Saddlebag Lake
Cass County, T5S/R13W/Sec 5, 6, and 7
Saint Joseph Watershed / May 9-12 and August 3, 2022

Matthew Diana / Fisheries Biologist

Environment

Saddlebag Lake is a small lake that is part of a lake chain in Cass County (Figure 1) near the town Marcellus, MI. The lake has a surface area of 103 acres and a maximum depth of 35 feet (Figure 2). It is connected by a navigable channel to the south to Fish Lake. Water flows from Gravel Lake into Saddlebag Lake, then through Fish Lake, Finch Lake, and Bunker Lake into Dowagiac Creek. Dowagiac Creek is a tributary to the Dowagiac River that flows southwest into the Saint Joseph River and into Lake Michigan. The lake has two basins with a shallow shoal between that resembles a saddlebag. The lake shoreline drops off to a depth of 10 feet relatively quickly. The lake has extensive wetland shorelines where it is not developed and a diverse native aquatic vegetation community is present. Vegetation is chemically treated primarily near residential properties but lake wide treatments for Eurasian Water Milfoil, Curly Leaf Pondweed, and Starry Stonewort are also conducted. There is a Michigan Department of Natural Resources (DNR) access site located on the south shore of Fish Lake that provides boating access to Saddlebag Lake. The access site has a hard surface ramp with a skid pier dock and has parking for 13 vehicles. The shoreline of Saddlebag Lake has some houses along the east and west ends, but the shoreline is primarily wetland. Substrates are dominated by pulpy peat with limited marl at depth. The watershed drains 966 acres (excluding Gravel Lake watershed) and the geology is primarily coarse-textured glacial till (81%) with some glacial outwash sand and gravel and postglacial alluvium (14%). The land cover based on 2023 mapping was primarily wetland (40%), agriculture (28%) and forested (24%) with a smaller amount of urban (8%) cover types (Figure 3; USGS 2024).

History

Fisheries management in Saddlebag Lake has been intricately connected to management in Fish Lake. Saddlebag Lake was stocked initially with Walleye fry in 1893 and 1909 (Table 1). Largemouth Bass and Bluegill were stocked sporadically from 1910 through 1945 when the practice was discontinued because stocking of these species was determined unnecessary (Cooper 1948). Fish stocking has focused on Fish Lake with the goal that fish would distribute throughout the chain. Under permits from the DNR, fall fingerling Walleye from private hatcheries were stocked annually in Fish Lake from 1994 through 2003 (except 2002 and 2009). The average number of fish stocked was 1,275 at a mean size of 5.9 inches. The DNR began stocking Walleye in Fish Lake in 2013, stocking spring fingerlings in 2013, 2015, and 2021 (average of 17,528 fish at 1.4 inches) and fall fingerlings in 2017 and 2023 (average of 1,428 at 6.6 inches). The current prescription for Fish Lake is to stock 1,360 (4 fish per acre) fall fingerling Walleye every other year. Spring fingerlings can be used as a backup (17,000 fish at 50 per acre) if fall fingerlings are not available. This stocking effort should maintain a Walleye fishery in Fish Lake as well as allow fish to move into Saddlebag Lake which is an acceptable management goal.

There are no historic aquatic surveys on Saddlebag Lake. Brief creel efforts conducted from 1954 through 1964 documented that Bluegill were the primary fish harvested from the lake with Black Crappie

harvest being variable. Most fisheries evaluations conducted on Fish Lake have focused on evaluating Walleye stocking success. The most recent survey was conducted in May and June 2002 and utilized fyke nets, trap nets, gill nets, seines, and electrofishing gear. Bluegill was the most abundant species and catch rates were high. Average size was only 5.6 inches, but an abundance of small Bluegill were caught in electrofishing gear. Growth was average when compared to statewide surveys. Fish up to 10 years old were captured that were over 10 inches. The Bluegill size structure scored 4.8 and was rated as good using an index developed by Schneider (1990). Black Crappie averaged 7.8 inches and fish up to 13 inches were captured. Largemouth Bass were abundant; however, the size structure appeared depressed with an average length of 10.8 inches and no fish over 15 inches were caught. Growth rates were on the low end of average compared to statewide surveys. The Yellow Perch population provided a quality fishery with good numbers and sizes. The average size was 8.8 inches, and fish up to 13 inches were collected. A total of 44 Walleye were captured, indicating survival of stocked fish. No natural recruitment of Walleye was documented. They averaged 14.8 inches and ranged up to 27 inches. Walleye growth was well above average with a growth index of +2.7 (mean length-at-age 2.7 inches larger than statewide mean length). Prey were abundant and Walleye stocking was successfully creating a fishery.

State endangered Pugnose Shiner have been observed in Finch Lake and state threatened Cisco have been observed in Bunker Lake. Despite the good connectivity between lakes, these species have not been observed in Saddlebag Lake.

Current Status

Methods

Saddlebag Lake was surveyed in 2022 as part the DNR's Status and Trends sampling program (S&T). This program utilizes a variety of gear types with standardized protocols in an effort to sample all fish species and all size classes of fish to evaluate the entire lake fish community. Lakes are selected randomly throughout the state to evaluate and monitor fish populations (Wehrly et al. DRAFT). Netting efforts took place during May 9-12, 2022. Two gill net sets were conducted overnight for two days (total of 4 net nights). Three large-mesh fyke nets were set for three overnight sets for a total of nine net nights. Two small-mesh fyke nets were set for two nights for a total of 4 net nights. Three 10-minute electrofishing transects were performed on May 12, 2022, for a total of 30 minutes of electrofishing. Only two seine hauls were conducted due to limited sites suitable for seine gear. All fish were identified, counted, and measured for total length, and aging structures were collected from 10 fish in each inch class for Black Crappie, Bluegill, Largemouth Bass, Northern Pike, Walleye, and Yellow Perch. Weights for all fish species were calculated using the length-weight regression equations compiled by Schneider et al. (2000b).

The relative stock density for each fish species was assessed using catch per unit effort (CPUE) calculated as the number of fish caught per net night (gill, fyke, and trap nets), per hour of electrofishing (boomshocker), or per seine haul. The CPUE data from this survey were compared to a summary of CPUE data from lakes surveyed in the Status and Trend Program from 2001 through 2022 on a statewide and regional level for the Southern Lake Michigan Management Unit (SLMMU). Weighted age compositions using length and age keys for each game fish species were calculated as described by Schneider (2000b). A growth index for each age class was calculated by subtracting the state average

mean length from the mean length-at-age from the 2022 Saddlebag Lake survey. Growth indices for age classes represented by a minimum of five fish were averaged to provide a mean index of fish growth (Schneider et al. 2000a). Panfish growth index scores between -0.5 and +0.5 were considered average while index scores below -0.5 were below average and above +0.5 were above average. Growth index scores for all other species that were between +1 and -1 are considered similar to the state average while scores less than -1 and greater than +1 are considered below or above the state average, respectively. Bluegill size structure was rated using an index based on the mean length and the proportion of fish >6 inches, >7 inches, and >8 inches collected using specific gear types (Schneider 2000a, Schneider 1990). Due to differences in size selectivity between gear types, separate scores were calculated for Bluegills captured using large-mesh fyke nets and electrofishing gear.

Limnological sampling was conducted on August 3, 2022, and included a temperature and oxygen profile and a shoreline development and woody cover survey. Temperature and dissolved oxygen concentrations were recorded at one-foot increments at the deepest spot in the lake. Shoreline surveys were conducted along 13 1,000-foot transects on Saddlebag Lake for a total of 13,320 feet (transect 13 was 1,320 feet). The number of docks (large = over 2 boat slips and small = 1-2 boat slips), dwellings, submerged trees and the percent of the shoreline that was armored (riprap or seawalls) were recorded for each transect. Hourly water temperatures were recorded on Saddlebag Lake from April 11, 2022 through November 14, 2022, using an Onset Hobo Water Temp Pro v2 temperature logger that was deployed at a depth of 2.5 feet.

Results

A total of 4,374 fish from 21 species were captured in the 2022 Saddlebag Lake survey (Table 2). Bluegill was the most abundant fish species with 3,301 fish captured making up 75% of the catch by number. A large majority of the Bluegill captured were 1 or 2 inches in length (87%). Most Bluegill captured were age 1 (64%) or age 2 (27%) indicating particularly strong recruitment in 2020 and 2021 (Figure 4). The average length of fish caught was only 2.3 inches because of the large number of juvenile fish. Despite the abundance of small fish, Bluegill up to age-9 and 9.1 inches were captured. Bluegill growth was average with an index score of -0.1 (Figure 5). Small-mesh fyke nets were particularly effective at capturing small Bluegill with a CPUE of 671.8 fish per net night which is well above the 75th percentiles for SLMMU (72.0 fish per net night) and statewide surveys (46.0 fish per net night). Larger fish were targeted by large-mesh fyke nets and CPUE was 13.9 fish per net night. CPUE was below the 25th percentile for SLMMU (22.1 fish per net night) but close to the median for statewide surveys (13.4 fish per net night). Schneider Bluegill size structure scores were 4.2 (satisfactory) for large-mesh fyke nets and 2.2 (poor) for electrofishing. Large-mesh fyke nets targeted larger fish since the 1-to-2-inch fish were not recruited to the gear, resulting in higher index scores that were based on abundance of catchable-sized fish. There were other panfish present in lower numbers including Pumpkinseed (n = 43), Warmouth (n = 32), Green Sunfish (n = 2), and hybrid sunfish (n = 72).

Black Crappie was the second most abundant species captured. A total of 427 fish were caught that averaged 9.5 inches and ranged from 4 to 12 inches. Large-mesh fyke net CPUE of Black Crappie was 44.3 fish per net night which is well above the 75th percentiles for SLMMU (6.9 fish per net night) and statewide surveys (4.8 fish per net night). Growth rates were average with an index score of +0.4. Black Crappie were larger than the statewide averages for ages 3-5, but similar to the statewide averages for

other year classes (Figure 6). Black Crappie that were age-4 were the most abundant making up 44% of the catch followed by age 3 at 28% (Figure 7). Age classes up through age-14 were observed (except age 11).

A total of 73 Yellow Perch were caught in the 2022 survey on Saddlebag Lake. These fish averaged only 5.2 inches and ranged from 2 to 10 inches. Yellow Perch CPUE was 1.8 fish per net night in gill nets and 128 fish per hour from electrofishing. Gill nets captured larger Yellow Perch (mean size 7.7 inches). Gill net catch rates were in the low range of what is considered average being just above the 25th percentile for SLMMU surveys (1.6 fish per net night) and statewide surveys (1.5 fish per net night). Electrofishing caught mostly small Yellow Perch (mean size = 4.9 inches) and catch rates were well above the 75th percentile for SLMMU (82.8 fish per hour) but just below the 75th percentile for statewide surveys (153 fish per hour). Yellow Perch that were 3 and 4 inches (ages 1 and 2) were most abundant making up 60% of the sample (Figure 8). Only 13 fish (18% of total catch) were 7 inches or larger and considered of harvestable size.

A total of 51 Largemouth Bass were caught in the 2022 survey. These fish averaged 11.8 inches and ranged from 6 to 19 inches. Fish were well distributed across size and age classes with ages 2 through 9 represented in the catch (Figure 9). Legal sized fish (14 inches or greater) made up 27% of the total catch. Growth rates were similar to the state average with an index score of -0.3. Largemouth Bass were primarily captured in electrofishing gear with a CPUE of 96.0 fish per hour which is just below the SLMMU median (106.2 fish per hour) and just below the 75th percentile for statewide surveys (103.2 fish per hour).

Only six Northern Pike were caught in the 2022 Saddlebag Lake survey, but they were large ranging from 32 to 38 inches. There were too few Northern Pike caught to evaluate growth; however, the individuals that were caught were much larger than the statewide mean for fish of that age. The Northern Pike captured were age-5 up to age-12. Northern Pike were only captured in large-mesh fyke nets and the CPUE was 0.7 fish per net night. These catch rates are lower than the 25th percentile of 1.0 fish per net night for both SLMMU and statewide surveys. Only two Walleye were caught in the survey that were 22.1 and 23.3 inches in length. Both fish were age-5 fish likely from the 2017 fall fingerling stocking in Fish Lake. They were both captured in large-mesh fyke nets resulting in a CPUE of 0.2 fish per net night. This is below the 25th percentile for SLMMU and statewide surveys. Other predators captured included Bowfin (n = 6) and Spotted Gar (n = 25). Eight Grass Pickerel were also caught ranging from 7 to 11 inches. Predators made up 31.9% of the total estimated biomass which is within the range of 20-50% recommended by Schneider (2000a).

Minnow species were primarily captured in the seine and small-mesh fyke nets. Blacknose Shiner was the most common minnow species with 162 fish caught. Larger-bodied prey species included Golden Shiner (n = 10) and Lake Chubsucker (n = 8). Other species included Sand Shiner (n = 20), Brook Silverside (n = 6), and Bluntnose Minnow (n = 3). Yellow Bullhead (n = 73) and Brown Bullhead (n = 27) were also caught in good numbers. Collectively they ranged from 6 to 14 inches and provide an additional fishery for anglers interested in targeting them.

The DNR's Master Angler Program is a voluntary angler incentive program that rewards anglers with special patches if they catch fish meeting established size criteria. Several Master Angler fish have been reported caught on Saddlebag Lake. Two 9.1 inch Pumpkinseed were caught in 2021, and a 39.5 inch

and a 42.5 inch Longnose Gar were caught in 2018. Master Angler Bowfin were also reported for Fish and Finch Lake and another Pumpkinseed was reported in Finch Lake.

Temperature logger data showed the lake was between 70 and 85 degrees F for most of June, July, August and September (Figure 10). The maximum temperature in Saddlebag Lake was 84.5 F and occurred on July 22, 2022. On August 3, 2022, a limnology profile was conducted at the deepest location identified where the depth reached 34.1 feet. Secchi depth was 9.4 feet which indicates there was light penetration to 18.8 feet of depth. Water temperature was 80.3 F at the surface and was relatively consistent to the thermocline at a depth of 12 feet (Figure 11). Dissolved oxygen dropped below 3 ppm at a depth of 13 feet. All of the oxygenated water in Saddlebag Lake was above the thermocline resulting in no coldwater habitat that can be used by fish.

The shoreline was mostly natural with a few transects with houses and docks. A total of 49 small docks (3.7 docks per 1,000 feet of shoreline) were located along the shoreline. This was close to the median for SLMMU and statewide surveys which were 5.3 and 2.4 docks per 1,000 feet respectively. There were only 25 houses along the shoreline (1.9 houses per 1,000 feet of shoreline) which is also below the 25th percentile for SLMMU (3.2 houses per 1,000 feet) and above the 25th percentile for statewide surveys (0.8 houses per 1,000 feet). Armoring was limited with only 3.1% of the shoreline having riprap or seawalls which is in the range considered average being just above the 25th percentile for SLMMU (2.2%) and statewide surveys (0.4%). There were no submerged trees along the shore mostly due to the wetland complex surrounding the lake resulting in a lack of recruitment of larger wood. The lack of wood likely limits fisheries habitat to some extent.

Tournaments

The Fish Lake boating access site (BAS) has been a popular site for black bass competitive fishing tournaments. Saddlebag Lake can be fished as part of tournaments held out of the Fish Lake BAS as well as other lakes on the chain. All bass fishing tournaments are required to register with the Michigan DNR Fishing Tournament Registration System (https://www.mcgi.state.mi.us/fishingtournaments/). There were a total of 118 black bass tournaments registered out of the Fish Lake BAS from 2015 through 2022. A total of 20 bass tournaments were held on Fish Lake in 2022 and the average number of tournaments annually from 2016 through 2022 was 16.9 tournaments per year. Fish Lake was tied for the 35th most tournaments statewide in 2022 and ranks 41st based on average tournaments per year from 2016 through 2022.

Analysis and Discussion

The Black Crappie fishery is excellent in Saddlebag Lake. There is a high abundance of fish and growth rates are average or even above average for some age classes. There were two strong year classes carrying the population (age 3 and age 4). These fish averaged 8.1 inches at age-3 and 9.6 inches at age-4. These are good sized fish for anglers to target and harvest as fish over 9 inches are preferred by anglers (Gabelhouse 1984). Black Crappie populations are often cyclical based on variable recruitment success (Swingle and Swingle 1967; Guy and Willis 1995; Sammons, et al. 2002). A Black Crappie fishery is often driven by a few strong year classes and as a result fishing success varies as the year class

grows and is harvested. The Black Crappie population may fluctuate in Saddlebag Lake but at the time of the survey there were abundant fish of preferred sizes present. Abundance of older fish was reduced after age-4. The drop in numbers could be due to variable recruitment but could also be related to harvest. Age-4 fish were fully recruited to the fishery and harvest is likely focused on fish 9 inches and above. Acceptable numbers of fish age-5 through age-8 are still present, but at a lower abundance compared to ages 3 and 4. The presence of fish up to age-14 creates the potential for anglers to catch memorable sized fish up to 12 inches in Saddlebag Lake.

Black Crappie numbers were extremely high in the catch. It is clear that there is a strong population of Black Crappie in Saddlebag Lake; however, the CPUE could also have been higher than normal due to the timing of the survey. This survey took place in early May which is near the beginning of the window for S&T surveys. It was clear during the survey that Black Crappie were still inshore and finishing spawning. Saddlebag Lake is also located on the north side of Fish Lake. It likely warms earlier than Fish Lake and some Black Crappie from Fish Lake may have congregated in Saddlebag Lake.

Abundance of small Bluegill is extremely high in Saddlebag Lake. Age-1 and age-2 Bluegill dominated the catch. Catch rates of adult Bluegill however were somewhat below average. The size structure of the large-mesh fyke net catch was satisfactory with 6- and 7-inch fish being present in acceptable numbers for anglers. There is a low density of larger fish present with few fish 8 inches and above being observed. The lack of large fish does not appear to be related to poor growth rates as growth rates for Bluegill were in the range considered average and a few larger fish up to 9 inches were caught. Harvest rates for Bluegill could be high resulting in a limited number of larger fish. There is a drop in abundance of fish once they reach 8 inches. Six- and seven-inch fish that are smaller than preferred for harvest are present in greater numbers. Saddlebag Lake may also serve somewhat as a nursery for the lake chain. Good vegetated habitat is present and it may warm earlier than Fish Lake and attract fish. This could inflate catch rates, and it would partially explain the extremely high abundance of small Bluegill observed. It is likely that there is strong Bluegill recruitment in Saddlebag Lake and management should focus on thinning small fish and promoting survival and growth of larger fish.

Only two Walleye were captured, both likely originating from the 2017 fall fingerling stocking in Fish Lake. No fish from the 2013, 2015, or 2021 spring fingerling stocking events in Fish Lake were collected. Catch rates were low for Walleye in the survey, but this does not necessarily mean that Walleye stocking in Fish Lake is not successful. The survey was not designed to evaluate Walleye stocking as it was performed in May using S&T protocols. Status and Trends surveys generally do not sample Walleye adequately. For example, the statewide 75th percentile for Walleye catch rates in large-mesh fyke nets is only 1.7 fish per net night. Lakes in the same size category as Saddlebag would average 9 net nights with large-mesh fyke nets. This would result in surveys with high catch rates still only catching 15 total Walleye. Gill nets can be more effective at capturing Walleye at this time of year, but they did not fish well in Saddlebag Lake, only catching 20 total fish with only eight species represented. Walleyes stocked as fall fingerlings were surviving well in Fish Lake based on the 2002 survey where 44 fish were caught that were growing well above the state average and were 14.8 to 27 inches. Walleye are likely more abundant in Fish Lake when lakes are stratified as they seek cooler water.

One goal of Walleye stocking is to increase predation on overabundant small Bluegill. Bluegill stunting can occur when there is an overabundance of small fish competing for limited resources. Walleye stocking has been demonstrated to reduce the abundance of small Bluegill resulting in improved growth

rates and/or size structure (Schneider and Lockwood 1997; Schneider and Lockwood 2002; Diana In Review). Stocking Walleye can prevent stunting and shift Bluegill size structure towards larger fish desired by anglers. Walleye stocking in Fish Lake has not successfully reduced the abundance of small fish in Saddlebag Lake, but the high density of small fish has not resulted in the population being stunted. Bluegill growth rates are average, and the abundance of age-3 and age-4 fish is not as high. Walleye and other predators appear to be preying on Bluegill enough to prevent stunting even when strong year classes persist past age-1. Continued fall fingerling Walleye stocking in connected Fish Lake will help control large year classes of small Bluegill as well as create a fishable Walleye population. The complete lack of Walleye from the three stocked spring fingerling year classes suggests that fall fingerlings are a better option for this system. Overall, predator growth rates were average to above average. The predator to prey ratio was within the target range proposed by Schneider (2000a). There is no evidence that stocking Walleye has created excessive competition among predators.

The Yellow Perch fishery in Saddlebag Lake appeared poor. Although good numbers of Yellow Perch were captured, they were mostly small fish. Anglers can target the modest numbers of 7-to-10-inch fish, but few large Yellow Perch are available to target. Lack of coolwater refuge habitat in summer limits perch habitat. Walleye stocking could negatively impact Yellow Perch populations as they are a preferred prey of Walleye. Northern Pike likely add to the predation on Yellow Perch. Some large-bodied prey are present including Golden Shiner and Lake Chubsucker, but no sucker species were observed in the survey.

The Largemouth Bass fishery in Saddlebag Lake is average. Catch and growth rates were similar to the statewide average. Survival of Largemouth Bass appears to be adequate as good numbers of legal-sized fish up to 19 inches were present. As a result, Fish Lake and the connected lakes are popular for bass tournaments. Bass tournament pressure is higher in southern Michigan due to proximity to population centers and the quality bass fisheries present. Fish Lake receives higher than average tournament pressure because it meets multiple criteria. In addition to having a bass population with a favorable size structure, Fish Lake also has a public BAS that is large enough to accommodate small tournaments and the connectivity to several lakes allows anglers to spread out across the chain. The DNR supports bass tournament angling as part of our strategy to provide diverse fishing opportunities. Bass tournaments practice catch, retain, and release practices, and fish are kept in aerated live wells, weighed, and released. Some mortality has been attributed to tournament weigh-ins; however, most fish are released alive. New technology and handling techniques have greatly improved live well conditions, decreased handling stress during weigh-in, and reduced the associated mortality (Ostrand et al. 2011; Allen et al. 2008). Temperature has been directly linked to the mortality observed in live-release tournaments as it increases stress of fish caught (Wilde 1998; Kwak and Henry 1995; Schramm et al. 1987). Water and air temperatures in Michigan are moderate compared to more southern reservoirs where high tournament mortality has been observed. Significant research has been conducted to monitor bass populations to determine if tournament pressure can result in impacts to the fish population. There is little evidence that live-release tournaments impact fish populations (Allen et al. 2004; Diana and Wahl 2015; Sylvia and Weber 2022). Recent analysis of statewide data in Michigan found no bass population impacts associated with tournament pressure (Herbst et. al unpublished data), but more robust studies are being conducted and long-term data from individual lakes would be more informative. Fish and Saddlebag Lakes have supported a bass fishery as well as sustained tournament pressure. Tournaments occurred from the bass opener in late May through the end of September. Most tournaments were on the weekend, but some evening weekday tournaments occurred as well. All tournaments were out of the Fish Lake

boat access site and this was the location of weigh-ins when conducted and fish were generally released at the BAS. There are no indications that above average bass tournament pressure has had any negative impacts on the fishery. Best management practices for tournaments include maintaining cool oxygenated water in live wells and weigh-in holding tanks. Reducing the amount of air fish are exposed to during capture, handling, weigh-in, pictures, and release will also limit fish stress and mortality. If release boats are used, water quality in tanks should be maintained and fish should not be crowded in tanks for extended periods of time. The DNR will continue to manage Saddlebag Lake as a bass fishery that supports bass fishing tournaments.

Northern Pike were also captured in low numbers during the 2022 survey. Similar to Walleye, Northern Pike population estimates are conducted immediately after ice out during spawning and are only sparsely captured in gill nets during May and June. The Northern Pike that were captured were growing well, indicating a low-density population with a high percentage of preferred-size fish. Spotted Gar also were collected during the 2022 sampling efforts. Longnose Gar were not collected but have been reported in the Master Angler Program. Spotted Gar are protected from bowfishing and spearing harvest due to their special concern status. Spotted Gar populations in Michigan are isolated to the southwestern part of the state (Diana and Goniea In Press). Because this population is at the northern fringe of the species' distribution, genetics have been shown to be unique (David 2012). Gar are important native predators that can help prevent overcrowding and stunting in panfish populations.

Vegetation and natural shorelines provide much of the fish habitat in Saddlebag Lake. Woody habitat is limited. Saddlebag Lake likely provides good nursery habitat for the lake chain. Natural shorelines with wetland fringe and native vegetation are vital habitats for juvenile fish. Vegetation and woody habitat have been shown to be directly related to growth rates of Bluegills and Largemouth Bass (Schindler et al. 2000). Shoreline development results in increased angling pressure, decreased water quality, and decreased woody habitat. Both Largemouth Bass and Bluegill production decreases when vegetation is absent, or densities are too low (Wiley et al. 1984; Savino at al. 1992). Largemouth Bass recruitment has also been shown to decline when vegetation coverage is low (Durocher et al 1984; Miranda and Pugh 1997). Presence of vegetation and woody habitat increase survival of young-of-year Largemouth Bass by providing refuge from predation and access to quality prey. The natural shorelines and wetland habitat around Saddlebag Lake should be protected. Vegetation treatments should be limited to target only nuisance invasive vegetation while emphasizing protection of native plant species. To improve nearshore habitat for fish and increase lake to upland connectivity for frogs and turtles, soft natural shoreline protection techniques should be considered in areas where erosion is occurring (O'Neal and Soulliere 2006; see https://www.shorelinepartnership.org/ for more information).

Management Direction

No significant management changes are recommended for Saddlebag Lake. Saddlebag Lake has an acceptable Bluegill fishery, an excellent Black Crappie fishery, and the chance to catch quality Northern Pike and Walleye. Walleye stocking in Fish Lake will continue to create a fishery in Saddlebag Lake. Walleye stocking has the added benefit of increasing predation on small Bluegill to prevent stunting. More consistent fall fingerling stocking could improve Walleye catch rates and potentially improve Bluegill size structure.

Habitat protection will continue to be an important component of fisheries management on Saddlebag Lake. This objective will be achieved in part by reviewing Michigan Department of Environment, Great Lakes, and Energy permit applications for potential impacts to the aquatic resources of Saddlebag Lake. The DNR also will promote natural shoreline techniques for erosion control and suggest best management practices to reduce impacts. In addition, DNR biologists will continue to review and comment on proposals for aquatic nuisance control treatments to promote practices that will limit negative impacts on fish and native vegetation.

Biologists will continue to work with anglers to get angler reports and as eyes in the field for issues that may arise on Saddlebag Lake. Anglers and lake front property owners continue to be a primary source of information on the fishery between survey dates. Good communication with anglers will help DNR in determining appropriate management and the need for additional survey work. Anglers and lakefront property owners are encouraged to reach out to DNR biologists at any time.

References

Allen, M.S., Rogers, M.W., Myers, R.A. and Bivin, W.M. 2004. Simulated impacts of tournament-associated mortality on Largemouth Bass fisheries. North American Journal of Fisheries Management 24:1252-1261.

Allen, M.S., Walters, C.J. and Myers, R., 2008. Temporal trends in largemouth bass mortality, with fishery implications. North American Journal of Fisheries Management. 28:418-427.

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

David, S.R. 2012. Life history, growth, and genetic diversity of the Spotted Gar Lepisosteus oculatus from peripheral and core populations. Doctoral dissertation. The University of Michigan, Ann Arbor.

Diana, M.J. In Review. Selkirk Lake: Allegan County. Michigan Department of Natural Resources. Status of the Fishery Report 2025- 0432.

Diana, M.J. and Goniea, T. In Press. Bowfishing effort and harvest activity in Michigan: management needs and implications for Longnose Gar, Spotted Gar, and Bowfin populations. Michigan Department of Natural Resources. Fisheries Report MS19_001.

Diana, M.J, and D.H. Wahl. 2015. Can tournament angling of Largemouth Bass affect lake-wide recruitment? Illinois Natural History Survey Reports 413: 21-22.

Durocher, P.P., Provine, W.C. and Kraai, J.E., 1984. Relationship between abundance of largemouth bass and submerged vegetation in Texas reservoirs. North American Journal of Fisheries Management. 4:84-88.

Gabelhouse, D.W. Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4: 273-285.

Guy, C. S., and D. W. Willis. 1995. Population characteristics of Black Crappies in South Dakota waters: a case for ecosystem management. North American Journal of Fisheries Management 15:754-765.

Kwak, T.J. and Henry, M.G. 1995. Largemouth Bass mortality and related causal factors during live-release fishing tournaments on a large Minnesota lake. North American Journal of Fisheries Management 15: 621-630.

Miranda, L.E. and Pugh, L.L., 1997. Relationship between vegetation coverage and abundance, size, and diet of juvenile largemouth bass during winter. North American Journal of Fisheries Management. 17:601-610.

O'Neal, R.P., and G.J. Soulliere. 2006. Conservation guidelines for Michigan lakes and associated natural resources. Michigan Department of Natural Resources, Fisheries Special Report 38, Ann Arbor.

Ostrand, K.G., Siepker, M.J. and Wahl, D.H. 2011. Effectiveness of livewell additives on Largemouth Bass survival. Journal of Fish and Wildlife Management 2:22-28.

Savino, J.F., E.A. Marschall, and R.A. Stein. 1992. Bluegill growth as modified by plant density: an exploration of underlying mechanisms. Oecologia 89: 153-160.

Sammons, S.M., Bettoli, P.W., Isermann, D.A. and Churchill, T.N., 2002. Recruitment variation of crappies in response to hydrology of Tennessee reservoirs. North American Journal of Fisheries Management, 22: 1393-1398.

Schindler, D.E., S.I. Geib, and M.R. Williams. 2000. Patterns of fish growth along a residential development gradient in north temperate lakes. Ecosystems 3: 229-237.

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. Interpreting fish population and community indices. Chapter 21 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. 2000b. 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. W. Laarman, and H. Gowing. 2000a. 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.

Schneider, J.C., P. W. Laarman, and H. Gowing. 2000b. Length-weight relationships. Chapter 17 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. and R.N. Lockwood. 1997. Experimental Management of Stunted Bluegill Lakes. Michigan Department of Natural Resources, Fisheries Research Report 2040.

Schneider, J. C., and R. N. Lockwood. 2002. Use of Walleye stocking, antimycin treatments, and catch-and-release angling regulations to increase growth and length of stunted Bluegill populations in Michigan lakes. North American Journal of Fisheries Management 22:1041-1052.

Schramm Jr, H.L., Haydt, P.J. and Portier, K.M. 1987. Evaluation of prerelease, postrelease, and total mortality, of Largemouth Bass caught during tournaments, in two Florida lakes. North American Journal of Fisheries Management 7: 394-402.

Smith, N.J., K.E. Webster, L.K. Rodriguez, K.S. Cheruvelil, and P.A. Soranno. 2021. LAGOS-US LOCUS v1.0: Data module of location, identifiers, and physical characteristics of lakes and their watersheds in the conterminous U.S. ver 1. Environmental Data Initiative. https://doi.org/10.6073/pasta/e5c2fb8d77467d3f03de4667ac2173ca (Accessed 2023-11-8).

Sylvia, A. and Weber, M.J. 2022. Assessing size-dependent population-level effects of Largemouth Bass tournament mortality. North American Journal of Fisheries Management, 42: 1324-1339.

Swingle, H. S., and W. E. Swingle. 1967. Problems in dynamics of fish populations in reservoirs. Pages 229-243 in Reservoir Committee, editors. Reservoir fishery resources symposium. American Fisheries Society, Southern Division, Reservoir Committee, Bethesda, Maryland.

U.S. Geological Survey (USGS). 2024. Annual NLCD Collection 1 Science Products: U.S. Geological Survey data release, https://doi.org/10.5066/P94UXNTS

Wehrly, K.E., G.S. Carter, and J.E. Breck. DRAFT. Chapter XX: Inland Lake Status and Trends Program Sampling Protocols. Michigan Department of Natural Resources, Fisheries Special Report Draft, Ann Arbor.

Wilde, G.R. 1998. Tournament-associated mortality in black bass. Fisheries 23(10): 12-22.

Wiley, M. J., R.W. Gorden, S.W. Waite, and T. Powless. 1984. The relationship between aquatic macrophytes and sport fish production in Illinois ponds: a simple model. North American Journal of Fisheries Management 4: 111-119.

Table 1. Fish stocked in Saddlebag Lake.

Species	Year	Number	Life Stage
Walleye	1893	400,000	Fry
Walleye	1909	75,000	Fry
Largemouth Bass	1910	750	Fingerlings
Bluegill	1933	5,000	5 month
Bluegill	1934	5,000	5 month
Bluegill	1935	10,000	4 month
Bluegill	1936	10,000	4 month
Bluegill	1937	20,000	4 month
Bluegill	1938	10,000	3 month
Bluegill	1939	10,000	4 month
Bluegill	1940	10,000	4 month
Bluegill	1941	10,000	4 month
Bluegill	1942	20,000	4 month
Bluegill	1943	5,000	4 month
Bluegill	1944	2,000	3.5 month
Bluegill	1944	3,000	3.5 month
Largemouth Bass	1944	1,000	3.5 month
Bluegill	1945	5,000	4 month
Largemouth Bass	1945	2,000	3.5 month

Table 2. Fish captured in the 2022 survey of Saddlebag Lake, Cass County.

Species	Number	Total Weight (lbs)	Average Length (inches)	Length Range (inches)
Black Crappie	427	215.8	9.5	4 - 12
Bluegill	3,301	62.3	2.3	1 - 9
Bluntnose Minnow	3	0.0	2.8	2 - 3
Blacknose Shiner	162	0.7	2.2	1 - 3
Bowfin	6	15.5	18.8	15 - 24
Brown Bullhead	27	27.3	12.9	10 - 14
Brook Silverside	6		3.5	3 - 3
Golden Shiner	10	0.8	5.8	1 - 8
Grass Pickerel	8	1.7	10.1	7 - 11
Green Sunfish	2	0.2	4.5	2 - 6
Hybrid Sunfish	72	18.2	6.7	2 - 8
Lake Chubsucker	8	4.5	9.4	3 - 10
Largemouth Bass	51	53.3	11.8	6 - 19
Northern Pike	6	63.4	35.5	32 - 38
Pumpkinseed	43	9.4	6.2	2 - 7
Sand Shiner	20	0.0	1.5	0 - 1
Spotted Gar	25	46.0	23.2	12 - 34
Walleye	2	8.0	23.0	22 - 23
Warmouth	32	3.7	4.3	1 - 8
Yellow Perch	73	6.7	5.2	2 - 10
Yellow Bullhead	90	51.4	10.5	6 - 13
Grand Total	**4,374**	**588.9**	**3.7**	**0 - 38**

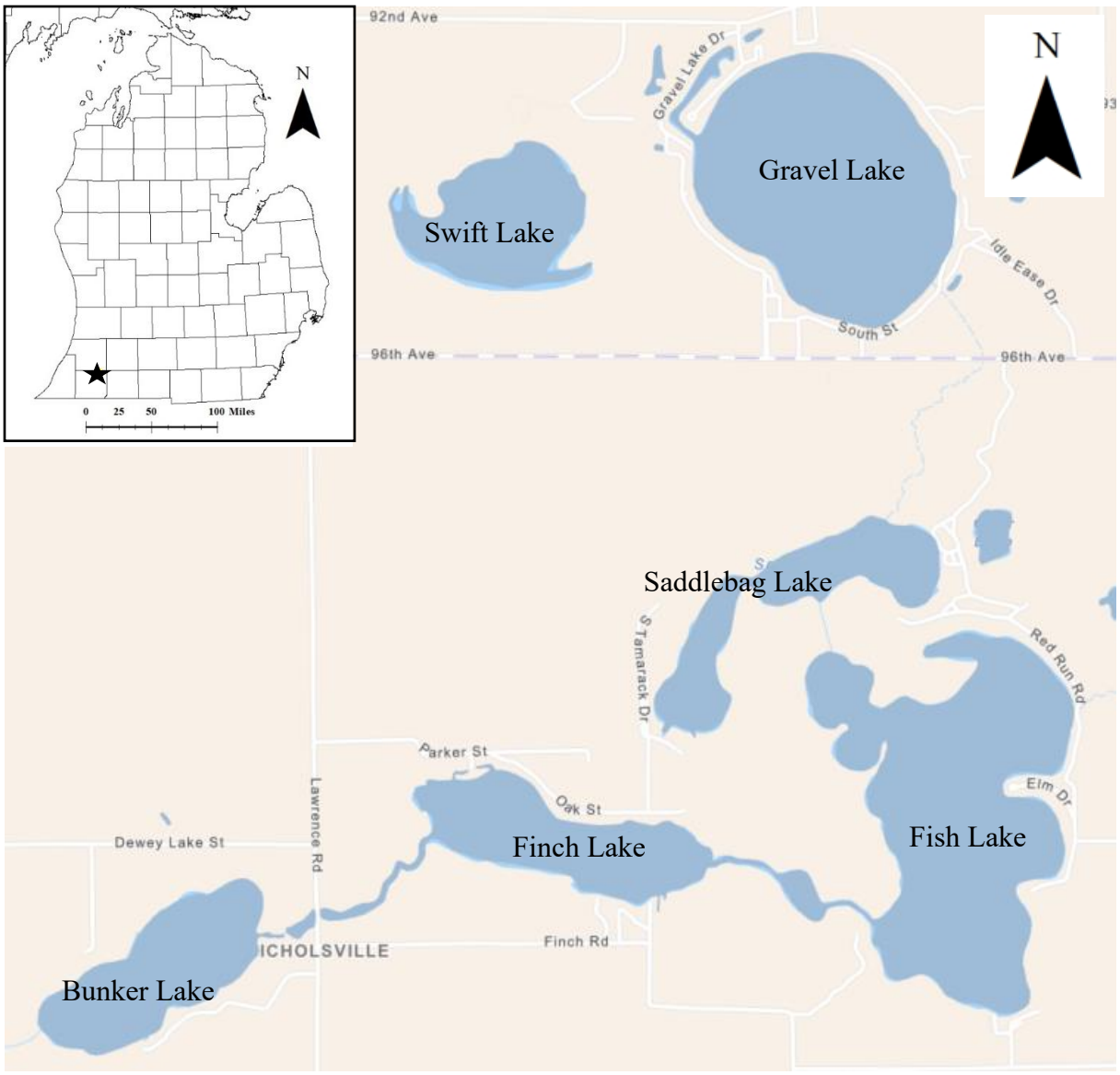

Figure 1. The location of Saddlebag Lake and adjacent lakes in Cass County in southwest Michigan.

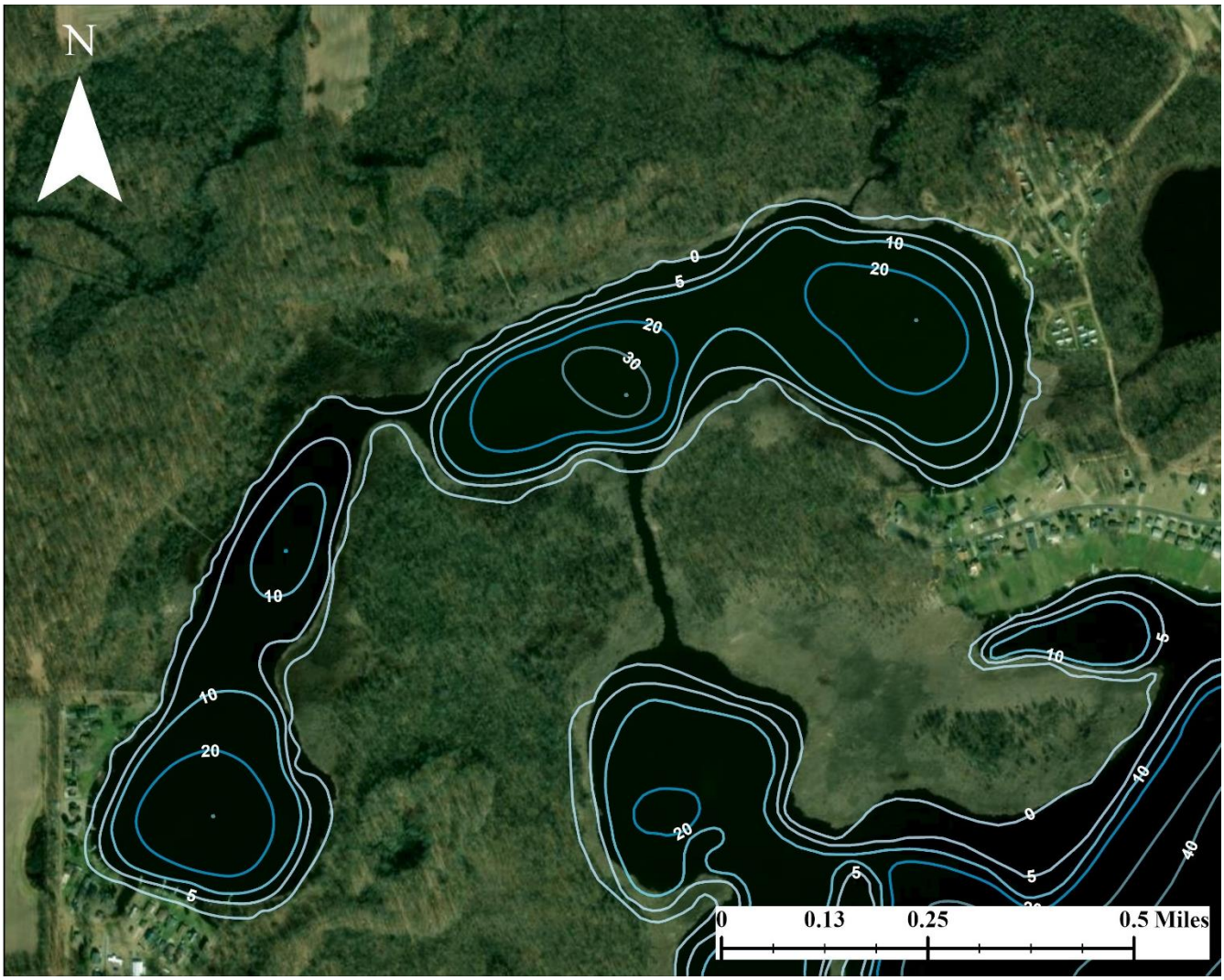

Figure 2. Depth contour map in feet for Saddlebag Lake, Cass County.

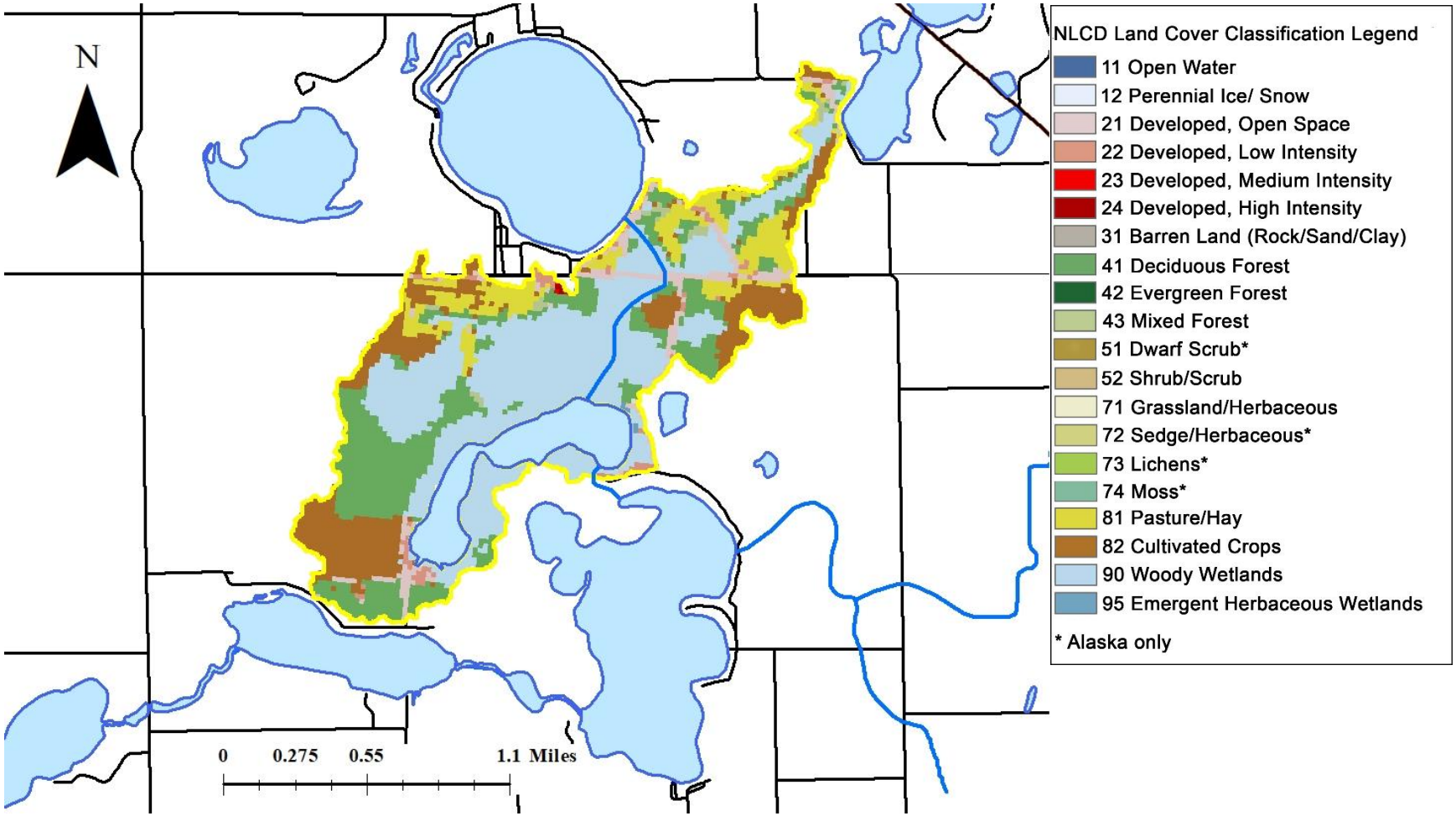

Figure 3. Land use map of the Saddlebag Lake watershed based on 2023 National Land Cover Database (USGS 2024). The Saddlebag Lake watershed was obtained from LAGOS delineation (Smith et al. 2021).

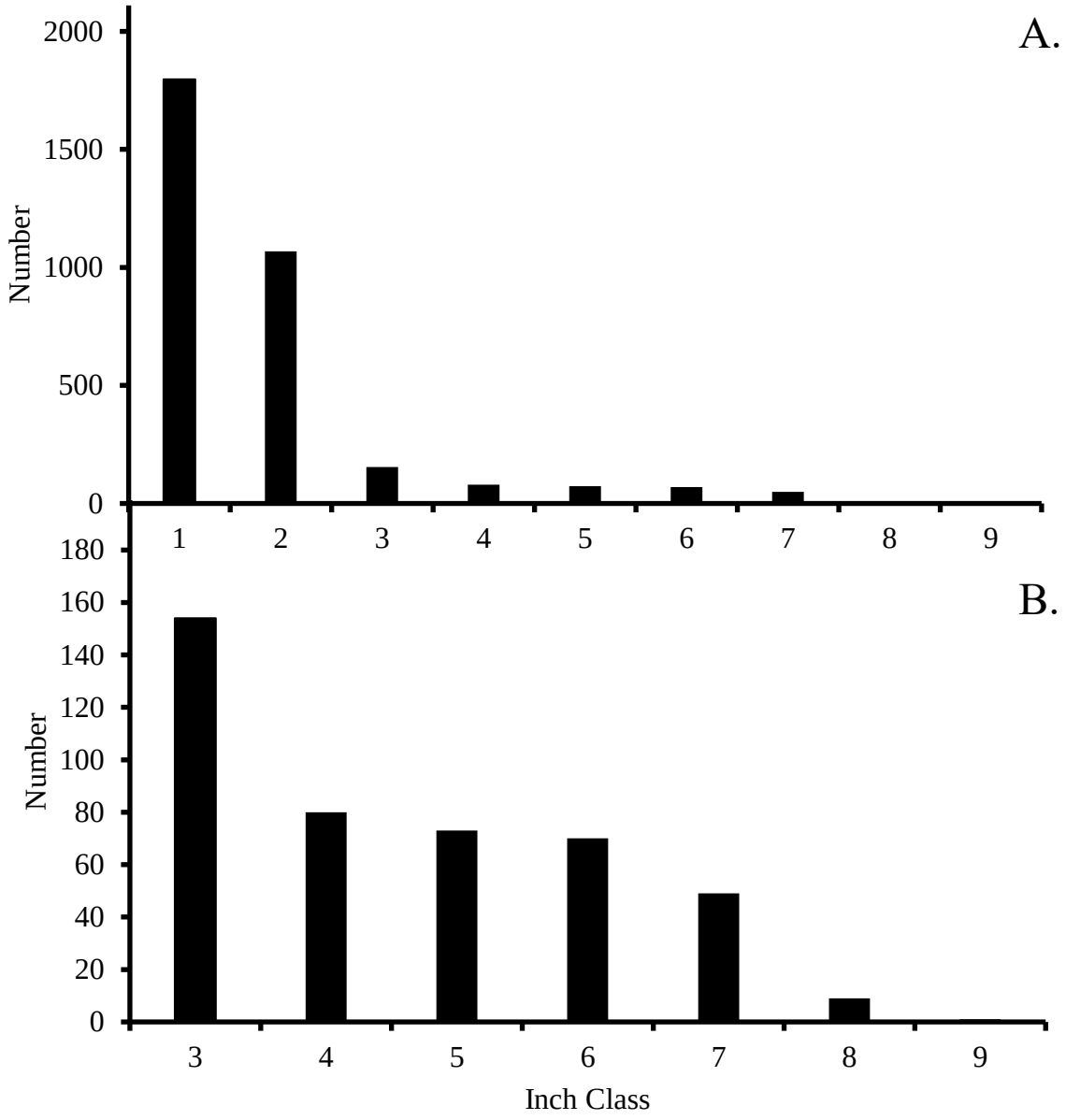

Figure 4. Length frequency of Bluegill 1-9 inches in length (A.) and 3-9 inches in length (B.) captured in the 2022 survey of Saddlebag Lake.

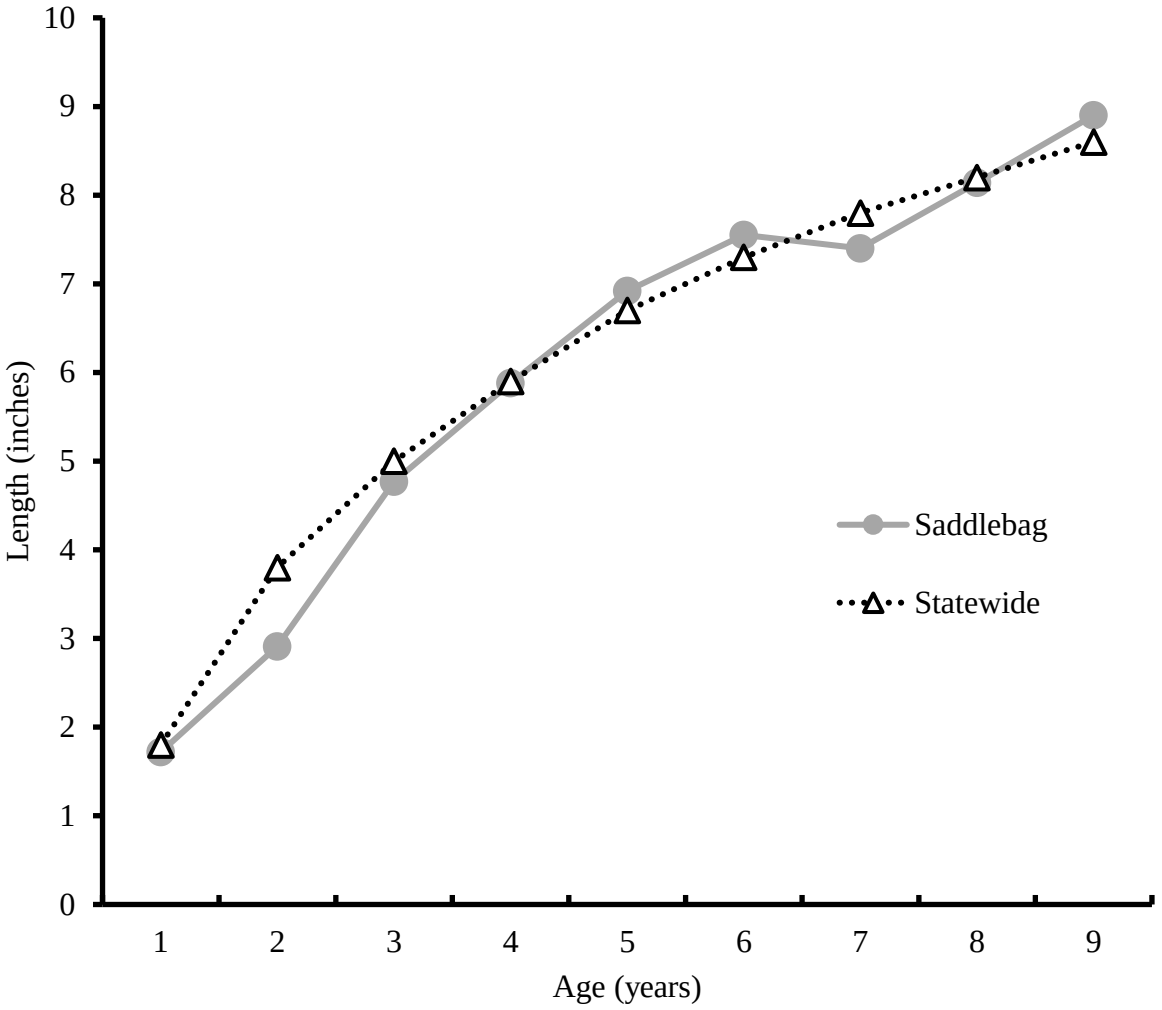

Figure 5. Average lengths-at-age for Bluegill captured in the 2022 survey of Saddlebag Lake compared to the statewide averages. Less than five fish were included in the Saddlebag averages for ages 7, 8, and 9.

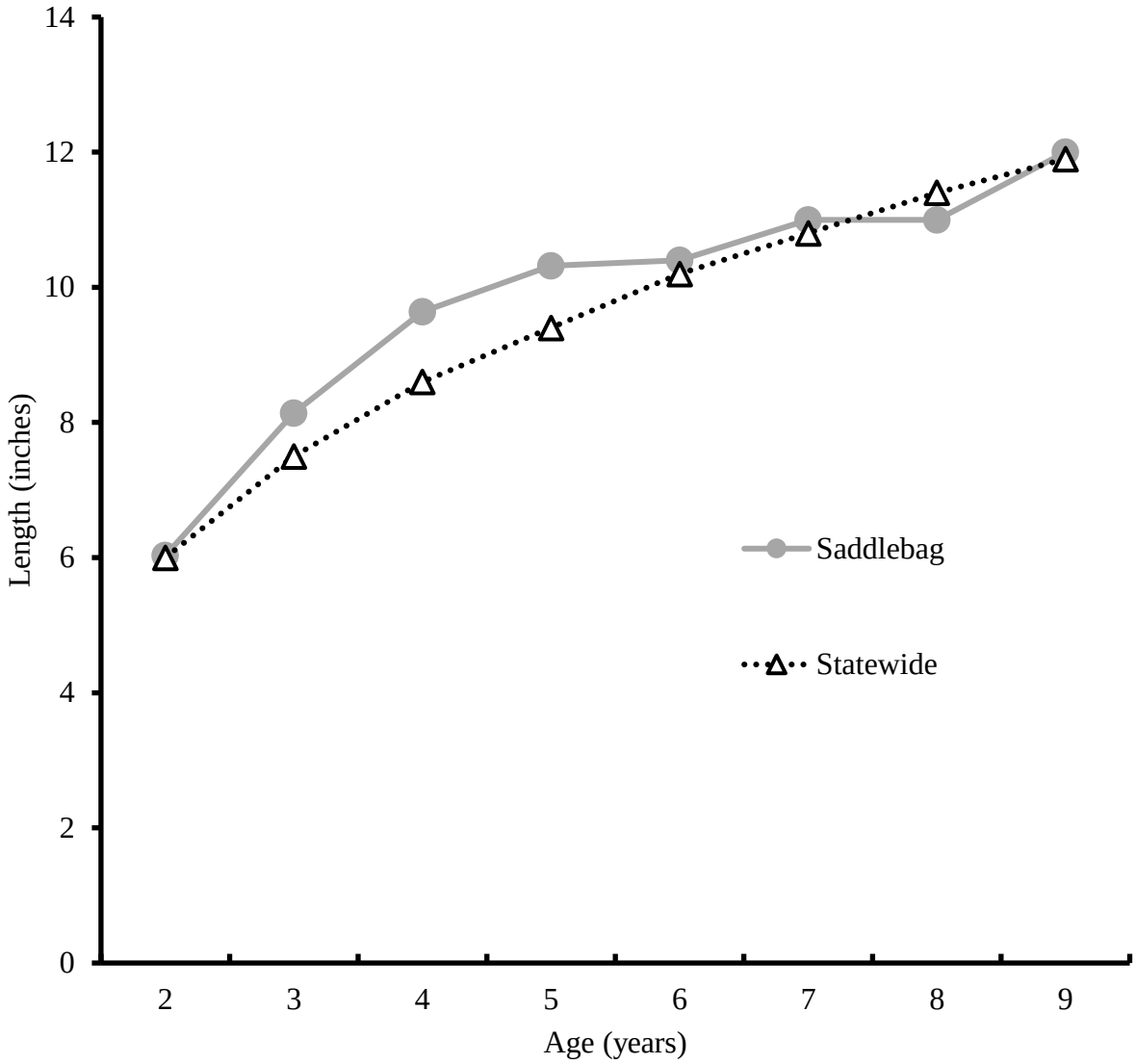

Figure 6. Average lengths-at-age for Black Crappie captured in the 2022 survey of Saddlebag Lake compared to the statewide averages. Less than five fish were included in the Saddlebag averages for ages 5, 6, and 9.

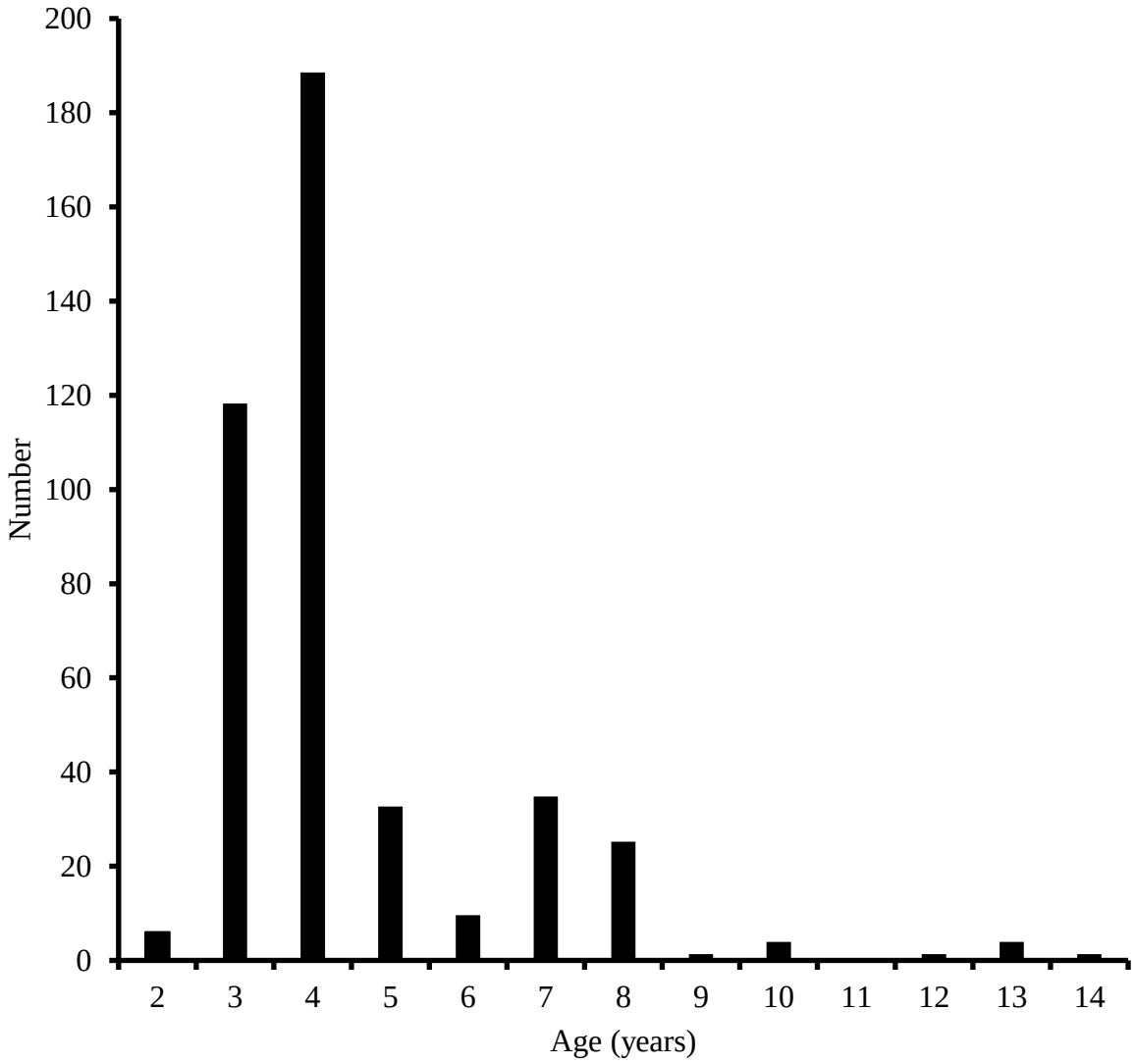

Figure 7. Numbers of Black Crappie caught from each age class in the 2022 survey conducted on Saddlebag Lake.

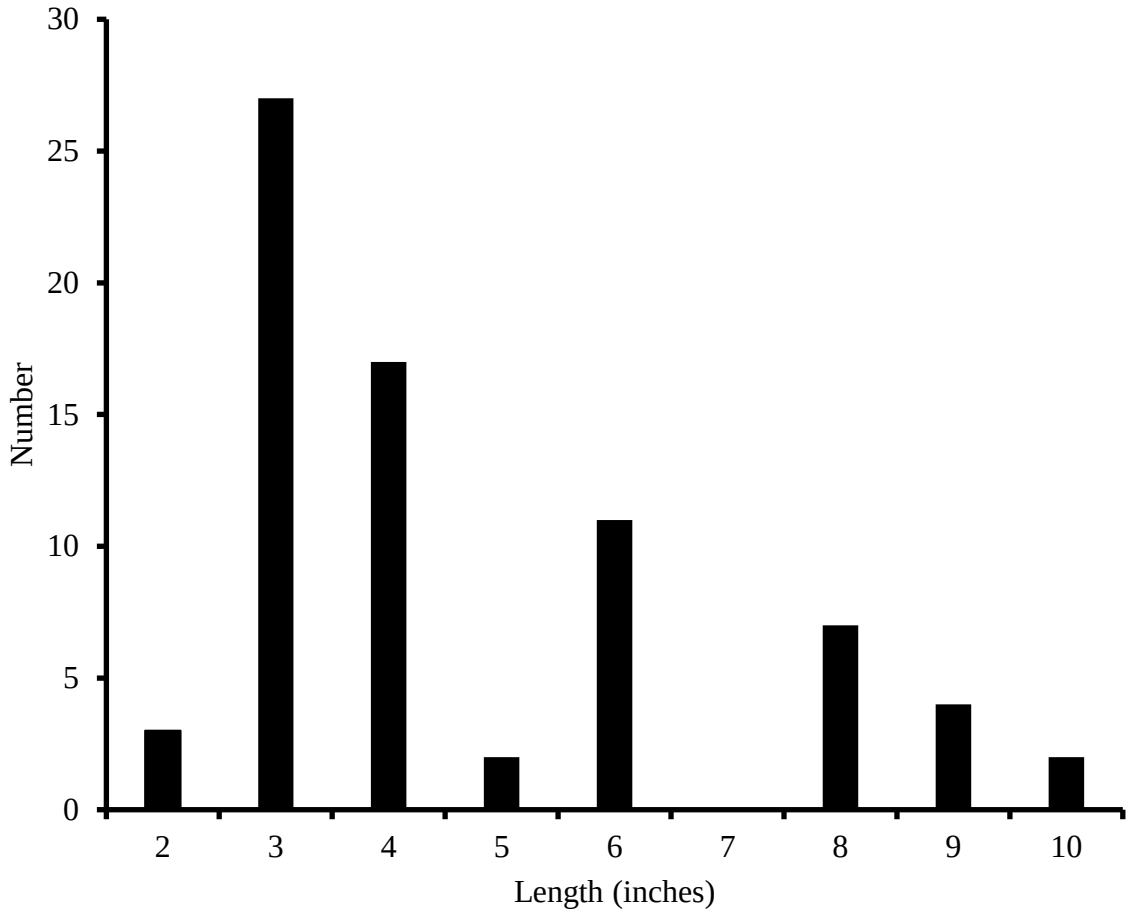

Figure 8. Length frequency of Yellow Perch caught in the 2022 fish survey on Saddlebag Lake.

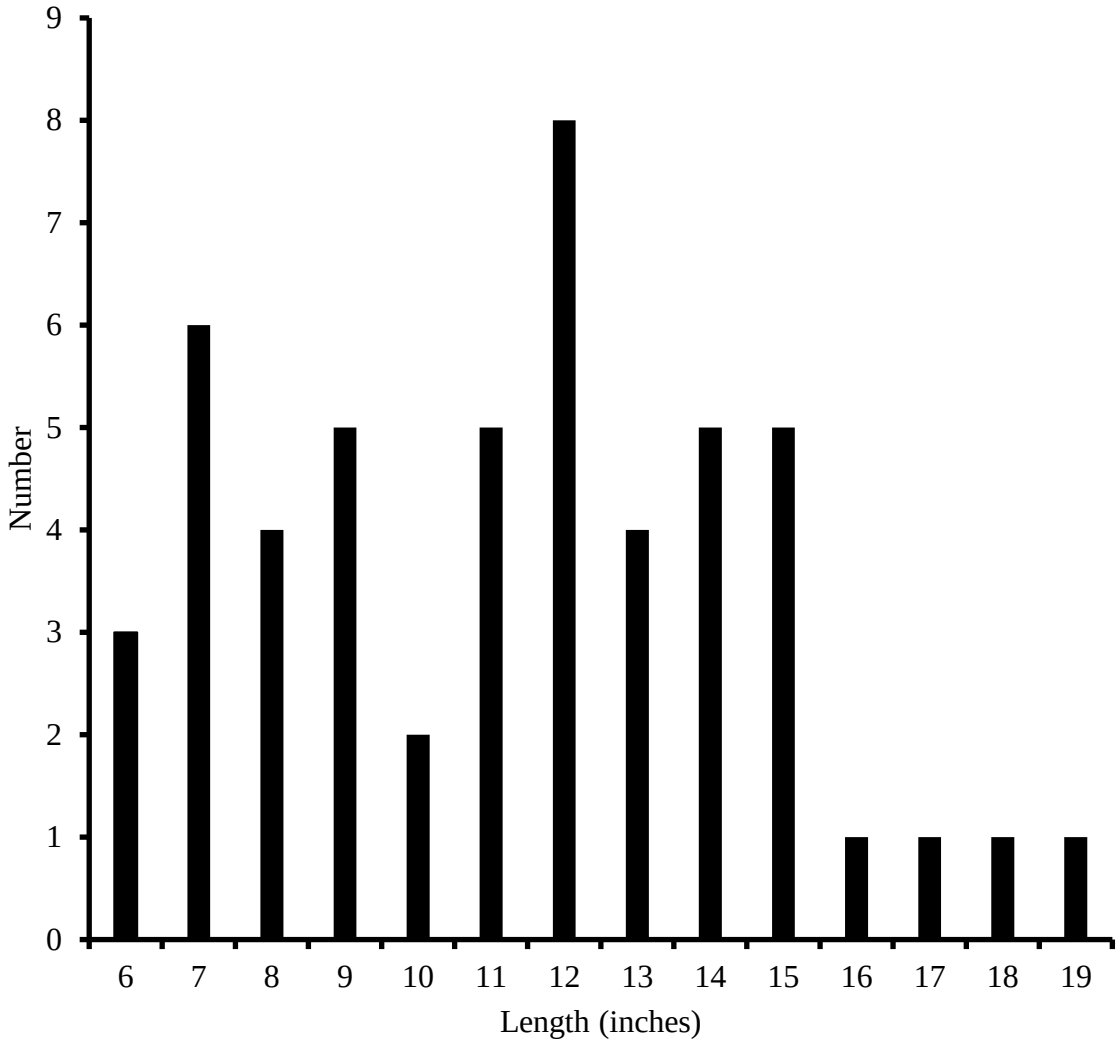

Figure 9. Length frequency of Largemouth Bass caught in the 2022 fish survey on Saddlebag Lake.

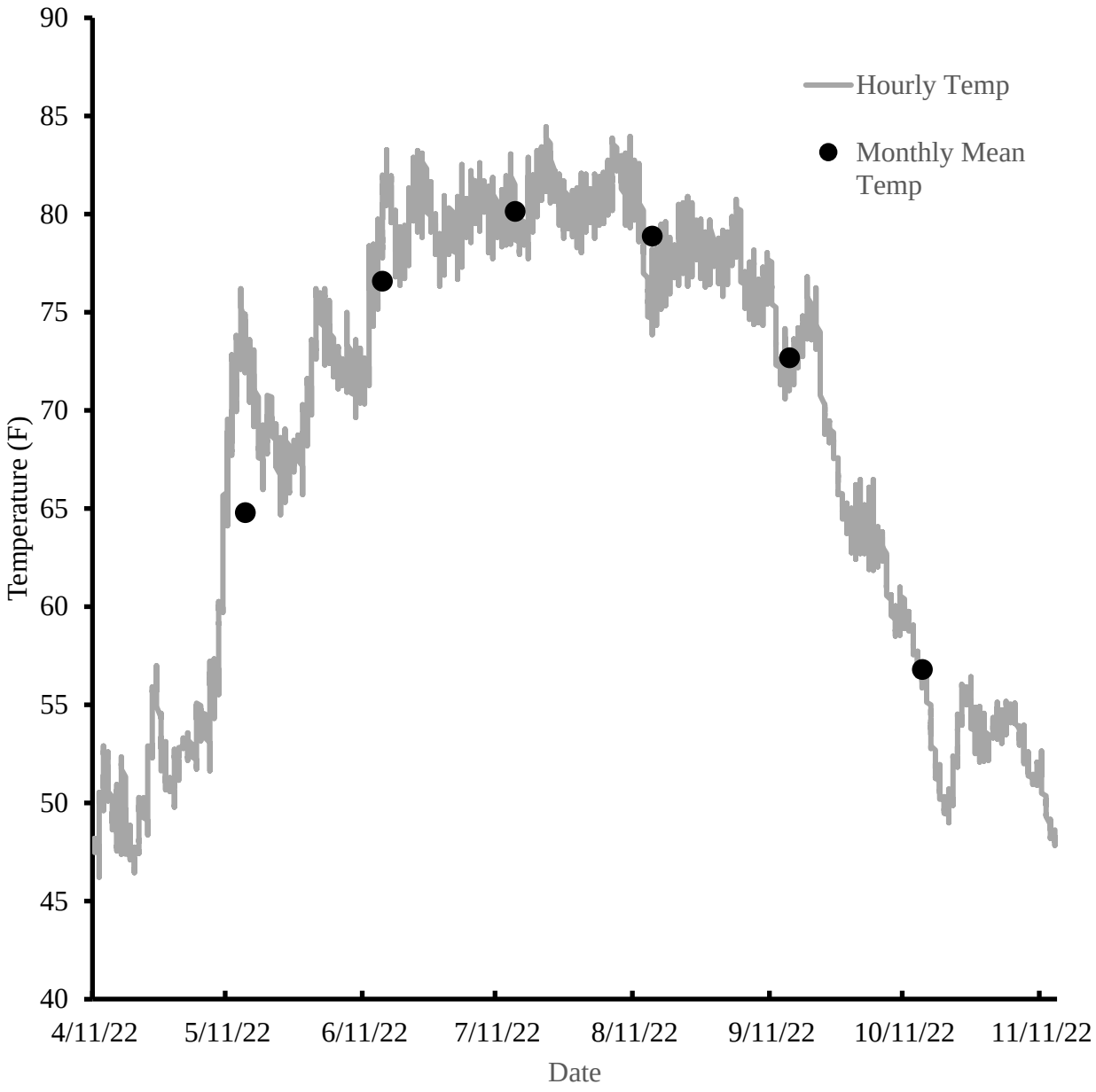

Figure 10. Water temperature logger readings from Saddlebag Lake from March 23 to October 28, 2022.

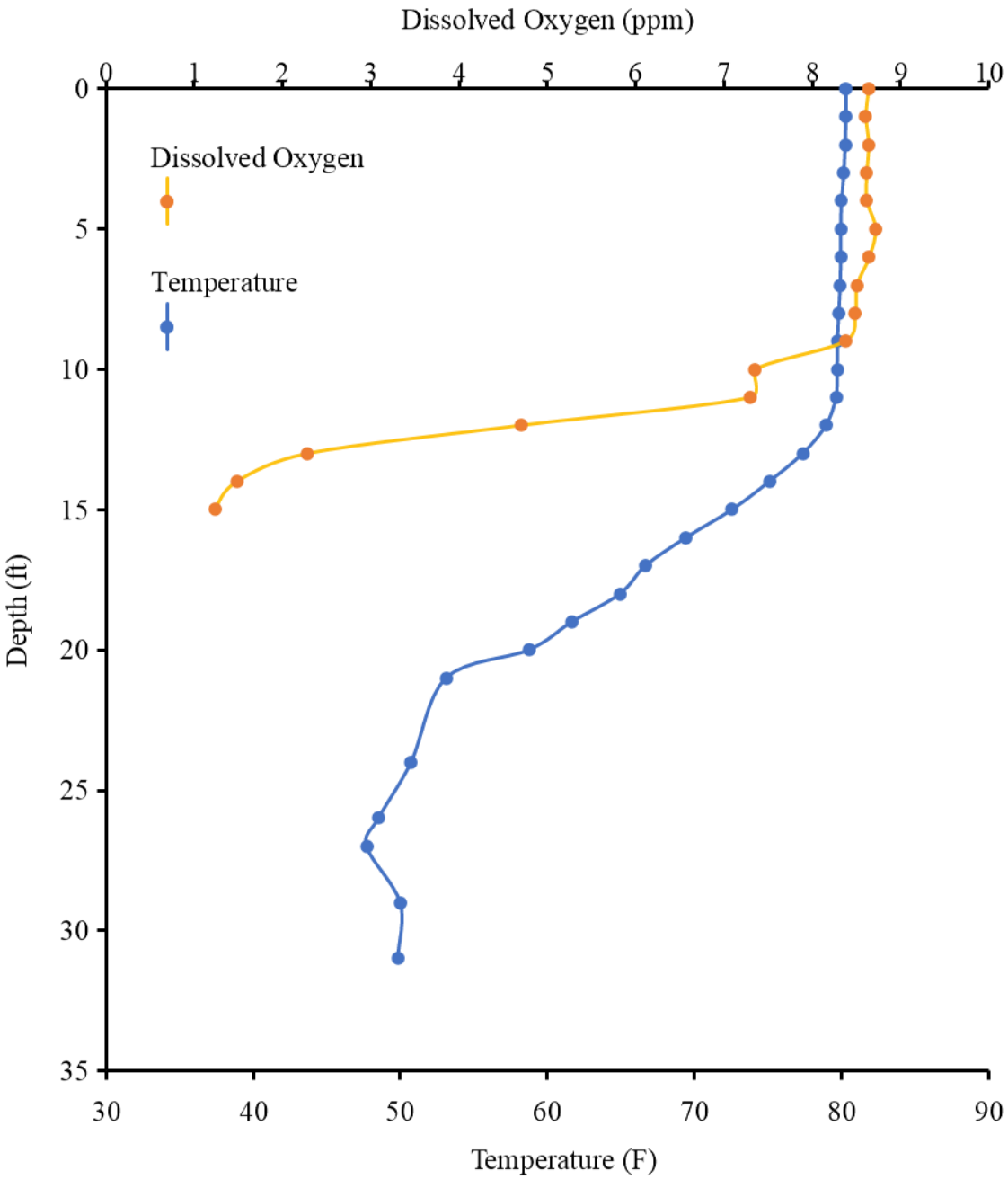

Figure 11. Temperature and dissolved oxygen profile at the deepest basin of Saddlebag Lake on August 3, 2022.

Received February 25, 2025; Approved March 14, 2025
Brian Gunderman, Unit Review and Approval
Tim Cwalinski, External Reviewer
John Bauman, SFR Facilitator
John Bauman, Desktop Publisher and Approval