisheries because of stocking efforts (Herbst et al. 2022). Lincoln Lake appears to be classified correctly as a class 1 lake based on the physical characteristics of the lake and the species composition of the fish community.

The Lincoln Lake Walleye population estimate was unreliable due to the low number of Walleye captured overall coupled with the low number of recaptures. The Lincoln Chain is a challenging system to survey because Walleye potentially could be distributed over multiple lakes and miles of river during spawning season. The 2024 estimate was similar to the 2014 estimate although the Walleye stocking regime was much different. Walleye captured during the 2014 survey were from spring fingerling stocking events, whereas most of the Walleye captured in the 2024 survey were from fall fingerling stocking events (Table 1). Although neither population estimate indicated a high abundance of Walleye, local anglers enjoy the Walleye fishery. Quantitative creel survey data are lacking, but SLMMU receives more anecdotal reports from Walleye anglers on Lincoln Lake than most other stocked lakes in southwest Michigan. It appears that the fishery can be maintained through spring fingerling Walleye stocking. The cost difference between stocking spring fingerling Walleye compared to stocking fall fingerling Walleye is significant. It costs approximately $1,335 to stock 20,550 spring fingerlings compared to $5,845 to stock 1,230 fall fingerlings. Moving forward, spring fingerlings should be the only option to stock in Lincoln Lake at a rate of 50 fish per acre every other year.

Northern Pike appear to be the dominant predators in Lincoln Lake. The population estimate of 2.4 Northern Pike per acre is a high estimate. Compared to other lakes surveyed as part of the Large Lakes program from 2001-2010, the average adult Northern Pike per acre was 0.8 per acre with a range of 0.1-2.9 Northern Pike per acre (Hanchin 2017). Similar to other lakes sampled as part of the large lakes program, the percentage of White Sucker captured by number (6.4%) to Northern Pike mean growth index fits a similar trend observed in Hanchin (2017). Given that the number of White Sucker was only recorded for a portion of the survey, it is likely the number of White Sucker is actually much higher, and the relationship would be stronger if all White Suckers were counted.

In 2016, the DNR began requiring all bass (collectively refers to Smallmouth Bass and Largemouth Bass) tournaments to register and receive a permit to conduct tournaments across the state in inland waterbodies and the Great Lakes. Since the initiation of this program, Lincoln Lake has had the 134th highest number of tournament days with 35 tournament days between 2016 and 2023. On average 4.4 tournament days are conducted on Lincoln Lake annually. In comparison, Gull Lake had the highest number of tournaments registered and averaged 52.0 tournament days per year. As part of the tournament permit, tournament directors must submit data on bass catches and angler participation. From 2016 through 2023, 35 bass tournaments occurred on Lincoln Lake with an average of 23.3 anglers fishing in 12.5 boats per tournament and an average of 34 bass were weighed at each tournament.

Lincoln Lake has had a large number of Master Angler fish over time and is the location of the current state record Black Crappie. Frank Lee caught the state record fish in 1947, and it weighed an impressive

4.12 pounds. In addition to the state record, there have been Master Angler sized fish caught from the following species: Largemouth Bass, Bowfin, Longnose Gar, Northern Pike, Black Crappie, Bluegill, Rock Bass, and Redear Sunfish. All of the species have three or fewer Master Angler awards with the exception of Longnose Gar. Eighteen Master Angler Longnose Gar have been caught on Lincoln Lake ranging in length from 32.2 inches to 50.0 inches.

Although not the target of the spring netting survey, the panfish community in Lincoln Lake appears to be dominated by Black Crappie and Bluegill. Both species had relatively high abundance of individuals captured despite the cold-water temperatures, but the size structure was dominated by smaller individuals. Future fisheries surveys should continue to monitor the panfish community.

Management Direction

1. Discontinue fall fingerling Walleye stocking and stock spring fingerling Walleye at a rate of 50/acre on an every other year basis.

2. Encourage riparian landowners to maintain natural shorelines, reduce run off, and use best shoreline management practices.

3. To assess survival of stocked spring fingerling Walleye, conduct an electrofishing survey within 10 years following the Fall Indexing for YOY and Yearling Walleye Sampling Protocol developed by DNR - Fisheries Division's Resource Inventory Team.

References

Carbine, W. F. and C. J. D. Brown. 1943 Further observations of Lincoln Lake, Kent County. Report # 891. Institute for Fisheries Research.

Christie, G. C., and H. A. Regier. 1988. Measures of optimal thermal habitat and their relationship to yields for four commercial fish species. Canadian Journal of Fisheries and Aquatic Sciences. 45:301-314.

Cooper, G. P. 1948. Fish stocking policies in Michigan. Michigan Department of Natural Resources, Fisheries Research Report 1167, Ann Arbor.

Herbst, S., D. Hayes, K. Wehrly, C. LeSage, D. Clapp, J. Johnson, P. Hanchin, E. Martin, F. Lupi, and T. Cwalinski. 2022. Management plan for Walleye in Michigan's inland waters. Michigan Department of Natural Resources.

Sargeant, N.D., J. McKevlir, H.H. Marke, T.S. Sargeant, M. H. Gibbone, T. S. Dixon, and C. Miller. 1891. Michigan Fish Commission. Examination of Interior Lakes.

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

Schneider, J. C. 2000a. Weighted average length and weighted age composition. Chapter 15 in Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

Schneider, J. C., P. Laarman, and H. Gowing. 2000. Age and growth methods and state averages. Chapter 9 in Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

Van Deusen, R. D. 1943. A fisheries survey of Lincoln, Little Lincoln, Black, Frant, and Blue Lakes, Kent County. Report # 849. Institute of Fisheries Research.

Wehrly, K.E., J.E. Beck, L. Wang, and L. Szabo-Kraft. 2012. Landscape-based classification of fish assemblages in sampled and unsampled lakes. Transactions of the American Fisheries Society 141:414-425.

Table 1. Fish stocked from 1874 to 2023 into Lincoln Lake, Kent County.

Date	Species	Number	Average Length (inches) or Lifestage
1874	Lake Whitefish	5,300	Swim-up Fry
1878	American Eel	5,000	Spring Fingerling
1878	Lake Trout	7,500	Swim-up Fry
1878	Lake Whitefish	20,000	Swim-up Fry
1909	Lake Trout	7,500	Fry
1929	Walleye	150,000	Fry
1930	Walleye	150,000	Fry
1933	Bluegill	10,500	5 month
1933	Largemouth Bass	7,740	2 month
1933	Largemouth Bass	146	Yearling
1933	Yellow Perch	4,400	7 month
1934	Bluegill	20,850	5 month
1934	Largemouth Bass	6,000	2 month
1935	Bluegill	6,840	4 month
1935	Largemouth Bass	1,190	3 month
1935	Largemouth Bass	960	Yearling
1935	Yellow Perch	6,525	7 month
1937	Bluegill	10,200	3 month
1937	Largemouth Bass	200	Yearling
1937	Yellow Perch	8,625	7 month
1938	Bluegill	6,000	5 month
1938	Bluegill	1,250	Yearling
1938	Largemouth Bass	1,160	4 month
1939	Smallmouth Bass	5,000	3 month
1939	Largemouth Bass	1,200	1 month
1939	Yellow Perch	10,400	6 month
1940	Bluegill	4,680	5 month
1940	Bluegill	1,625	Yearling
1940	Largemouth Bass	625	5 month
1940	Smallmouth Bass	600	5 month
1941	Bluegill	4,100	5 month
1941	Crayfish	9,000	5 month
1941	Largemouth Bass	936	4 month
1941	Smallmouth Bass	1,200	4 month
1942	Largemouth Bass	1,000	3 month
1942	Smallmouth Bass	1,000	5 month
1943	Smallmouth Bass	5,200	3 month
1970	Tiger Muskellunge	3,000	Fingerling
1971	Tiger Muskellunge	1,529	Fingerling

1972	Tiger Muskellunge	1,300	Fingerling
1974	Tiger Muskellunge	1,250	Fingerling
1976	Tiger Muskellunge	1,600	Spring fingerling
1977	Tiger Muskellunge	1,600	Fall fingerling
1978	Tiger Muskellunge	1,600	Fall fingerling
07/20/1979	Tiger muskellunge	1,600	5.16
08/11/1980	Tiger muskellunge	1,600	6.69
08/13/1981	Tiger muskellunge	1,100	6.10
08/02/1982	Tiger muskellunge	1,500	5.28
08/22/1984	Tiger muskellunge	1,360	6.85
06/18/1986	Walleye	20,701	2.09
06/29/1987	Walleye	450	2.99
08/27/1987	Walleye	2,870	6.18
09/28/1987	Walleye	1,580	3.39
06/02/1988	Walleye	24,300	1.38
06/23/1989	Walleye	390	1.73
06/30/1989	Walleye	800	2.24
09/13/1989	Walleye	2,375	5.20
09/15/1989	Walleye	132	5.20
06/13/1990	Walleye	8,300	1.34
06/21/1990	Walleye	14,200	1.42
10/04/1990	Walleye	250	5.98
06/08/1991	Walleye	14,738	1.50
06/14/1991	Walleye	3,820	1.46
06/26/1991	Walleye	8,280	1.85
06/06/1992	Walleye	24,878	1.30
06/07/1992	Walleye	11,164	1.69
06/18/1992	Walleye	2,306	1.30
06/03/1994	Walleye	42,866	1.10
06/11/1996	Walleye	42,120	1.34
06/26/1996	Walleye	10,087	1.50
06/24/1997	Walleye	21,933	1.89
06/24/1997	Walleye	12,838	1.61
06/25/1997	Walleye	6,923	1.89
07/01/1997	Walleye	2,313	1.81
07/02/1997	Walleye	33,272	1.81
06/08/1999	Walleye	42,900	1.10
06/09/1999	Walleye	30,626	1.06
06/11/2001	Walleye	39,995	0.94
05/28/2003	Walleye	40,455	0.96
06/02/2004	Walleye	34,125	1.10

06/03/2004	Walleye	35,813	1.10
06/06/2006	Walleye	60,000	0.82
06/02/2011	Walleye	15,120	1.39
06/09/2011	Walleye	6,090	1.28
05/23/2012	Walleye	16,111	0.94
10/14/2015	Walleye	451	6.38
10/16/2015	Walleye	1,204	5.79
10/12/2016	Walleye	1,631	5.99
10/04/2017	Walleye	1,804	6.00
10/01/2019	Walleye	1,644	5.01
10/04/2022	Walleye	1,644	6.09
06/08/2023	Walleye	22,364	1.21

Table 2. Presence of fish species in historical fisheries surveys of Lincoln Lake, Kent County, Michigan.

Species	1891	1942	1943	1971	1984	1988	1997	2014	2023
Black Bullhead		X		X			X		
Black Crappie	X	X	X	X	X	X	X	X	X
Blacknose Shiner		X							
Blackchin Shiner		X							
Bluegill	X	X	X	X	X	X	X	X	X
Bluntnose Minnow		X							
Bowfin		x		X	X		X	X	X
Brook Silverside		X		X					
Brown Bullhead		X		X				X	X
Bullheads	X								
Central Mudminnow		X							
Central Stoneroller		X							
Chestnut Lamprey								X	
Common Carp				X	X				X
Common Shiner		X		X					
Creek Chub		X						X	
Golden Redhorse		X							
Golden Shiner								X	X
Grass Pickerel									X
Greater Redhorse								X	
Green Sunfish		X		X	X			X	X
Iowa Darter		X							

Johnny Dater		X							
Lake Chubsucker				X					X
Largemouth Bass	X	X	X	X	X	X	X	X	X
Least Darter		X							
Longear Sunfish		X							
Longnose Gar		X		X	X		X		
Mimic Shiner		X							
Muskellunge		X							
Northern Hog Sucker				X				X	X
Northern Pike		X	X	X	X	X		X	X
Pugnose Shiner		X							
Pumpkinseed		X	X	X	X		X	X	X
Rainbow Darter				X					
Rock Bass		X	X	X	X		X	X	X
Smallmouth Bass	X	X			X	X			
Spotted Gar						X			
Tadpole Madtom		X						X	
Tiger Muskellunge				X	X				
Walleye		X				X	X	X	X
Warmouth		X		X					X
White Sucker		X	X	X	X	X	X	X	X
Yellow Bullhead		X	X	X		X	X		X
Yellow Perch	X	X	X	X	X		X	X	X

Table 3. Age and growth data for Northern Pike (top) and Walleye (bottom) captured in Lincoln Lake, Kent County during the 2023 spring survey. Mean growth indices were calculated as described by Schneider et al. (2000a).

Species	Age	Number Aged	Length Range (in)	Weighted Mean Length (in)	State Average Length (in)	Mean Growth Index
Northern Pike	1	28	9.0-19.5	13.2	11.7	+0.9
	2	26	15.4-19.6	17.8	17.7	
	3	46	16.6-24.3	21.0	20.8	
	4	103	19.0-32.8	23.6	23.4	
	5	46	20.9-35.0	27.7	25.5	
	6	12	22.2-33.9	29.1	27.3	
	7	8	24.2-36.1	29.9	31.2	
	8	5	28.1-36.8	31.4	N/A	
	9	1	36.3	N/A	N/A	
	10	1	25.8	N/A	N/A	

Species	Age	Number Aged	Length Range (in)	Weighted Mean Length (in)	State Average Length (in)	Mean Growth Index
Walleye	1	1	9.4	N/A	10.4	+2.4
	4	13	17.6-22.0	19.5	13.9	
	5	3	19.3-21.2	N/A	15.8	
	6	9	20.7-23.0	21.8	17.6	
	7	5	20.4-24.1	22.3	19.2	
	8	11	21.0-25.0	23.3	20.6	
	11	4	21.7-26.6	N/A	N/A	
	12	1	25.8	N/A		

Table 4. Numbers, weights, and lengths for fish species collected during the 2023 spring survey on Lincoln Lake, Kent County. Fish were captured using trap nets. Because not all fish species were marked, this table includes all captures (i.e., recaptured Walleye and Northern Pike were not excluded).

Species	Number	Percent by Number	Weight (lb.)	Percent by Weight	Length Range (in)	Percent Harvestable Size[1]
Black Crappie	563	16.8	101.3	4.1	4.0-13.9	33
Bluegill	1,660	49.6	181.4	7.3	3.0-10.9	21
Bowfin	10	0.3	40.4	1.6	18.0-27.9	N/A
Brown Bullhead	26	0.8	19.7	0.8	9.0-13.9	N/A
Brook Silverside	1	<0.1	<0.1	<0.1	3.0-3.9	N/A
Common Carp	1	<0.1	8.5	0.3	26.0-26.9	N/A
White Sucker	216	6.4	624.2	25.3	7.0-23.9	N/A
Golden Shiner	1	<0.1	0.2	<0.1	8.0-8.9	N/A
Grass Pickerel	1	<0.1	0.2	<0.1	9.0-9.9	N/A
Green Sunfish	3	0.1	0.1	<0.1	3.0-3.9	N/A
Hybrid Sunfish	53	1.6	13.5	0.5	3.0-9.9	55
Largemouth Bass	71	2.1	111.5	4.5	6.0-19.9	61
Northern Hog Sucker	1	<0.1	0.8	<0.1	12.0-12.9	N/A
Northern Pike	330	9.9	1,069.3	43.3	6.0-39.9	38
Pumpkinseed	123	3.7	22.7	0.9	3.0-8.9	50
Rock Bass	145	4.3	23.3	0.9	3.0-9.9	34
Walleye	55	1.6	195.4	7.9	9.0-26.9	98
Warmouth	4	0.1	1.0	<0.1	5.0-7.9	75
Yellow Perch	7	0.2	1.0	<0.1	6.0-7.9	57
Yellow Bullhead	79	2.4	54.0	2.2	4.0-13.9	N/A

[1] Harvestable size is defined as 6 inches for Bluegill, Hybrid Sunfish, Pumpkinseed, and Warmouth and 7 inches for Black Crappie and Yellow Perch.

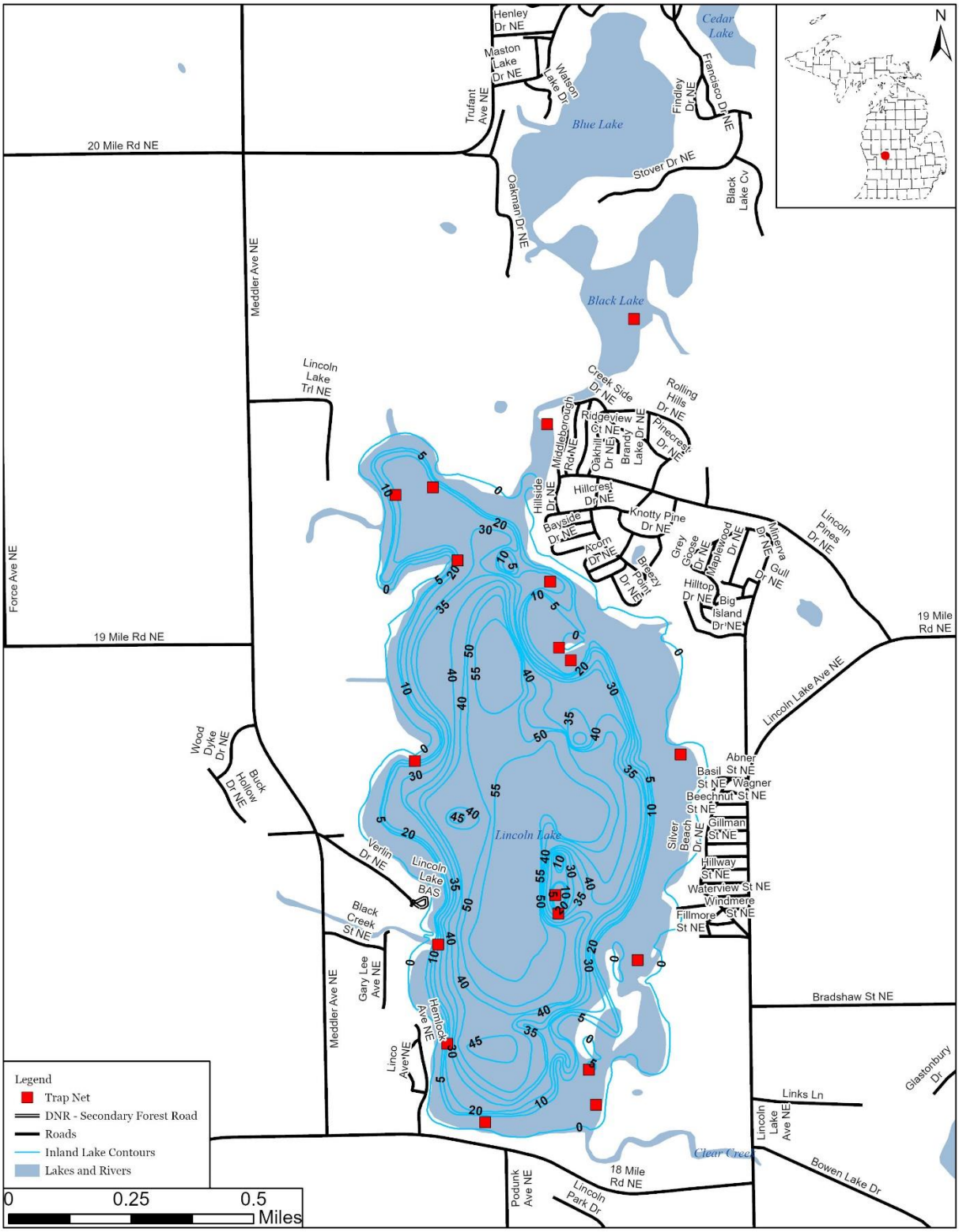

Figure 1. Map of Lincoln Lake with squares indicating locations of trap nets set during the 2023 spring netting survey

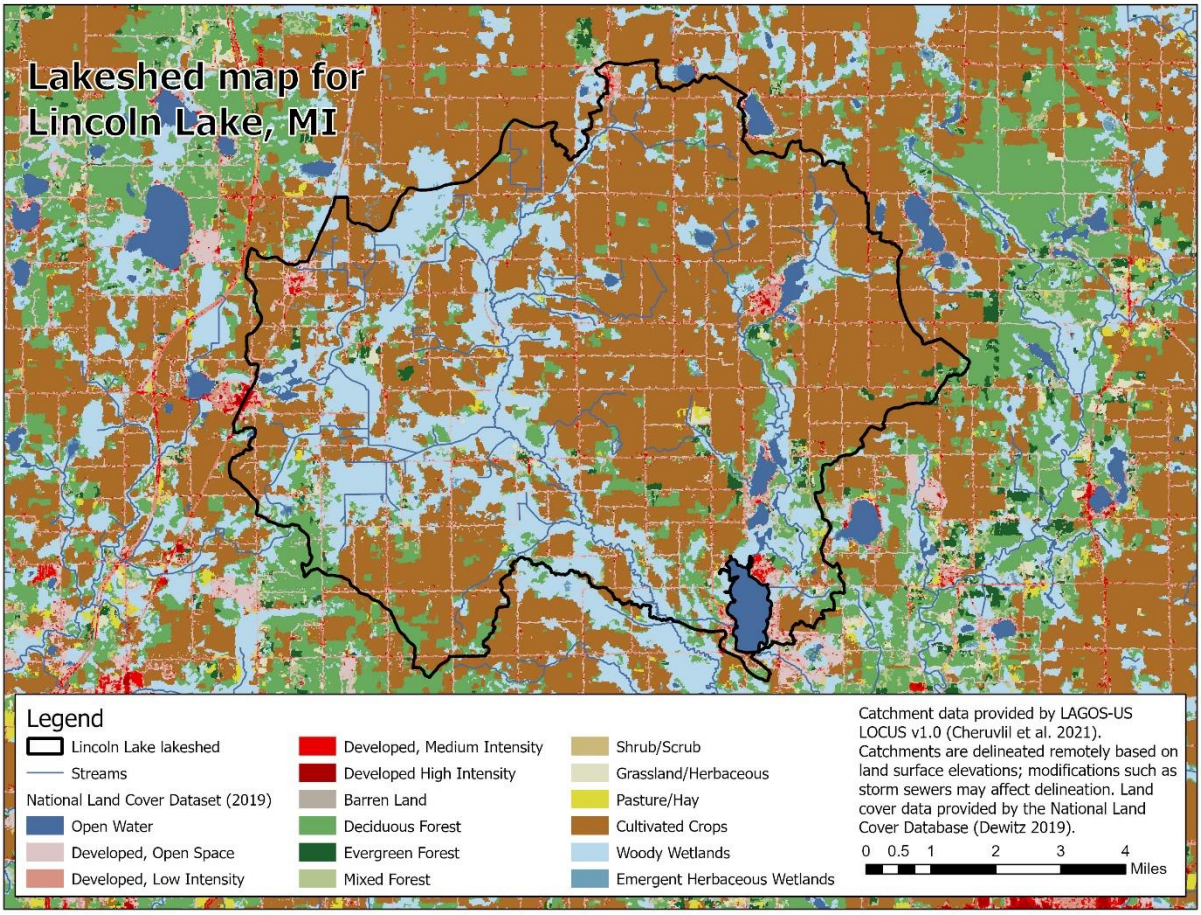

Figure 2. Land cover within the Lincoln Lake, Kent County lakeshed as of 2021.

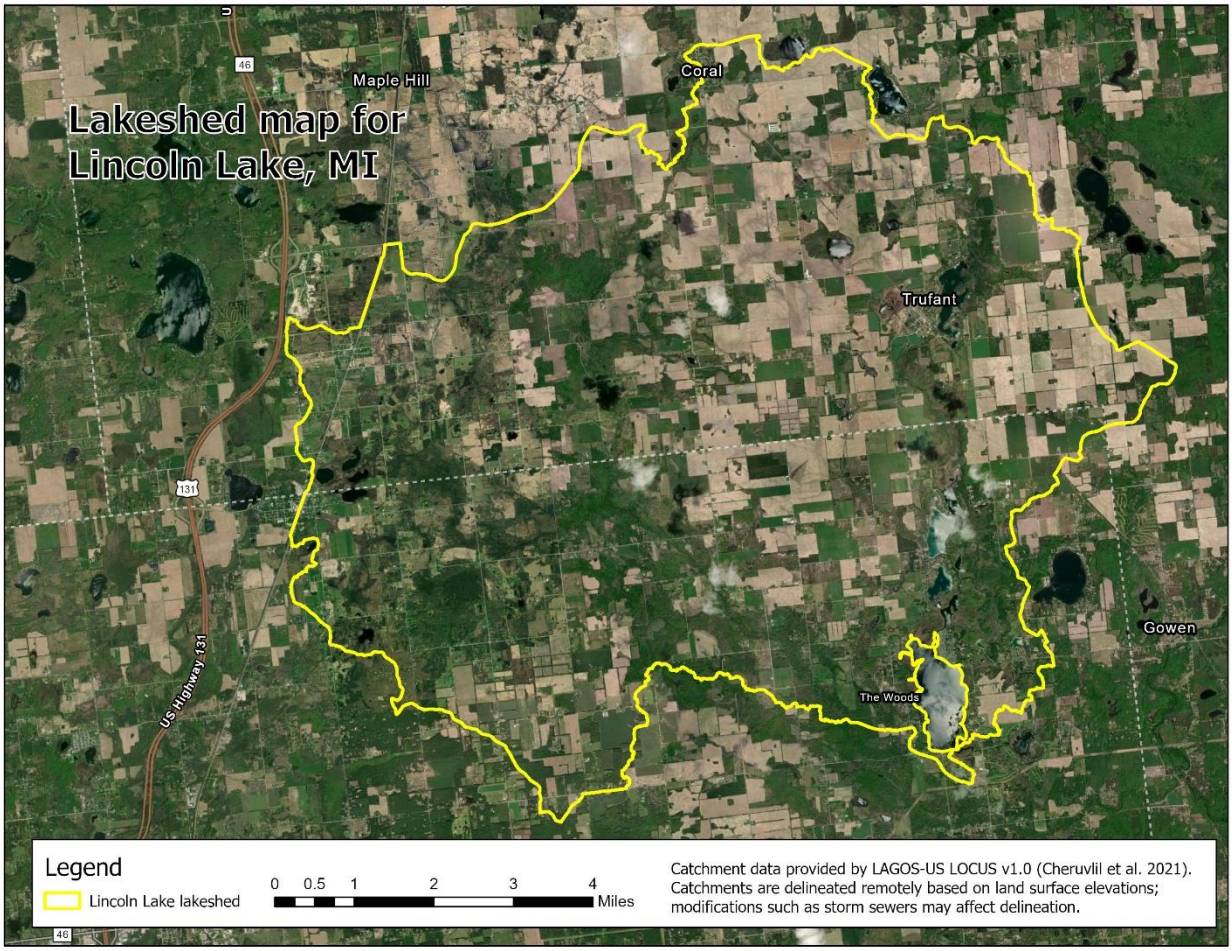

Figure 3. Lincoln Lake, Kent County lakeshed boundary.

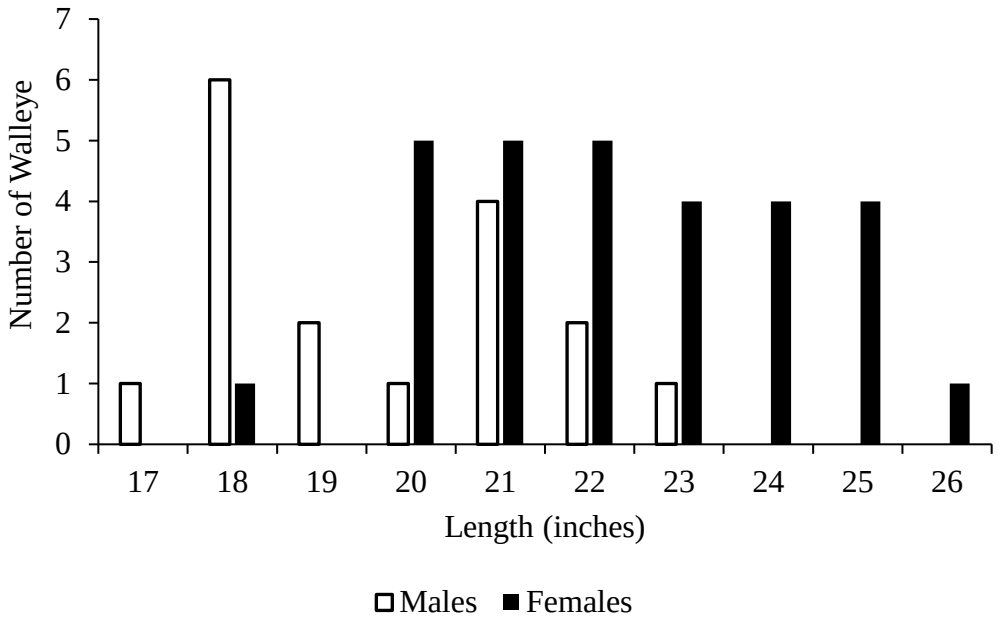

Figure 4. Length frequency distribution of Walleyes captured during the 2023 spring survey on Lincoln Lake. Males are represented by the open bars and females are represented by the solid black bars. One unknown sex Walleye 9 inches in length is not represented on the graph.

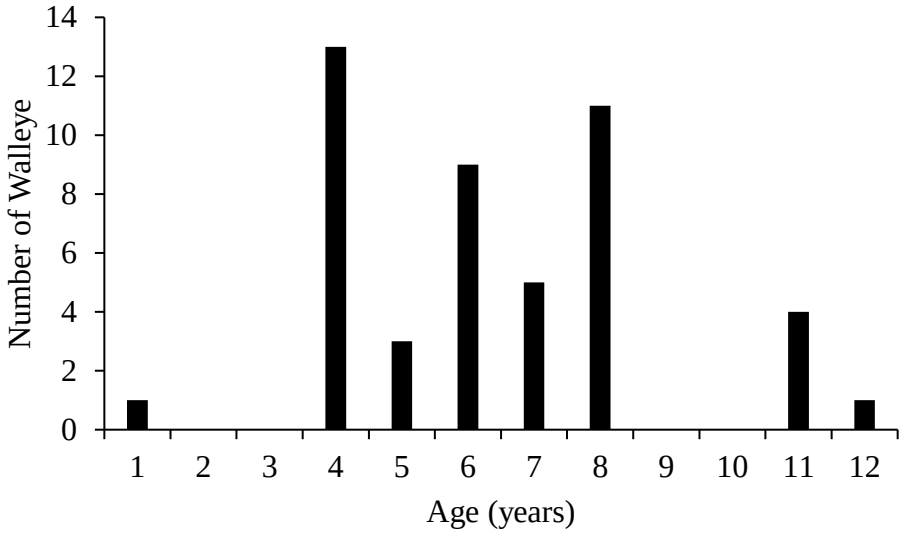

Figure 5. Age frequency distribution of Walleye captured during the 2023 spring survey of Lincoln Lake, Kent County.

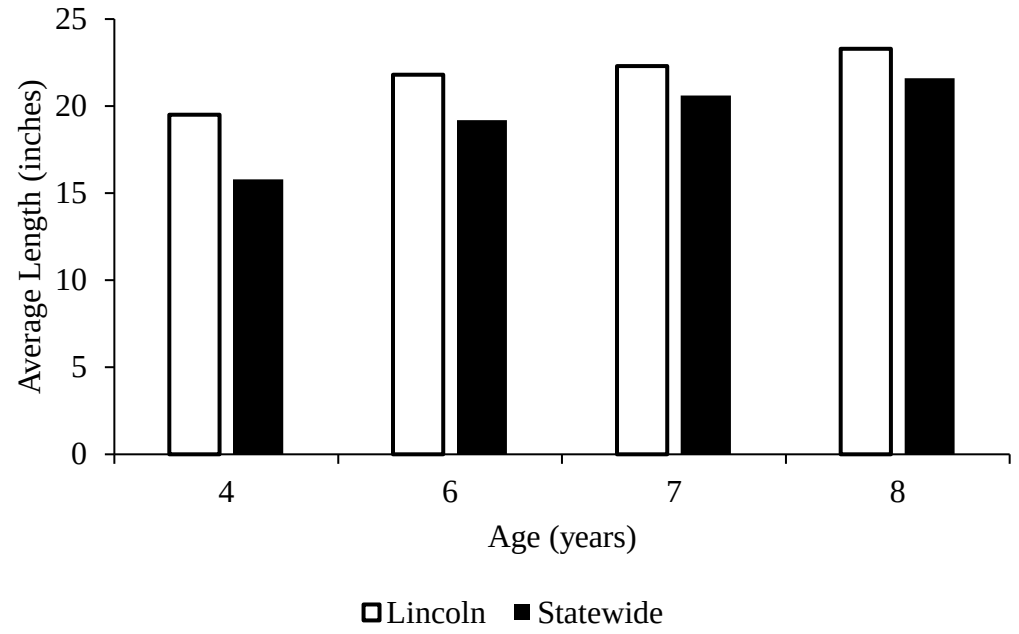

Figure 6. Average lengths at age for Walleye in Lincoln Lake (white bars) compared to statewide averages (black bars) determined through analysis of spine samples collected during the 2023 spring survey. State average lengths are from Schneider et al. (2000).

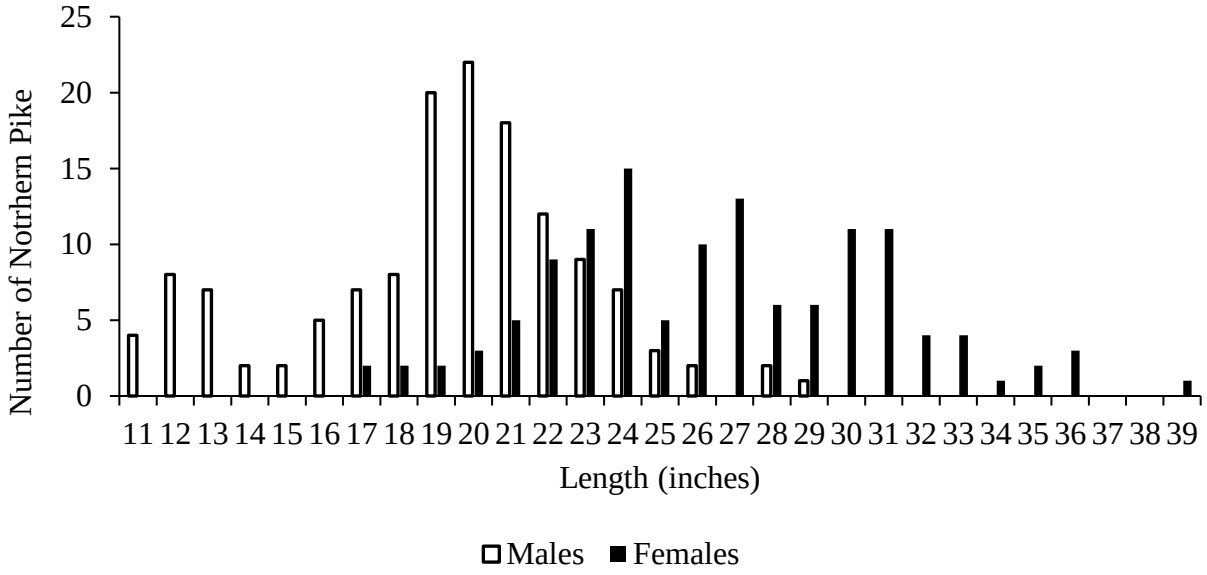

Figure 7. Length frequency distribution of Northern Pike captured during the 2023 spring survey on Lincoln Lake. Males are represented by the open bars and females are represented by the solid black bars. Ten fish of unknown sex (total length range = 9-23 inches) were also collected but are not displayed in the figure.

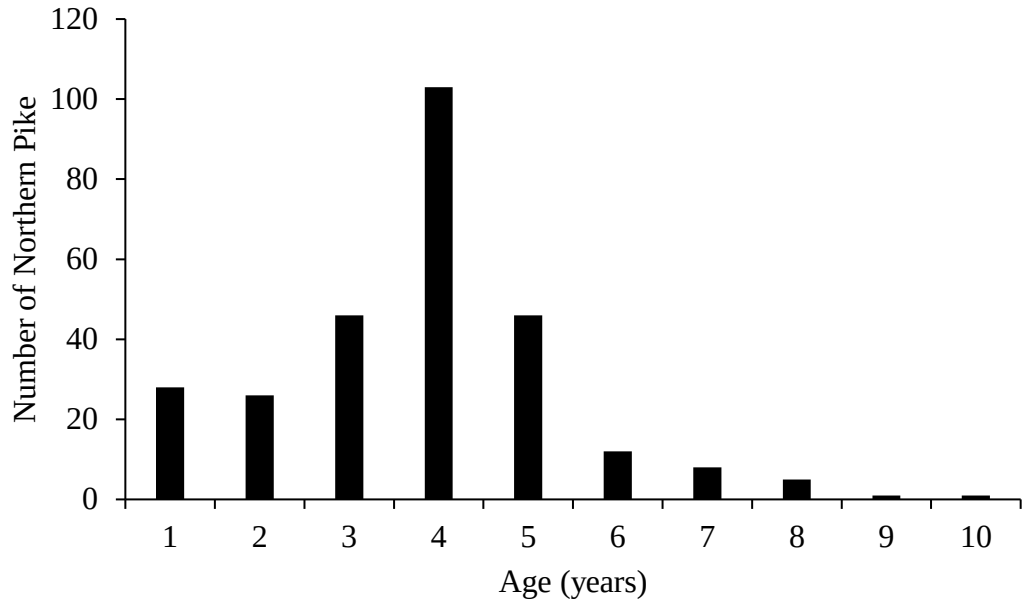

Figure 8. Age frequency distribution of Northern Pike captured during the 2023 spring survey of Lincoln Lake, Kent County.

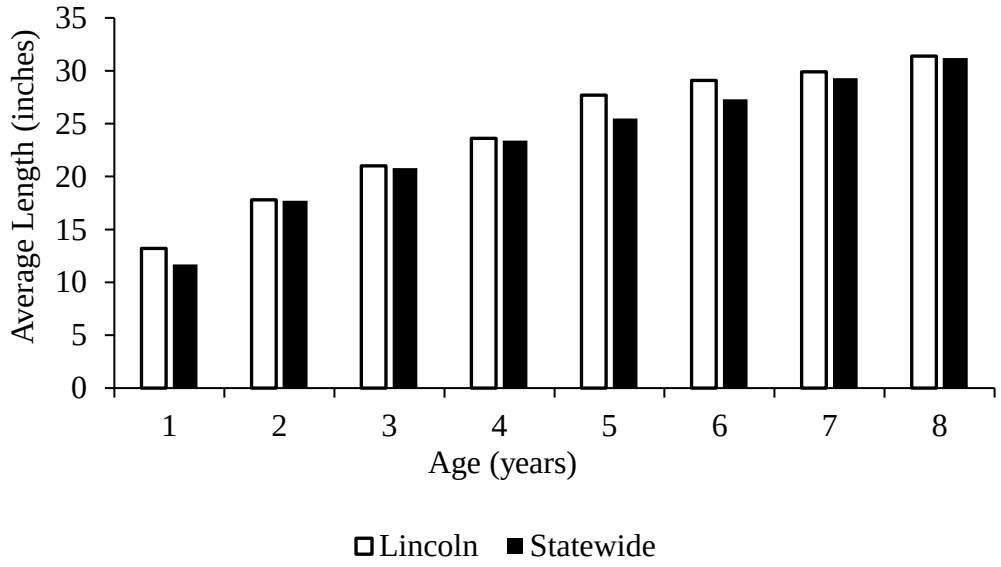

Figure 9. Average lengths at age for Northern Pike in Lincoln Lake (white bars) compared to statewide averages (black bars) determined through analysis of ray samples collected during the 2023 spring survey. State average lengths are from Schneider et al. (2000).

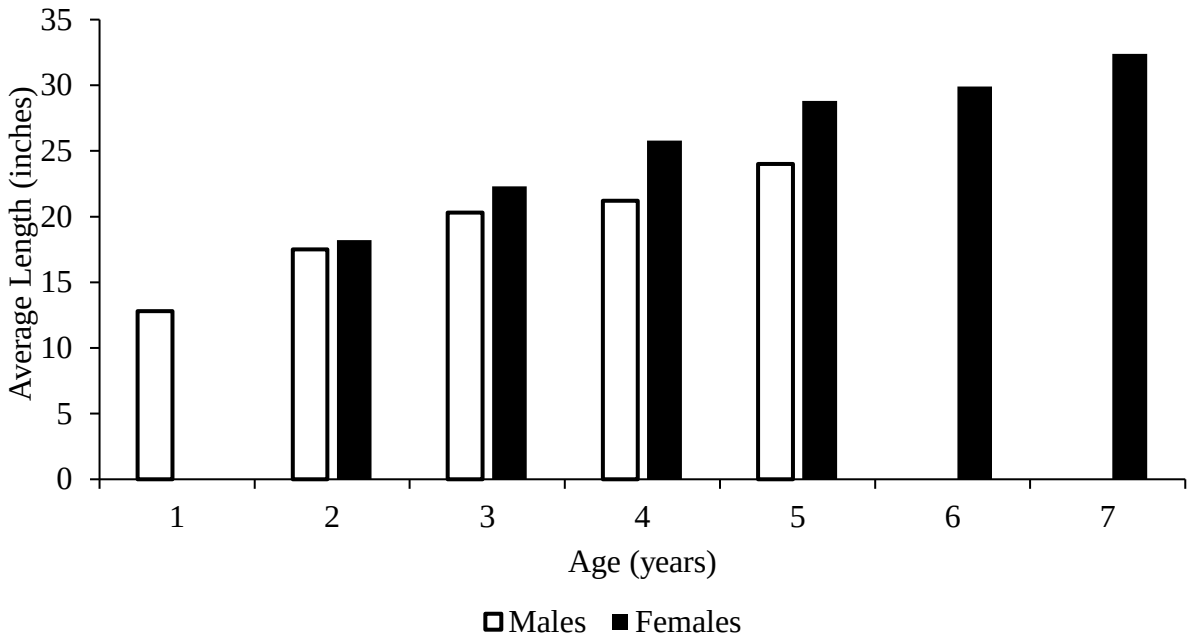

Figure 10. Average length at age for Northern Pike in Lincoln Lake determined through analysis of ray samples collected during the 2023 spring survey. White bars represent males and black bars represent females.

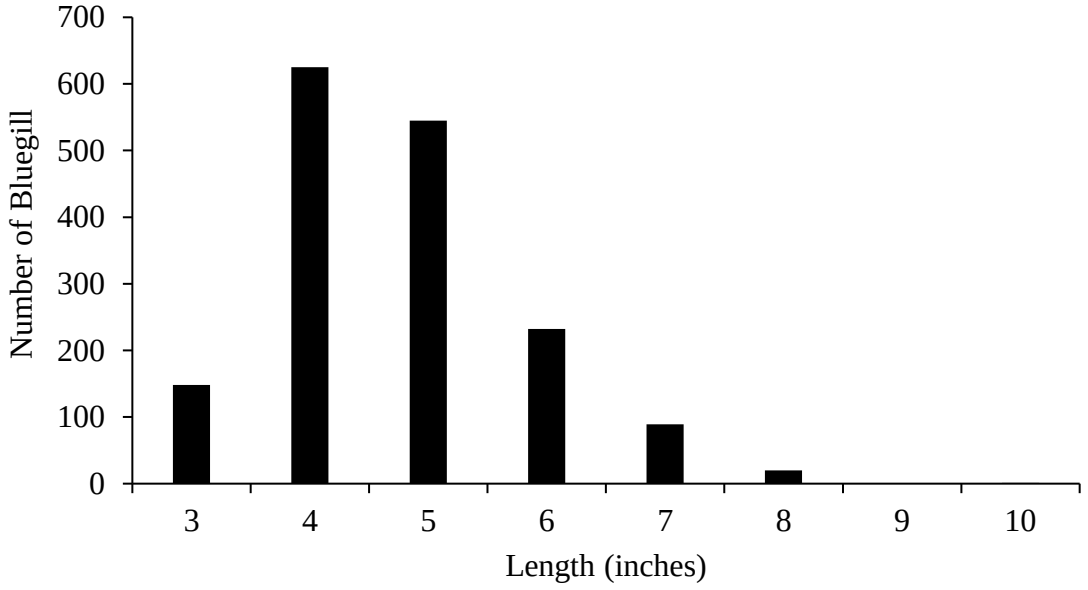

Figure 11. Length frequency distribution of Bluegill captured during the 2023 spring survey on Lincoln Lake.

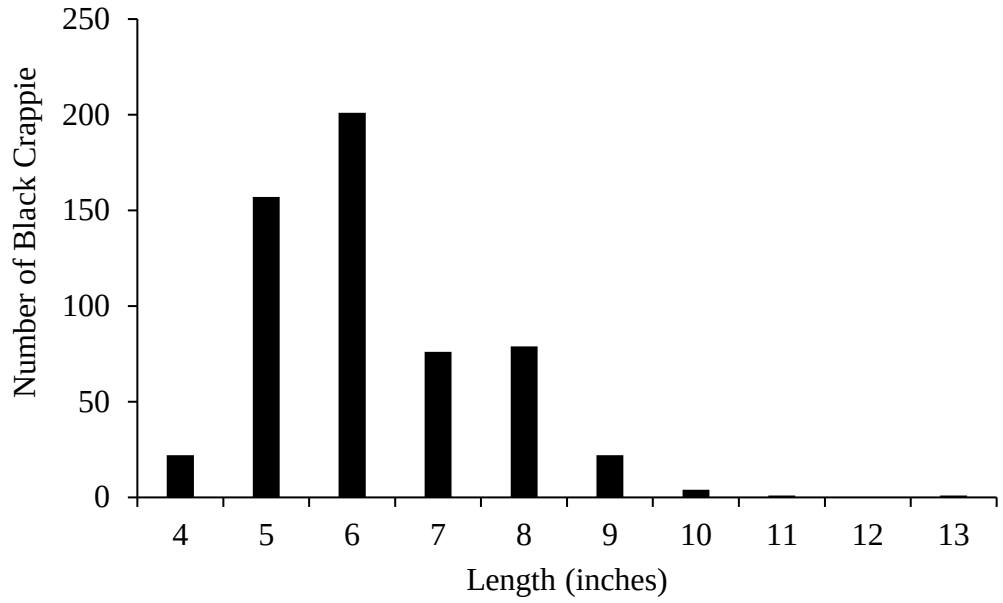

Figure 12. Length frequency distribution of Black Crappie captured during the 2023 spring survey on Lincoln Lake.

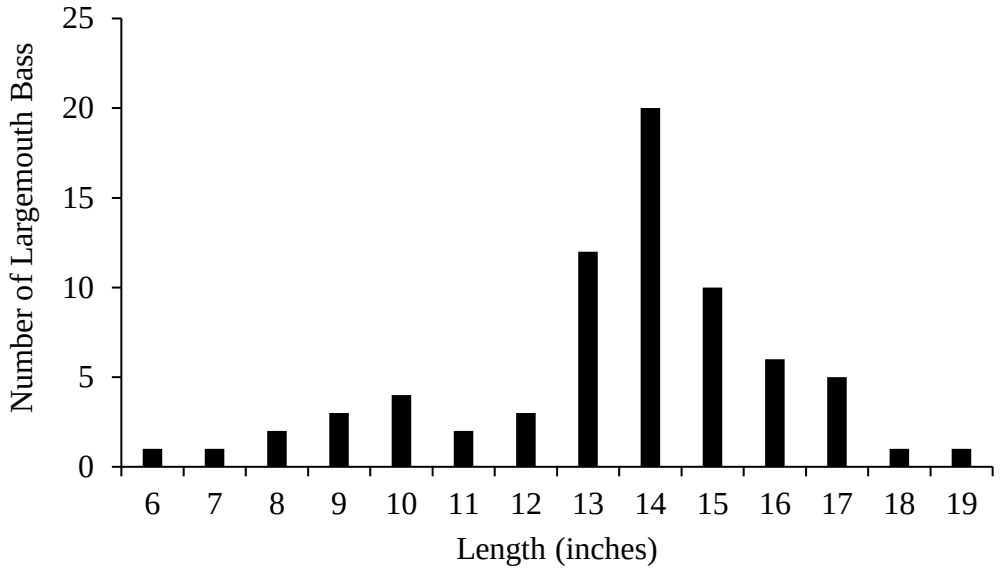

Figure 13. Length frequency distribution of Largemouth Bass captured during the 2023 spring survey on Lincoln Lake.

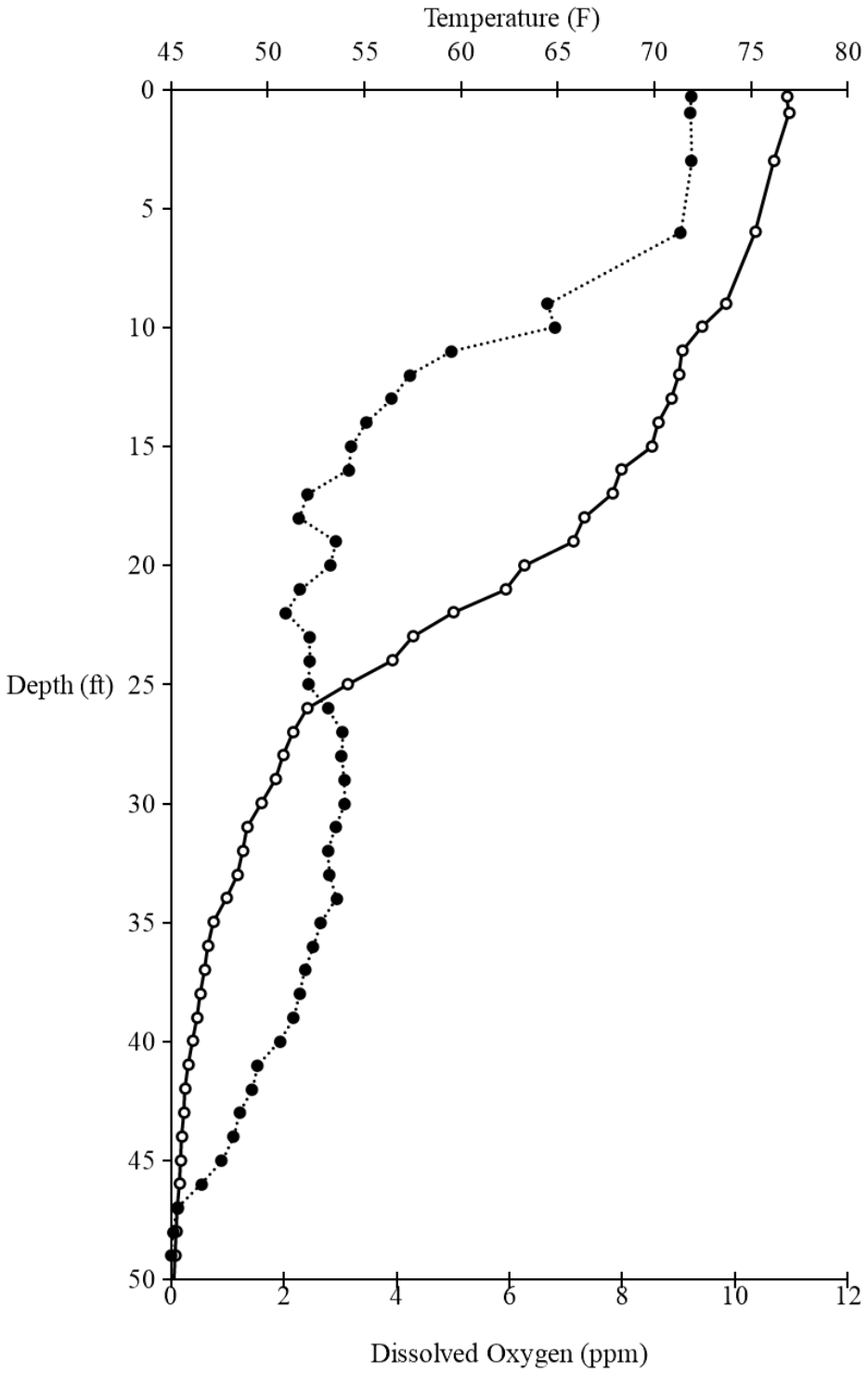

Figure 14. Temperature and dissolved oxygen profile of Lincoln Lake on July 31, 2023. The dashed line with solid circles is dissolved oxygen (ppm) and the solid line with open circles is temperature (F).

Received November 6, 2024; Approved November 11, 2024
Brian Gunderman, Unit Review and Approval
Tom Goneia, External Reviewer
John Bauman, SFR Facilitator
John Bauman, Desktop Publisher and Approval