Pleasant Lake
St. Joseph County, T6S, R12W, S9-10 and 16
St. Joseph River watershed, 2014

Brian Gunderman - Unit Manager

Environment

Pleasant Lake is a 262-acre natural lake located about 4 miles west of the city of Three Rivers (centroid = latitude N41.96 degrees and longitude W85.70 degrees). The lake consists of two basins with maximum depths of 48 ft in the west basin and 53 ft in the east basin (Figure 1). Approximately 47% of the lake (by surface area) is less than 15 ft deep (Smith 2012b). Drop-offs generally are steep with the widest shoals occurring along the eastern shore and in the bay at the north end of the lake. Marl is common in the nearshore zone, whereas organic substrates predominate in offshore areas. The Michigan Department of Natural Resources (MDNR) boat launch on the southwest shore provides public access to Pleasant Lake.

The surficial geology of the area consists primarily of deposits of outwash sand and gravel covered by sandy loams of the Oshtemo, Brady, Bronson, and Hillsdale series. These soils have moderate water infiltration and transmission rates. Michigan Department of Conservation maps indicate the presence of several spring seeps along the west basin of the lake. Water enters Pleasant Lake through these spring seeps, direct precipitation, and surface runoff and exits the lake via a stream that flows southward into Little Pleasant Lake. In 1967 the Circuit Court of St. Joseph County set the lake elevation at 851 ft above sea level. A dam on the outlet is used to maintain the lake at this elevation.

The Pleasant Lake watershed (i.e., the land surface area that drains to the lake) encompasses 1,040 acres. Lakes with low watershed area/lake surface area ratios like Pleasant Lake typically have lower inputs of nutrients and sediment than lakes with high ratios (Shaw et al. 2004). The area surrounding the lake consists of a mixture of agricultural fields and woodlots (Figure 2). Most of the land immediately adjacent to the lake has been modified for residential or vacation home development. The 2014 habitat survey indicated that the dwelling density along the lake is 41.0 dwellings/mile and 39% of the shoreline is armored with seawalls or riprap. These values are between the 50th and 75th percentiles for lakes in southwest Michigan (MDNR Status and Trends Program 2002-2008 summary; K. Wehrly, MDNR - Fisheries Division, unpublished). As observed in many other southwest Michigan lakes, coarse woody habitat is sparse in Pleasant Lake. Only 8.1 logs were observed per mile of shoreline, which was slightly above the median value for southwest Michigan lakes (5.4 logs/mile) and below the statewide median (14.7 logs/mile).

Limnological sampling was conducted at the deepest point in Pleasant Lake on August 11, 2014. Total alkalinity was 138 ppm. This is indicative of a hardwater lake with substantial buffering capacity (Shaw et al. 2004). The biological productivity of a lake is strongly dependent on its supply of two key nutrients: phosphorus and nitrogen. Nitrogen is the limiting nutrient when the ratio of total nitrogen to total phosphorus is <10:1, and phosphorus is the limiting nutrient when this ratio is >15:1 (Shaw et al. 2004). In Pleasant Lake, the ratio of total nitrogen to total phosphorus was 74:1. Thus, phosphorus is the limiting nutrient in this system. The total phosphorus concentration was 0.0092 ppm. The chlorophyll a concentration, which provides an index of algal biomass, was 0.0018 ppm. The Secchi

disk depth (a measure of water transparency) was 11 ft. Based on these water quality parameters, Pleasant Lake is considered an oligotrophic or low productivity lake (Carlson and Simpson 1996).

Water temperature, dissolved oxygen concentration, and pH were measured at the deepest point of the lake on August 10, 2015. As expected, the lake was thermally stratified (Figure 3). The epilimnion extended from the surface to a depth of 14 feet. Water temperatures in the epilimnion ranged from 78.5 F to 78.9 F. The metalimnion (zone of thermal change) extended from 14 feet to 36 feet. Water temperatures in the metalimnion declined with depth from 78.5 F to 51.9 F. In the hypolimnion (depth = 36 feet to the lake bottom), the water temperature slowly dropped with increasing depth to a low of 49.3 F at 50 feet. Most fish species avoid areas with oxygen levels below 3 ppm. The dissolved oxygen concentration in Pleasant Lake remained above 3 ppm to a depth of 27 feet. The pH varied from 8.4 at the surface to 7.2 at the bottom.

History

The first fisheries survey of Pleasant Lake was completed in 1887 by the Michigan Fish Commission. Largemouth Bass, Bluegills, Yellow Perch, and Ciscoes were collected during this initial sampling effort. Fall fingerling Bluegills, Largemouth Bass, and Yellow Perch were stocked in the lake during 1933-1945 (Table 1). Throughout the state, annual stocking programs for these species were discontinued after research indicated spawning habitat (i.e., aquatic vegetation for Yellow Perch, and sand, gravel, or firm mud for Bluegills and Largemouth Bass) was abundant in Michigan lakes and that supplemental stocking had minimal effects on the quality of the fishery (Cooper 1948).

Rainbow Trout were stocked in Pleasant Lake from 1949 through 1995. According to Dexter (2001), trout fishing success was "sporadic", and the stocking program was discontinued in 1995 due to low targeted fishing effort for trout. Walleyes were stocked in the lake from 1978 through 1995. Walleye stocking ceased after few juvenile Walleyes were collected during fall electrofishing surveys completed in 1991, 1993, and 1995.

Eighteen fish species were collected during a general fish community survey in May 1996 (Dexter 2001). Bluegill was the most abundant species in the catch. Bluegill growth was average, and the size structure was rated as good-excellent using Schneider's (1990) index. Yellow Perch also were an important component of the fish community. Perch growth was above average and over 90% of the perch were 7 inches or larger. Largemouth Bass were abundant. However, only 1% of the catch was of legal size (14 inches), and growth rates were below average. The minimum size limit for Largemouth Bass in nearby Corey Lake was reduced to 10 inches in 1998, and soon afterwards the Pleasant Lake Association asked MDNR for a similar change on Pleasant Lake. After reviewing the available data, MDNR decided to change the minimum size limit for Largemouth Bass on Pleasant Lake to 10 inches in April 2002.

In April 2008, Largemouth Bass were captured with nighttime electrofishing gear. Bass 10 inches or larger were tagged with sequentially numbered metal jaw tags (Smith 2012b). Bass of all sizes received dorsal fin clips to evaluate tag loss and record recaptures for population estimates. The population estimate for Largemouth Bass of all sizes was 22.7 fish/acre, which was similar to the population density on Duck Lake (Calhoun County; Smith 2014), and higher than the population density estimates for Corey (Smith 2012b), Gun (Smith and Gunderman 2017), and Gull (Smith 2012a) lakes. The mean size for Largemouth Bass on Pleasant Lake (9.26 inches) was larger than the

mean size on Duck Lake, similar to the mean size on Gull Lake, and smaller than the mean size on Gun and Corey lakes.

A creel survey also was conducted from April 26 through October 31, 2008 to assess fishing effort, catch, and harvest of Largemouth Bass and other fish species. Bluegills (n = 8,087) made up 72% of the total harvest. Anglers harvested 1.8 Bluegills for each Bluegill that was released, which is indicative of a Bluegill population with a good size structure. The harvest estimate for Largemouth Bass was 1,034 fish, and the exploitation rate for bass in Pleasant Lake was 18%. Anglers released 4.2 Largemouth Bass for each bass that was harvested. Anglers reported catching and releasing Northern Pike during the 2008 creel survey, which was surprising because this species had not been captured during any previous sampling efforts on Pleasant Lake.

The Cisco is listed as a threatened species in Michigan. Ciscoes were collected in Pleasant Lake during the 1887, 1969, and 1985 surveys. No Ciscoes were captured during the 1996 sampling effort. To ascertain if Ciscoes were still present in the lake, gill nets were deployed at various locations in early December 2009. One Cisco was caught during the survey.

Current Status

In May 2014, fish were captured with fyke nets, gill nets, seines, and nighttime electrofishing gear as part of MDNR's Status and Trends Program (STP; Table 2). This program involves standardized sampling in randomly selected lakes to provide information regarding spatial and temporal trends in Michigan's fish communities. Total lengths were recorded for all fish. For game fish species, spine or scale samples for age determination were collected from 10 fish per inch group. Weights for all species were calculated using the length-weight regression coefficients compiled by Schneider et al. (2000b). Weighted age frequencies and weighted mean lengths at age were derived using the procedures described by Schneider (2000b).

Twenty-three fish species (plus hybrid sunfishes) were collected during the 2014 STP survey (Table 3). Bluegill (n = 1,615) was the most abundant species, composing 36% of the catch by number and 42% of the catch by weight. Fifty-six percent of the Bluegills were 6 inches or larger. Size structures of Bluegill populations can be challenging to interpret because each gear type exhibits some degree of size selectivity (Figure 4). Schneider (1990) developed a standardized scoring system for interpreting legnth-frequency distributions of Bluegills collected with various types of sampling gear. The majority of the Bluegills in Pleasant Lake were collected in large-mesh fyke nets. The size score for these fish was 5.5, which is considered good to excellent.

Eight year classes of Bluegills were represented in the survey catch (Figure 5). Mean lengths at age were slightly below average through age 2 but were 1.6 inches above average by age 4 (Figure 6). Relative abundance of Bluegills declined sharply from age 3 to age 5. Age 5 and older fish made up only 5% of the Bluegill catch.

Yellow Perch (n = 132), Pumpkinseeds (n = 107), and Black Crappies (n = 60) collectively composed 7% of the total survey catch by number. The percentage of harvestable size fish in the sample varied from 82% for Black Crappies to 93% for Pumpkinseeds (Figure 7). Mean growth indices were +1.4 for Yellow Perch and +1.0 for Pumpkinseeds, indicating above average growth for these species (Figures 8-9). The mean growth index for Black Crappies was in the average range at +0.4 (Figure 10).

Largemouth Bass (n = 100) was the most numerically abundant piscivore in the sample. The total length range for Largemouth Bass was 3-21 inches (Figure 11). Relative to past surveys on Pleasant Lake, the electrofishing catch rates in 2014 were lower for bass 10 inches or larger, but higher for bass 14 inches or larger (Table 4). Although fish up to age 14 were collected, 89% of the Largemouth Bass were age 4 or younger (Figure 12). Mean lengths at age were near the state average for age 1 fish. By age 4, Pleasant Lake Largemouth Bass were 1.6 inches shorter than the state average (Figure 13). Mean lengths at age from the 2014 survey were similar to those recorded in 1996 and slightly below the mean lengths from the 2008 survey (Table 5).

Three Northern Pike were captured during the 2014 survey. The total length range was 30.4-30.7 inches. All of the pike were least 3.1 inches larger than the state average for their age class.

Collectively, the five piscivorous species (Largemouth Bass, Northern Pike, Spotted Gar, Longnose Gar, and Grass Pickerel) composed 26.6% of the total fish biomass during the Pleasant Lake survey. Spotted Gar were the most abundant piscivores in terms of biomass (Table 1). Five Longnose Gar exceeded the minimum size requirement for the Master Angler Program (32 inches), and the largest gar was 44 inches.

Analysis and Discussion

Bluegills are the primary game fish in Pleasant Lake. Catch-per-effort (CPE) with specific gear types provides abundance indices that can be compared to values for STP lakes sampled throughout Michigan during 2002-2007. The Bluegill CPE in large-mesh fyke nets was near the 75th percentile for southwest Michigan lakes and was above the 75the percentile for lakes statewide. The electrofishing CPE was in the top 10% of values statewide and in southwest Michigan. Thus it appears that Bluegill abundance in Pleasant Lake is high relative to other lakes in the region and statewide.

It was not possible to calculate annual fishing mortality for Bluegills in Pleasant Lake due to the absence of population estimates and 2014 harvest data. Bluegill harvest (in terms of number of fish harvested per surface acre) in Pleasant Lake during the 2008 creel survey was compared to similar estimates from MDNR creel surveys completed on other lakes in southwest Michigan during 2002-2009. The sampling periods differed between surveys so they were standardized to calculate harvest per acre only during June-August. Pleasant Lake had the fifth highest harvest per acre out of ten lakes. In addition, the harvest per acre in Pleasant Lake was approximately half of the corresponding estimates for nearby Corey, Clear, and Long lakes. Thus, although I cannot rule out the possibility that fishing mortality was responsible for the truncated age distribution for Bluegills in Pleasant Lake, the available data does not indicate that Bluegill harvest is especially high in Pleasant Lake.

The observed increase in growth of Pleasant Lake Bluegills between ages 2 and 3 likely is the result of a change in foraging strategy (Figure 6). Juvenile Bluegills are confined to vegetation to avoid predators, whereas large fish often forage on Daphnia in open water (Spotte 2007). Gunderman (2015) documented a similar shift in Bluegill growth on Indian Lake in Cass County.

Yellow Perch have completed spawning and most perch have moved offshore by the time STP surveys are conducted. Thus, gill net catch rates are the best indicators of Yellow Perch abundance. Out of 160 STP lakes where at least one perch was captured in gill nets, only eight lakes had Yellow Perch CPEs

higher than Pleasant Lake. The high abundance of Yellow Perch coupled with their rapid growth allows Pleasant Lake to support an excellent perch fishery.

Largemouth Bass CPE with nighttime electrofishing gear was 2.3 fish/minute. This value is well above the 75th percentile statewide and slightly below the 75th percentile (2.4 fish/minute) for southwest Michigan lakes. The Largemouth Bass CPEs in 2014 and 1996 (2.2 fish/minute) were nearly identical. The Largemouth Bass CPE was slightly higher in 2008 (3.3 fish/minute). However, the 2008 survey was not directly comparable to the 1996 and 2014 sampling events because the 2008 survey crew was specifically targeting bass whereas the other crews were attempting to net all species. Overall, the CPE data suggest that total Largemouth Bass abundance in Pleasant Lake has not changed substantially during the last 20 years.

The electrofishing CPE for Largemouth Bass 10 inches or larger was lower in 2014 than in past surveys (Table 4). This is not surprising given that the minimum size limit reduction was designed to increase harvest on bass from 10 inches to 13 inches. Conversely, the CPE for bass 14 inches or larger increased from 0.01/minute in 1996 to 0.17/minute in 2014. Thus, the size structure of the bass population has improved since the 10 inch minimum size limit was implemented. The increased abundance of large bass is not due to a change in growth rate (Table 5). Anglers may be preferentially harvesting small bass and releasing larger fish, thereby decreasing fishing mortality for bass larger than 14 inches.

Northern Pike are growing rapidly in Pleasant Lake. Only adult fish were captured during the 2014 survey. At this time it is unclear if pike are reproducing in this system.

The percentage of the total fish biomass made up of predators was within the target range of 20-50% proposed by Schneider (2000a). The average to above average growth for panfish species suggests that the current predator abundance is sufficient to keep prey populations at desired levels. Stocking additional predators could adversely affect growth of Largemouth Bass in Pleasant Lake.

No ciscoes were collected during the 2014 survey. The timing of the survey was not optimal for capturing this species. Ciscoes most commonly are found in water layers where the temperature is 68 F or colder and the dissolved oxygen concentration is at least 3 mg/L (Latta 1995). The August 2015 limnological sampling indicated that these conditions were met in Pleasant Lake at depths of 21 ft to 27 ft.

The Michigan Aquatic Habitat Viewer predicts a class 1 fish community in Pleasant Lake. Warmouth, Yellow Bullhead, Bluegill, Largemouth Bass, and Black Crappies are common species in class 1 lakes (Wehrly et al. 2012). These five species made up 62% of the fish biomass during the 2014 survey. Thus, the survey data support the existing designation as a class 1 lake.

Management Direction

The current 10 inch minimum size limit for Largemouth Bass on Pleasant Lake has accomplished two objectives. It has increased Largemouth Bass harvest opportunities, and it has resulted in an increase in abundance of bass that are 14 inches or larger. Based on anecdotal reports and comments at public meetings, the existing minimum size limit has broad acceptance among anglers. No regulation changes are proposed at this time.

No fish stocking is recommended for Pleasant Lake. The lake already supports strong fisheries for Bluegill, Pumpkinseed, Yellow Perch, and Largemouth Bass. Introducing a new species could adversely affect the existing game fish and cisco populations.

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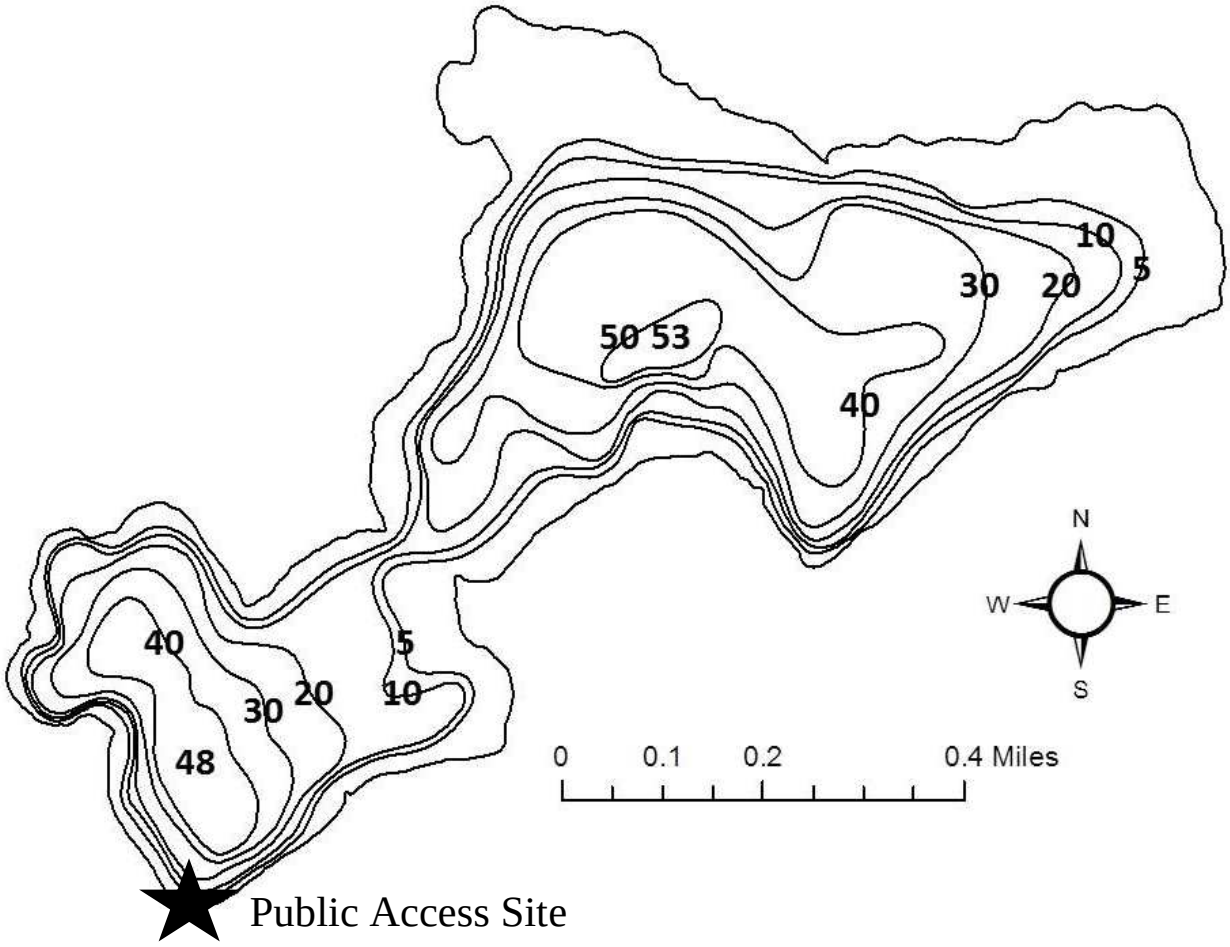


Figure 1.–Bathymetry of Pleasant Lake, St. Joseph County. Depths are in feet.

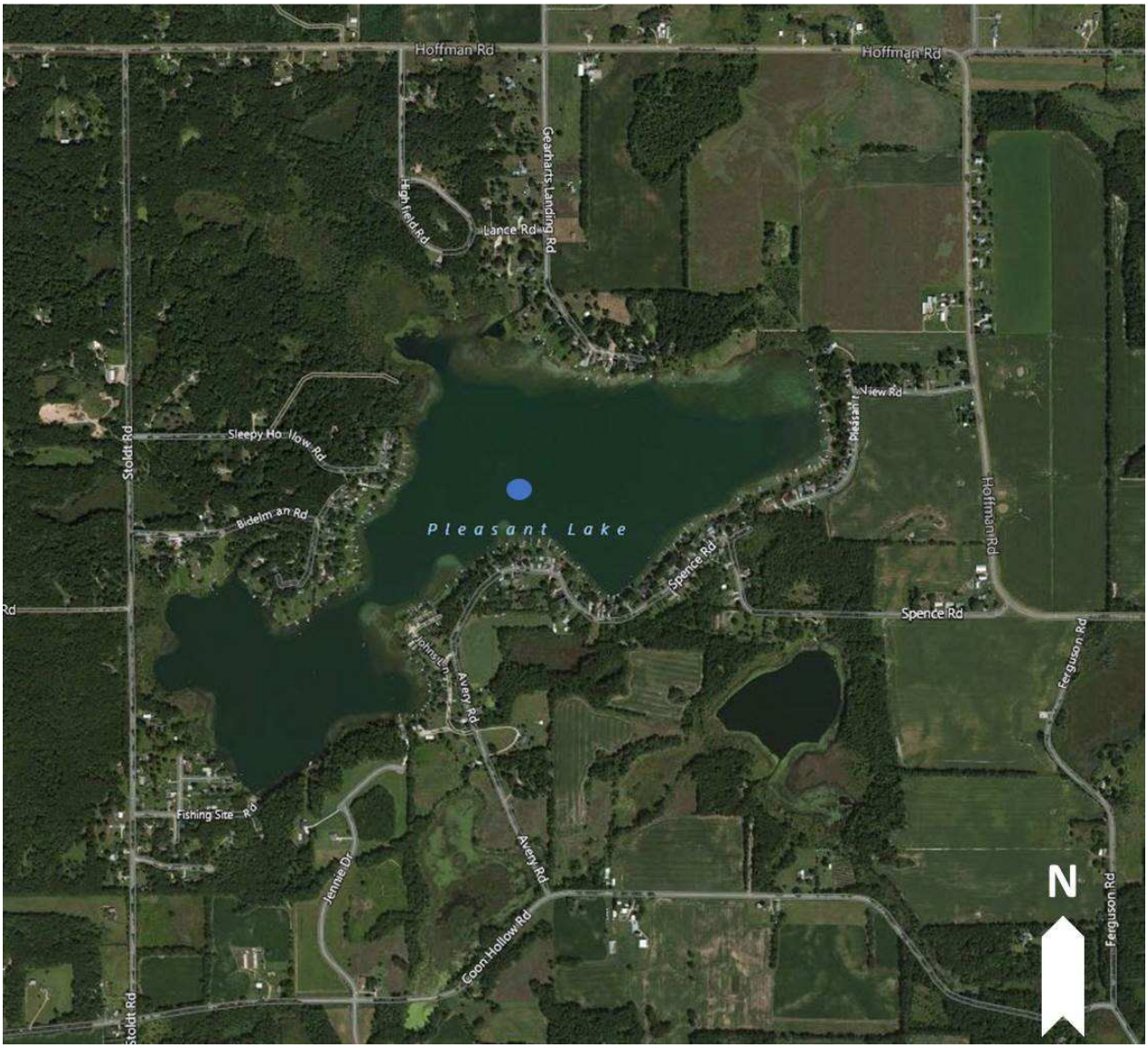
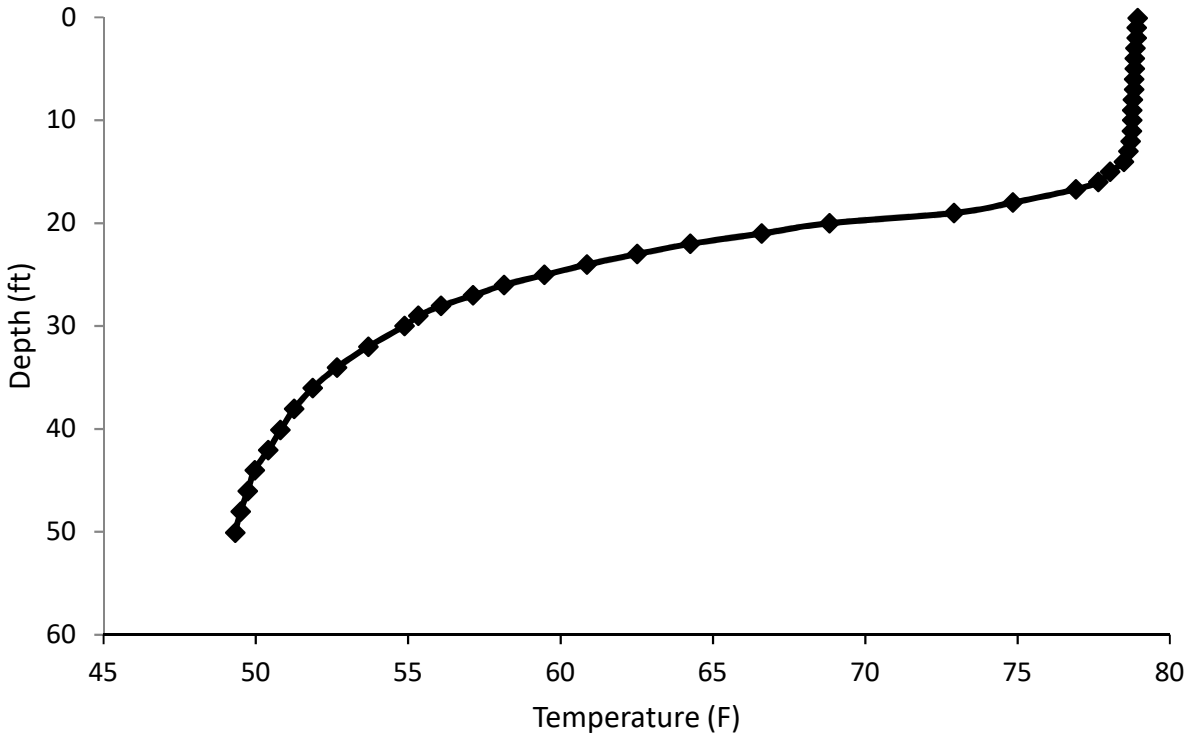


Figure 2.–Aerial view of Pleasant Lake and the surrounding area. The blue dot indicates the location of the 2014 and 2015 water quality sampling. Image from www.bing.com/maps.



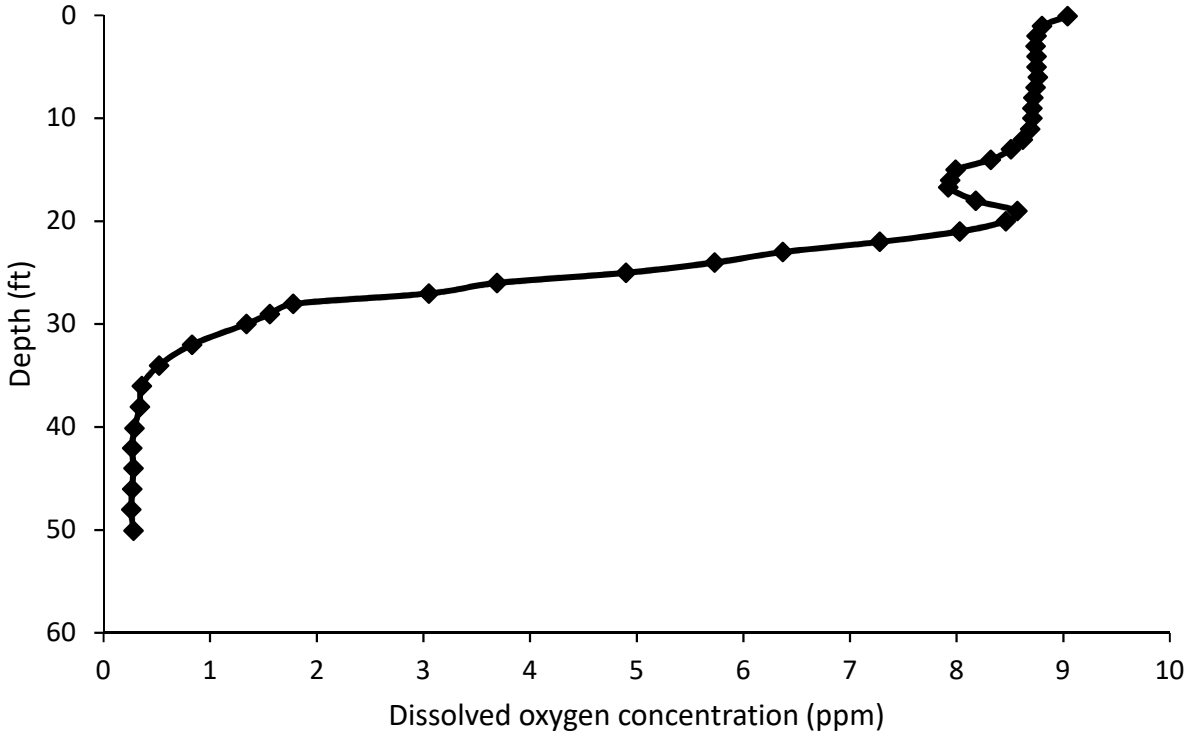


Figure 3.–Temperature and dissolved oxygen profiles recorded at the deepest point on Pleasant Lake on August 10, 2015.

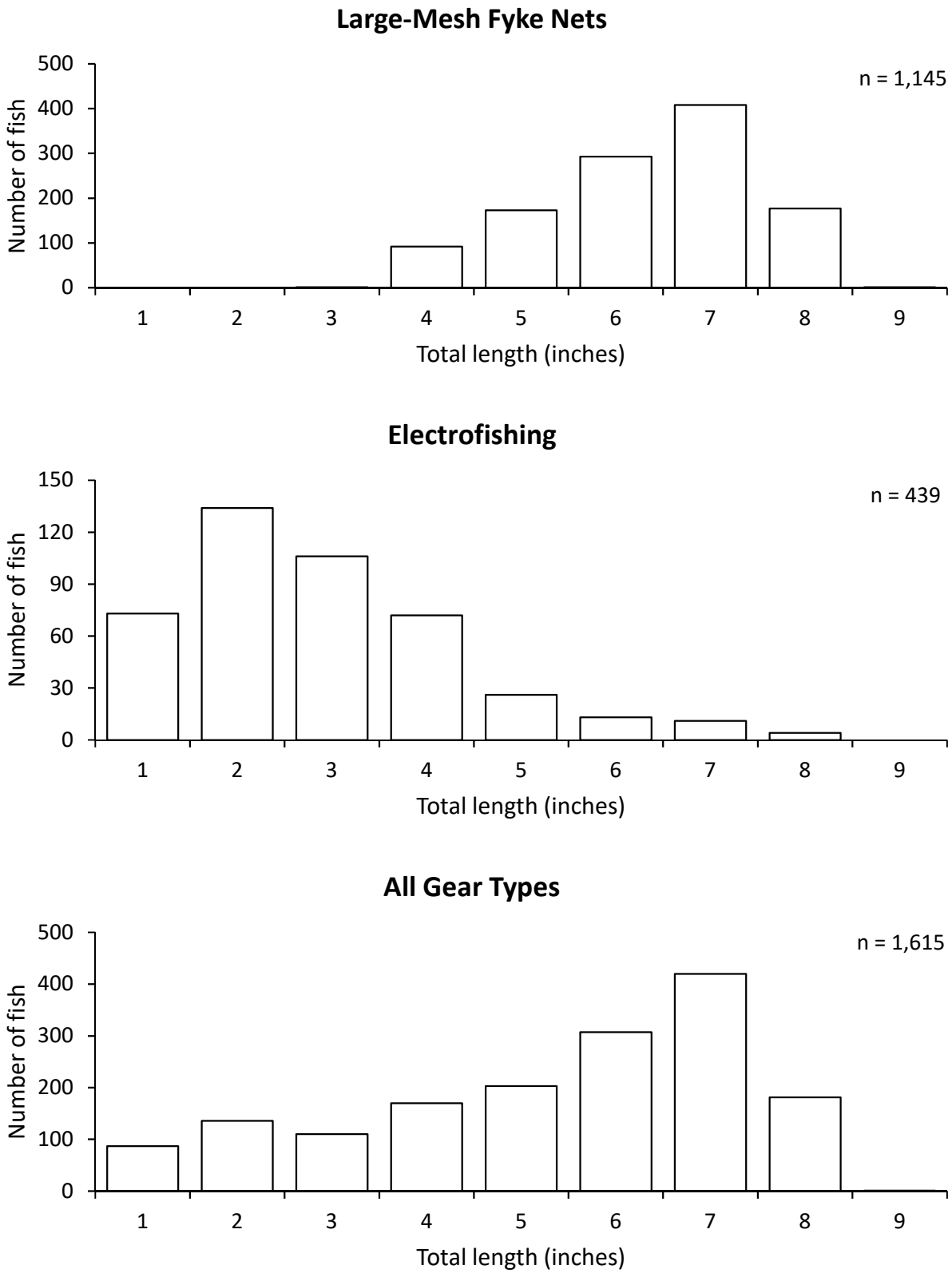


Figure 4.–Length-frequency distributions for Bluegills captured in Pleasant Lake using large-mesh fyke nets, nighttime electrofishing gear, and all gear types during May 12-15, 2014.

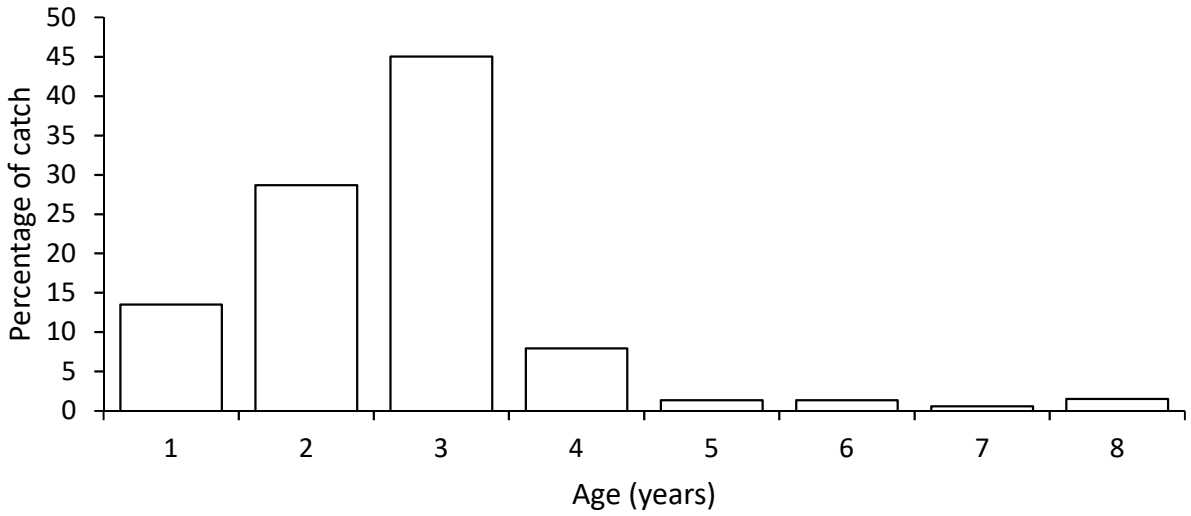


Figure 5.–Weighted age frequency distribution for Bluegills captured in Pleasant Lake during May 12-15, 2014.

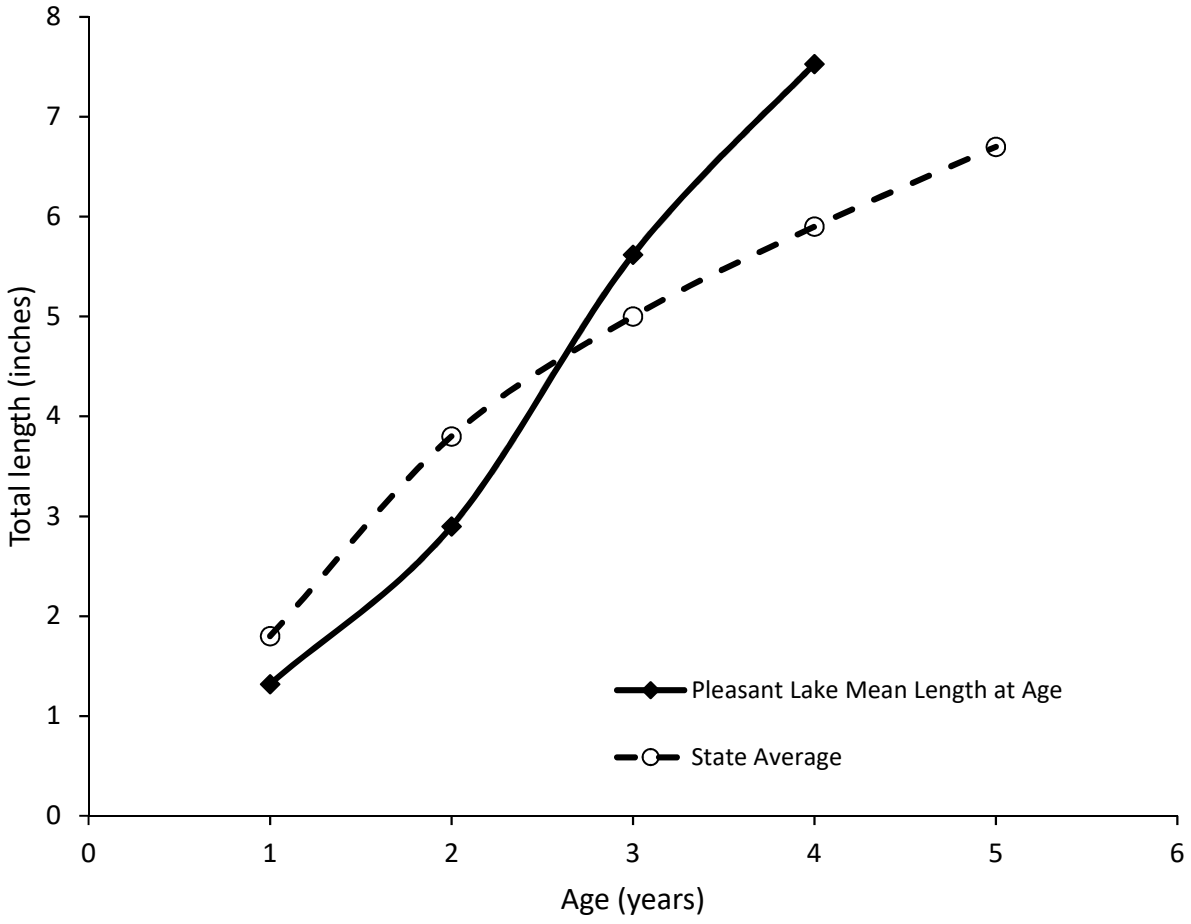


Figure 6.–Growth of Bluegills in Pleasant Lake, as determined from scale and spine samples collected during May 12-15, 2014. State average lengths are from Schneider et al. (2000a).

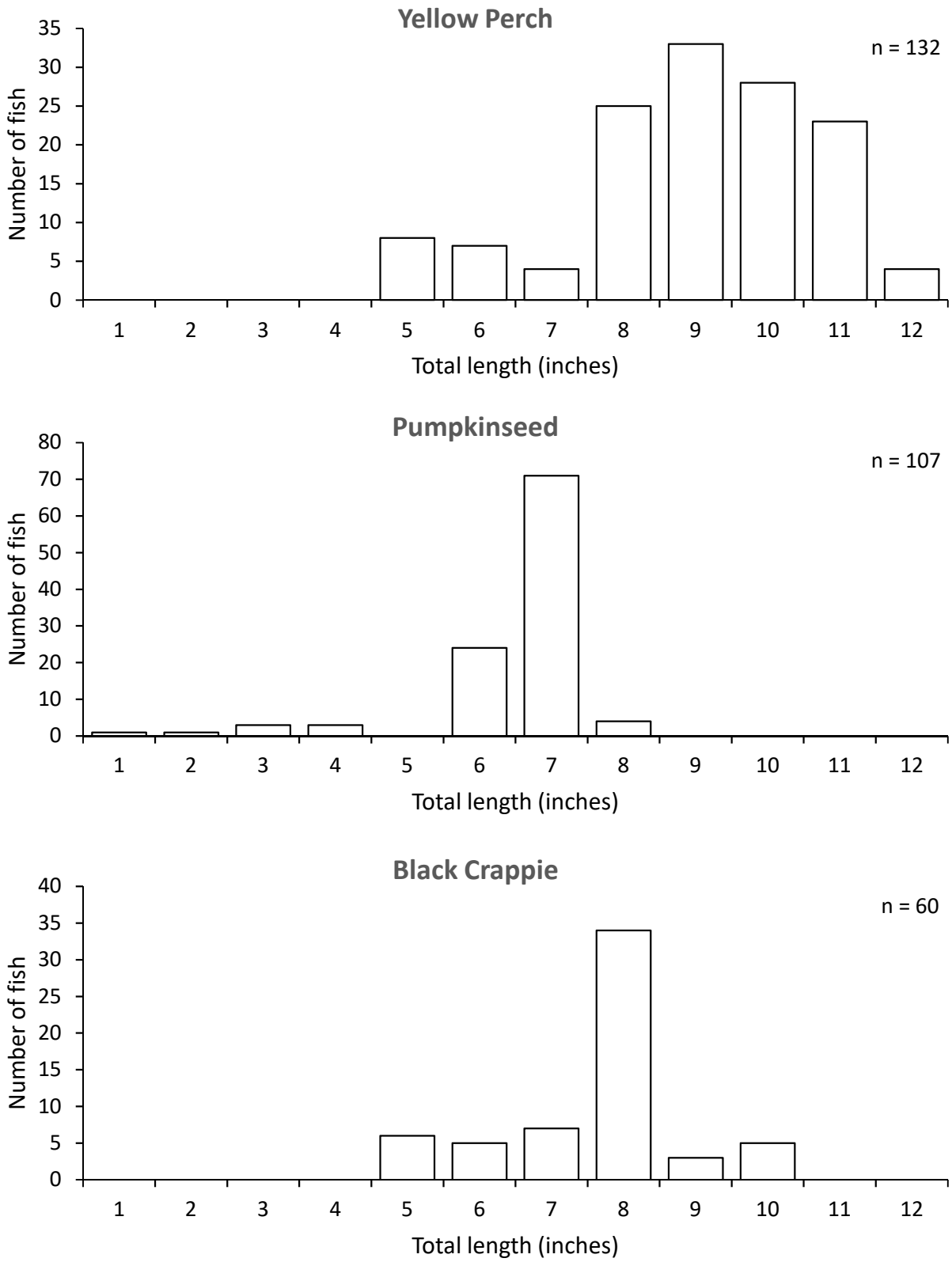


Figure 7.–Length frequency distributions for Yellow Perch, Pumpkinseeds, and Black Crappies captured in Pleasant Lake during May 12-15, 2014.

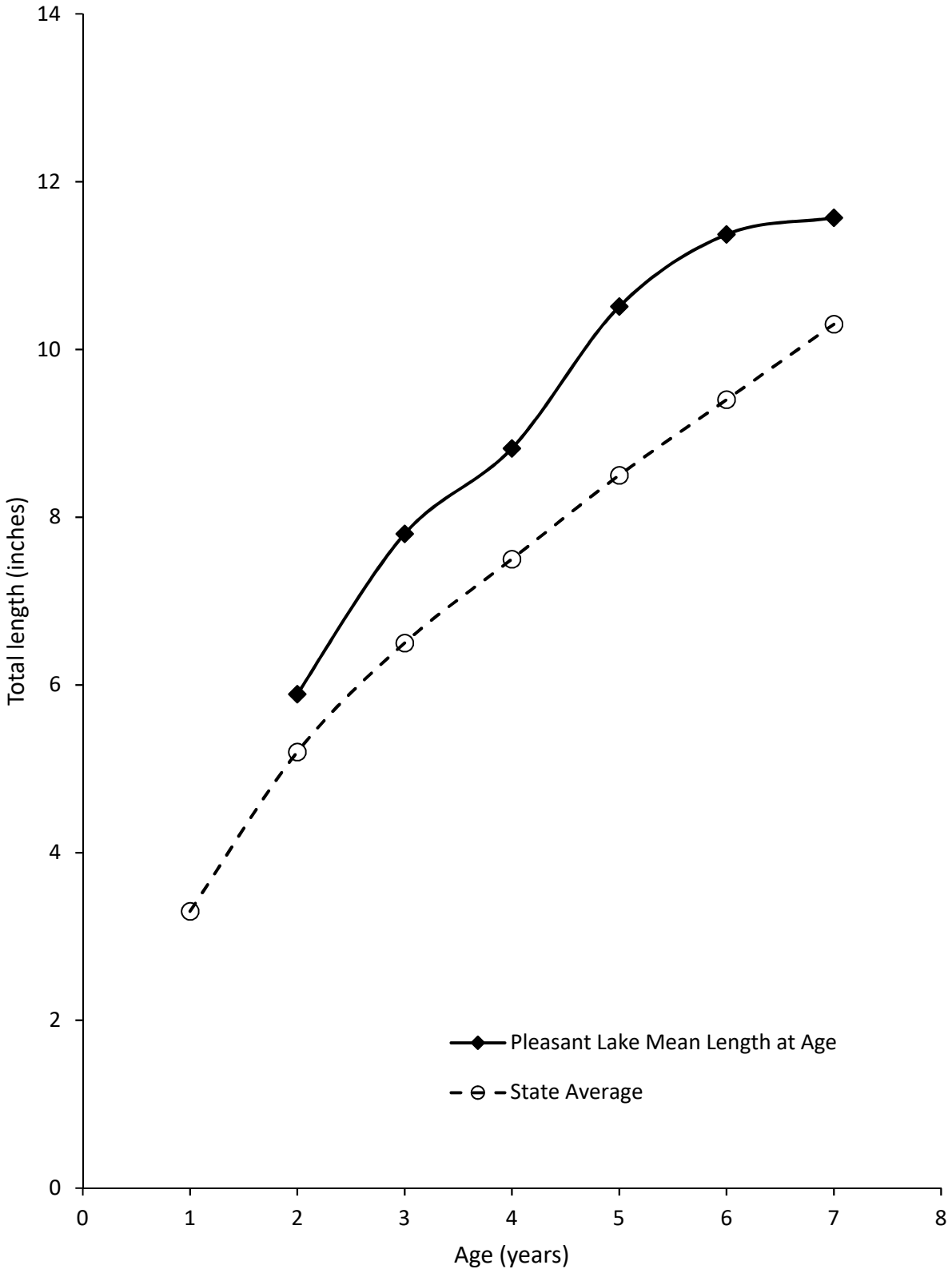


Figure 8.–Growth of Yellow Perch in Pleasant Lake, as determined from scale and spine samples collected during May 12-15, 2014. State average lengths are from Schneider et al. (2000a).

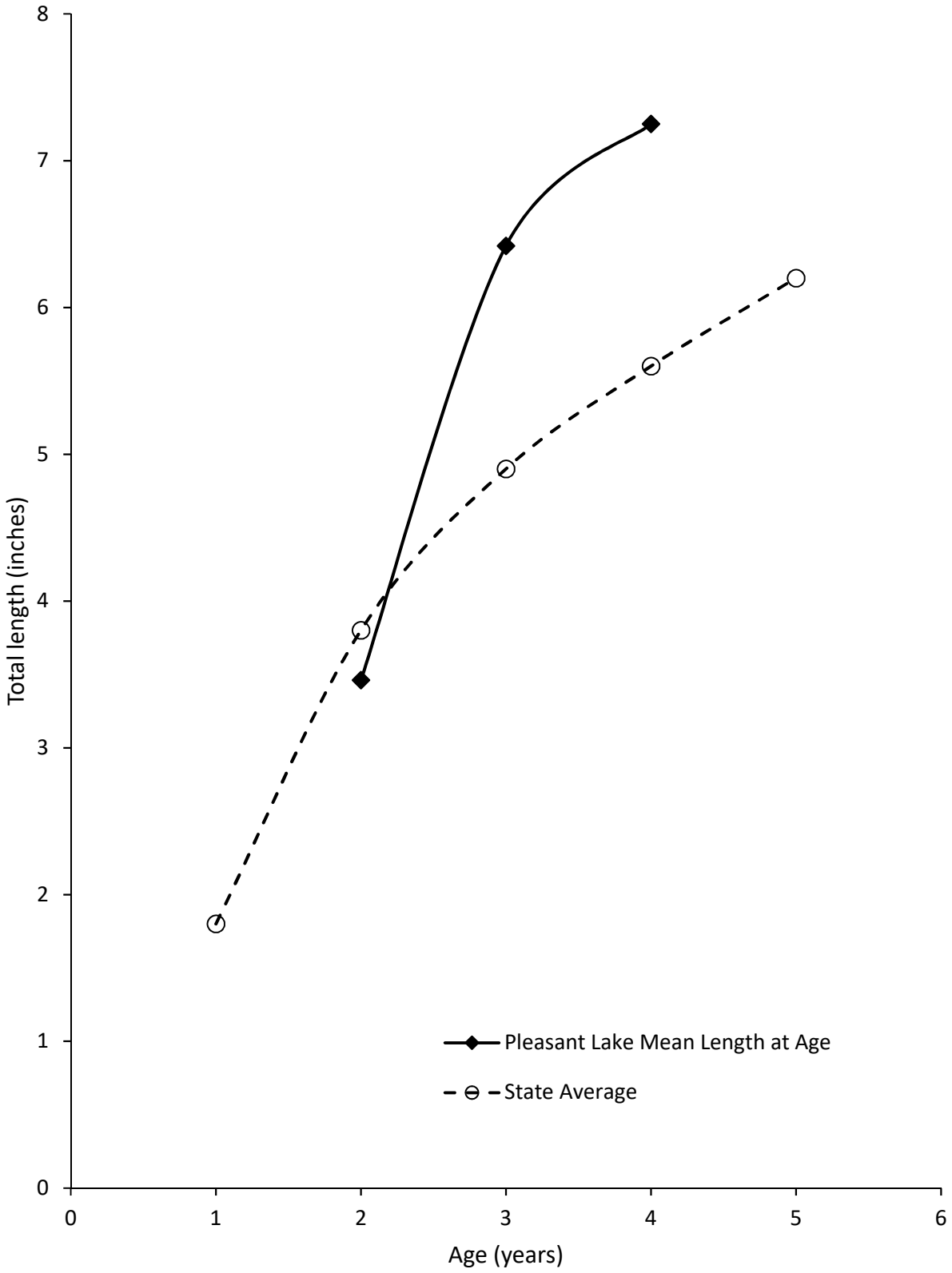


Figure 9.–Growth of Pumpkinseeds in Pleasant Lake, as determined from scale and spine samples collected during May 12-15, 2014. State average lengths are from Schneider et al. (2000a).

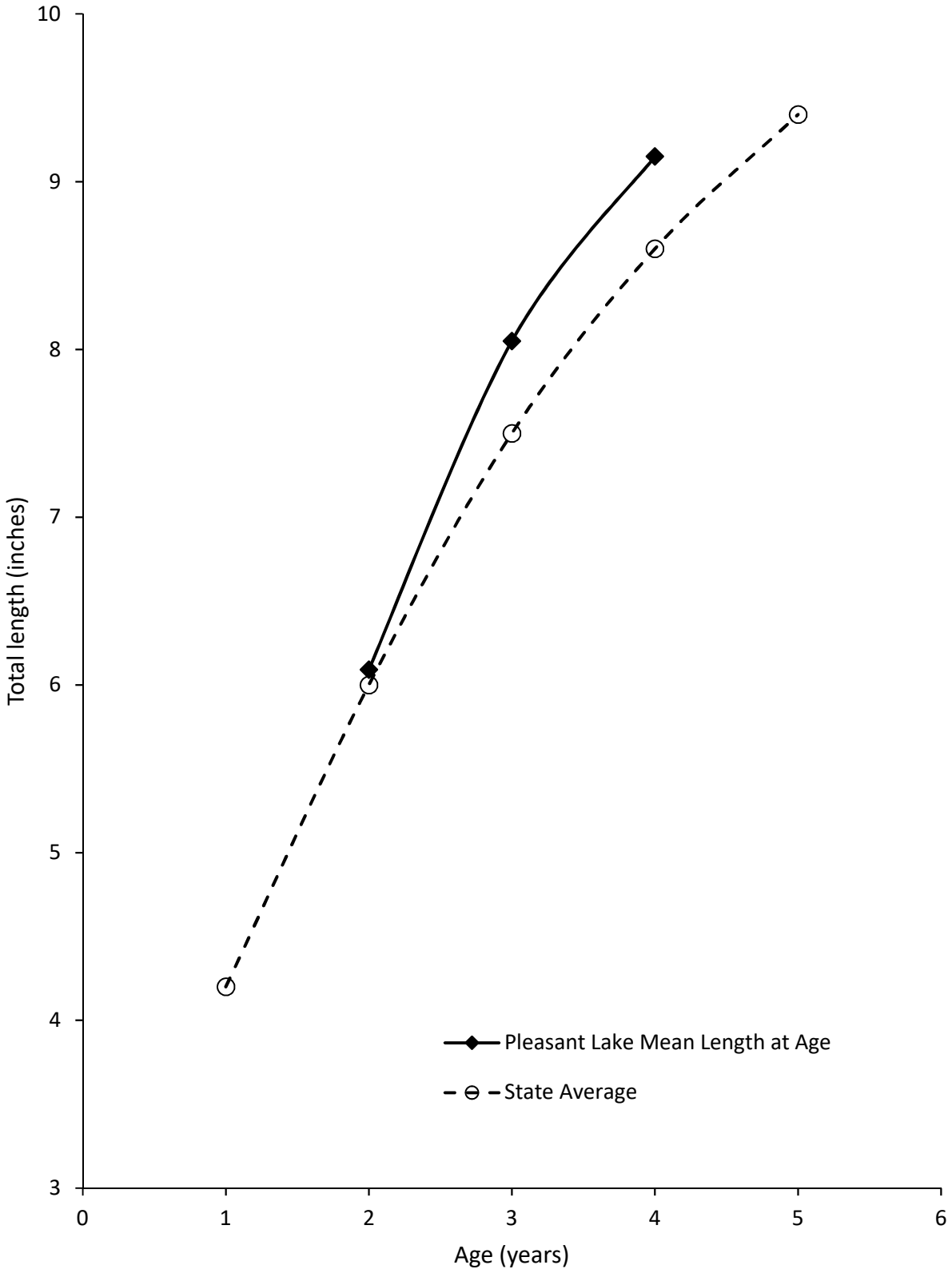


Figure 10.–Growth of Black Crappies in Pleasant Lake, as determined from scale and spine samples collected during May 12-15, 2014. State average lengths are from Schneider et al. (2000a).

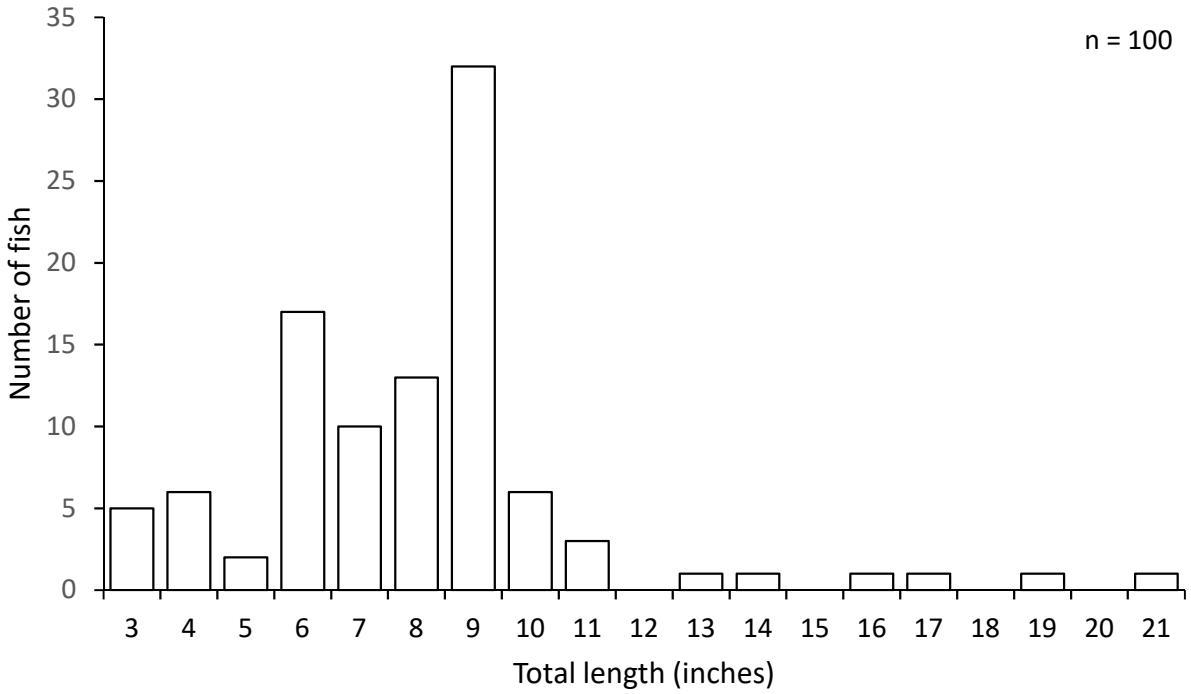


Figure 11.–Length frequency distribution for Largemouth Bass captured in Pleasant Lake during May 12-15, 2014.

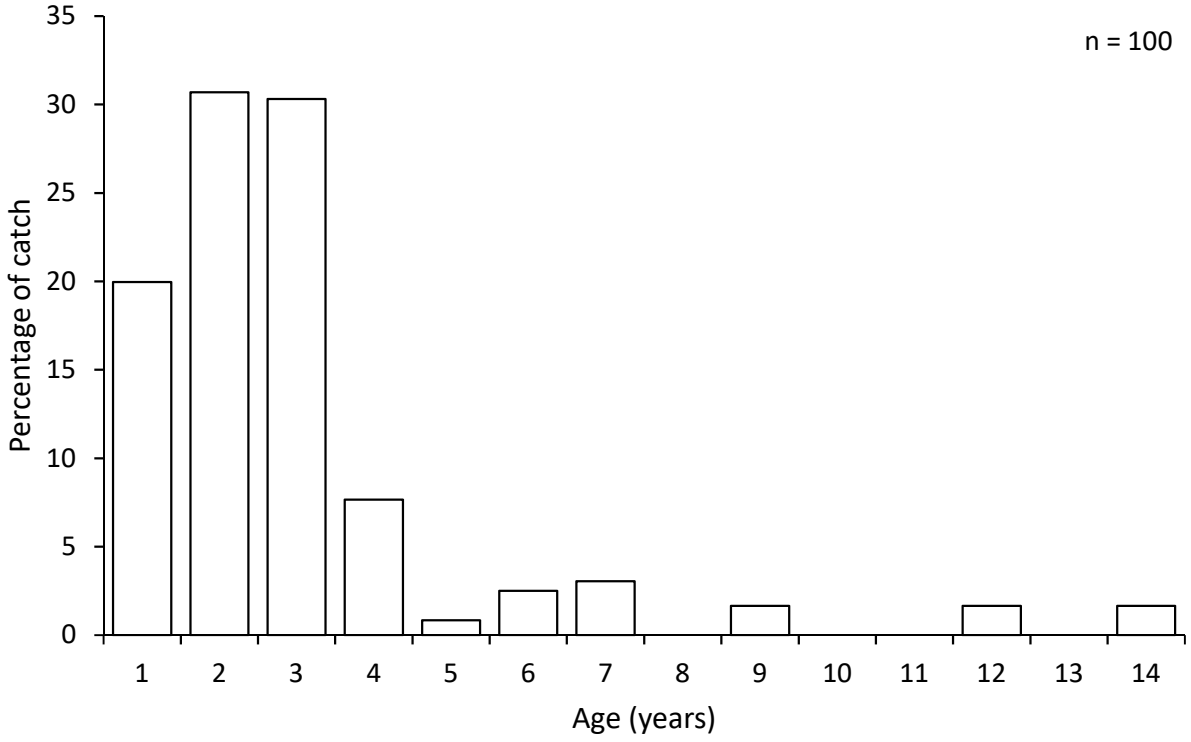


Figure 12.–Age frequency distribution for Largemouth Bass captured in Pleasant Lake during May 12-15, 2014.

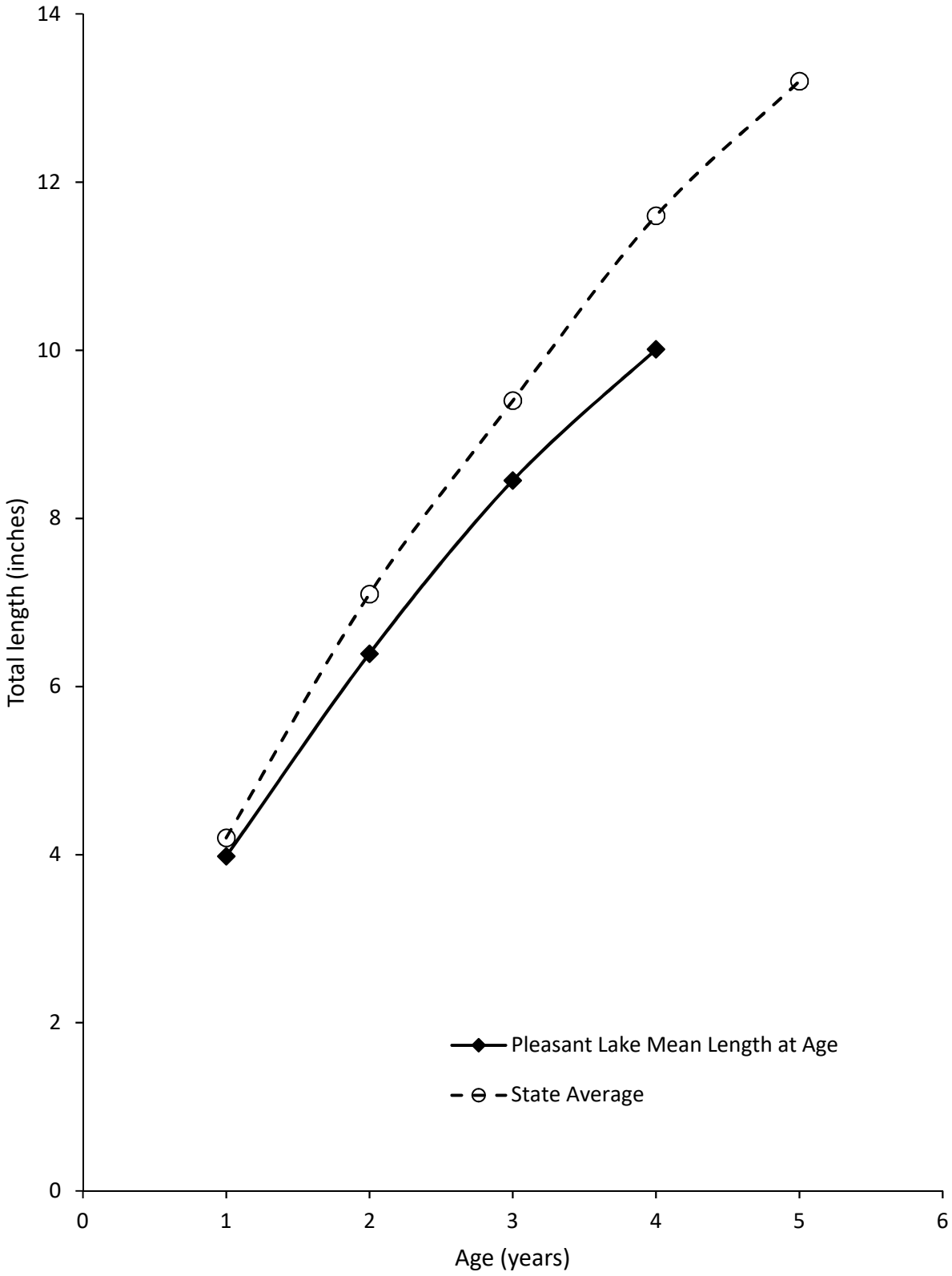


Figure 13.–Growth of Largemouth Bass in Pleasant Lake, as determined from scale and spine samples collected during May 12-15, 2014. State average lengths are from Schneider et al. (2000a).

Table 1.–Fish stocking in Pleasant Lake, 1933-2014.

Year	Species	Life stage	Number	Number/acre	Average length (inches)
1933	Bluegill	Fall fingerling	10,000	38	---
1934	Bluegill	Fall fingerling	15,000	57	---
1937	Largemouth Bass	Fall fingerling	1,500	6	---
1938	Bluegill	Fall fingerling	100,000	382	---
	Yellow Perch	Fall fingerling	15,000	57	---
1939	Bluegill	Fall fingerling	40,000	153	---
	Yellow Perch	Fall fingerling	15,000	57	---
1940	Bluegill	Fall fingerling	18,000	69	---
	Bluegill	Yearling	1,500	6	---
	Largemouth Bass	Yearling	1,500	6	---
1941	Bluegill	Fall fingerling	70,000	267	---
	Largemouth Bass	Fall fingerling	1,000	4	---
1942	Bluegill	Fall fingerling	20,000	76	---
	Largemouth Bass	Fall fingerling	1,000	4	---
1943	Bluegill	Fall fingerling	10,000	38	---
	Largemouth Bass	Fall fingerling	2,000	8	---
1944	Bluegill	Fall fingerling	20,000	76	1.50
	Largemouth Bass	Fall fingerling	1,000	4	3.00
1945	Bluegill	Fall fingerling	15,000	57	2.00
	Largemouth Bass	Fall fingerling	4,500	17	4.00
1949	Rainbow Trout	Adult	2,000	8	8.00
1950	Rainbow Trout	Adult	2,000	8	7.50
1951	Rainbow Trout	Adult	2,000	8	8.00
1952	Rainbow Trout	Adult	1,000	4	8.00
	Rainbow Trout	Adult	1,000	4	16.00
1953	Rainbow Trout	Adult	1,000	4	7.00
1954	Rainbow Trout	Adult	1,000	4	9.00
1955	Rainbow Trout	Legal	1,000	4	---
1956	Rainbow Trout	Legal	1,000	4	---
1957	Rainbow Trout	Legal	1,000	4	---
1958	Rainbow Trout	Legal	1,000	4	---
1959	Rainbow Trout	Legal	500	2	---
1960	Rainbow Trout	Legal	1,250	5	---
1961	Rainbow Trout	Legal	1,000	4	---
1962	Rainbow Trout	Legal	1,000	4	---
1963	Rainbow Trout	Legal	1,000	4	---
1964	Rainbow Trout	Sublegal	1,500	6	---
1965	Rainbow Trout	Fall fingerling	3,000	11	---
	Rainbow Trout	Legal	164	1	---
1966	Rainbow Trout	Fall fingerling	5,600	21	---
1967	Rainbow Trout	Yearling	5,000	19	---

Table 1.–Continued.

Year	Species	Life stage	Number	Number/acre	Average length (inches)
1967	Rainbow Trout	Yearling	5,000	19	---
1968	Rainbow Trout	Yearling	4,000	15	---
1969	Rainbow Trout	Yearling	5,000	19	---
1971	Rainbow Trout	Yearling	5,000	19	---
1972	Rainbow Trout	Yearling	5,000	19	---
1973	Rainbow Trout	Yearling	5,000	19	---
1974	Rainbow Trout	Yearling	5,000	19	---
1975	Rainbow Trout	Yearling	4,000	15	---
1976	Rainbow Trout	Yearling	5,000	19	---
1977	Rainbow Trout	Yearling	5,000	19	---
1978	Rainbow Trout	Yearling	5,000	19	---
	Walleye	Fall fingerling	3,660	14	---
1979	Rainbow Trout	Yearling	5,000	19	5.72
	Rainbow Trout	Yearling	5,000	19	4.80
1980	Rainbow Trout	Yearling	5,000	19	7.80
1981	Rainbow Trout	Yearling	4,000	15	7.28
1982	Rainbow Trout	Yearling	4,500	17	6.20
1983	Rainbow Trout	Yearling	5,000	19	6.92
	Walleye	Spring fingerling	2,900	11	---
1984	Rainbow Trout	Yearling	3,900	15	6.92
	Walleye	Spring fingerling	8,000	31	1.84
1985	Rainbow Trout	Yearling	5,000	19	7.80
	Walleye	Spring fingerling	5,000	19	0.72
1986	Rainbow Trout	Yearling	6,300	24	6.96
	Walleye	Spring fingerling	5,200	20	1.92
1987	Rainbow Trout	Yearling	8,000	31	6.52
	Walleye	Spring fingerling	5,432	21	1.72
1988	Rainbow Trout	Yearling	8,000	31	6.52
1989	Rainbow Trout	Yearling	6,800	26	6.68
	Walleye	Spring fingerling	4,977	19	1.72
1990	Rainbow Trout	Yearling	8,000	31	6.88
1991	Rainbow Trout	Yearling	4,398	17	7.12
	Walleye	Spring fingerling	4,442	17	1.76
1993	Walleye	Spring fingerling	8,037	31	2.12
1995	Rainbow Trout	Yearling	6,700	26	6.84
	Walleye	Spring fingerling	14,489	55	1.08

Table 2.–Sampling effort during the STP survey on Pleasant Lake, May 2014. Each net night equals one overnight set of one net.

Sampling period	Gear	Effort
May 12-15	Large-mesh fyke net	12 net nights
May 12-14	Small-mesh fyke net	4 net nights
May 12-14	Graded-mesh gill net	4 net nights
May 27	Seine	4 hauls (25 ft each)
May 27	Nighttime electrofishing	30 minutes

Table 3.–Numbers, weights, and lengths for fish species collected during the STP survey on Pleasant Lake, May 2014. Fish were captured using fyke nets, gill nets, seines, and nighttime electrofishing gear.

Species	Number	Percent by number	Weight (lbs)	Percent by weight	Length range (inches)	Percent legal or harvestable[1]	Growth index[2]
Bluegill	1,615	35.7	300.5	41.9	1-9	56	+0.2
Bluntnose Minnow	1,114	24.7	1.5	0.2	1-3	---	---
Blacknose Shiner	543	12.0	1.3	0.2	1-2	---	---
Sand Shiner	288	6.4	0.7	0.1	1-2	---	---
Warmouth	180	4.0	27.2	3.8	2-7	37	---
Yellow Perch	132	2.9	54.1	7.5	5-12	89	+1.4
Pumpkinseed	107	2.4	33.2	4.6	1-8	93	+1.0
Largemouth Bass	100	2.2	45.5	6.3	3-21	15	-0.9
Banded Killifish	93	2.1	0.2	0.0	1-2	---	---
Yellow Bullhead	83	1.8	52.9	7.4	8-13	---	---
Black Crappie	60	1.3	18.8	2.6	5-11	82	+0.4
Spotted Gar	59	1.3	88.1	12.3	16-32	---	---
Lake Chubsucker	31	0.7	11.6	1.6	2-10	---	---
Hybrid Sunfish	24	0.5	7.5	1.0	4-8	96	---
Blackchin Shiner	24	0.5	0.1	0.0	1-2	---	---
Iowa Darter	19	0.4	0.0	0.0	1-2	---	---
Brown Bullhead	13	0.3	15.5	2.2	10-15	---	---
Golden Shiner	9	0.2	1.1	0.2	5-8	---	---
Longnose Gar	8	0.2	37.4	5.2	28-44	---	---
Spotfin Shiner	8	0.2	0.1	0.0	1-3	---	---
Northern Pike	3	0.1	19.4	2.7	30-30	100	---
Central Mudminnow	3	0.1	0.0	0.0	2-2	---	---
Spottail Shiner	2	0.0	0.0	0.0	2-2	---	---
Grass Pickerel	1	0.0	0.2	0.0	9	---	---
Total	4,519		716.7				

[1] Harvestable size is 6 inches for Bluegills, Pumpkinseeds, Hybrid Sunfish, and Warmouths, and 7 inches for Black Crappies and Yellow Perch.

[2] Average deviation from the state average length at age. Mean growth indices <-1 indicate below average growth, indices between -1 and +1 indicate average growth, and indices >+1 indicate growth is faster than the state average.

Table 4.–Electrofishing catch per effort (fish/minute) for Largemouth Bass equal to or larger than three total length thresholds during MDNR surveys conducted on Pleasant Lake in 1996, 2008, and 2014.

Total length	1996	2008	2014
≥ 10 inches	0.76	1.11	0.37
≥ 12 inches	0.14	0.20	0.20
≥ 14 inches	0.01	0.10	0.17

Table 5.–Mean lengths at age (in inches) for Largemouth Bass captured during MDNR surveys on Pleasant Lake in 1996, 2008, and 2014.

Age	1996	2008	2014
1	3.67	4.47	3.98
2	6.40	7.13	6.39
3	8.44	8.95	8.45
4	10.34	10.22	10.01