

## **McDonald Lake**

Schoolcraft County, T41N/R13W/Section 05  
Undesignated – Bulldog Creek, Last Surveyed 2022

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### **Environment**

#### Location

McDonald Lake is a 1,612-acre natural lake located in Mueller Township in southeastern Schoolcraft County in Michigan's Upper Peninsula (Figure 1). The towns of Gulliver and Manistique are located northwest of McDonald Lake, and both are within a fifteen-minute drive. McDonald Lake is also uniquely positioned within a 30-to-40-minute drive of the Hiawatha National Forest, Seney National Wildlife Refuge, and six large inland lakes greater than 1,000 acres. The Seul Choix Pointe lighthouse, leased by the Gulliver Historical Society, is located about eight miles south of the lake and is a popular attraction. McDonald Lake and the surrounding area provide vast recreational fishing opportunities.

#### Geology and geography

The geological bedrock formations encompassing McDonald Lake include the Manistique Group overlaid by the Engadine bedrock group (MDNR 2001). The Manistique Group formation spans the northern shore of Lake Michigan from west to east and is exposed in Fayette, Michigan and can be seen along the northwestern shore of the Garden Peninsula (Dellapenna 1987). Two surface mineral mines exist to the east and to the northeast of McDonald Lake. The adjacent land cover of McDonald Lake is comprised primarily of wetland (57.9%), forest (32.8%), urban (3.8%), grasslands (2.7%), agriculture (1.9%), and barren land (0.2%, Figure 2). The surficial geology in this region is comprised of untextured organic material (93.3%) and large course (6.7%) materials. Soil types surrounding McDonald Lake are comprised largely of muck and sandy loam (USDA 2019) materials and are typical of low gradient, very poorly drained soils. The geological characteristics of this region are most favorable to cool- and warm-water fishes as low gradient, slow-moving water is prone to warming and tends to support abundant submergent and emergent aquatic vegetation that is utilized by phytophilic spawning fishes (namely, Northern Pike and Yellow Perch). Coarse texture materials, although limited, may help facilitate the exchange of cooler groundwater as oxythermal habitat becomes limited during the summer and winter months.

#### Watershed description

McDonald Lake resides within an undesignated watershed that drains south to Lake Michigan. Fernia Creek and Anderson Creek serve as tributaries to McDonald Lake located in the north and northeast regions of the lake, respectively. Fernia Creek and Anderson Creek are classified as warm transitional streams that have average predicted July water temperature of 61.9 °F. Bulldog Creek is the sole outflow of the lake which drains southeast to Lake Michigan. Bulldog Creek is classified as a warm stream and has a predicted average July water temperature of 66.7 °F. The McDonald Lake lakeshed (Figure 3) encompasses 11,984 acres, of which 96% is currently unprotected and vulnerable to residential and agricultural development (MGLP 2026). The immediate shoreland area of McDonald Lake encompasses 302 acres (MGLP 2026). Approximately 84% of the immediate shoreline area is unprotected and vulnerable to residential and agricultural development.

### Chemical and physical characteristics

Alkalinity measurements reported from McDonald Lake during the 1970s showed values ranging from 85.5 to 102.0 (mg/L CaCO<sub>3</sub>), which is ‘moderate’ compared to statewide standards (Wehrly et al. 2015), but high compared to waterbodies in the central and eastern Upper Peninsula. McDonald Lake is a large inland lake with a maximum depth of eight to ten feet. By volume, only 20% of the lake is deeper than five feet and by surface acreage, approximately 51% of the lake is deeper than five feet. Therefore, the lake is relatively large and shallow and is most favorable to warmwater fish communities. Wetlands that surround the landscape and the abundant aquatic vegetation present in McDonald Lake favor fish species that require aquatic plants for reproduction (e.g., Northern Pike, Yellow Perch).

### Development, public ownership, and access

A large proportion of the McDonald Lake shoreline is held in private ownership. However, there are three areas of public ownership totaling about a mile and a half of shoreline. Two of the three parcels held in public ownership are located on the east and southeast side of the lake and are part of the Michigan Department of Natural Resources (MDNR) Shingleton Forest Management Unit. The remaining parcel held in public ownership is located on the west side of the lake and includes a public boating access site (GPS: 45.983031 -85.990081) located at the east end of Dixner Road (Figure 1). The boater access site is a hard-surfaced ramp with sufficient water depth to accommodate most trailerable watercraft. Additionally, the boater access site includes five spaces available for trailer parking and two spaces for vehicle-only parking. The McDonald Lake boater access site is managed by the MDNR Parks and Recreation Division staff from Indian Lake State Park.

## Fishery Resource

### History

During the early 20th century, John Nicholas Lowe was a fisheries biologist who taught at Northern State Teachers College (now Northern Michigan University). J. N. Lowe had assembled fish collections from numerous waterbodies in Michigan’s Upper Peninsula where no information had been gathered previously. McDonald Lake was surveyed by J. N. Lowe on 12 August 1929 using a beach seine. A total of seven fish species were captured including Bluntnose Minnow, Brown Bullhead, Johnny Darter, Mimic Shiner, Northern Pike, Sand Shiner, and Smallmouth Bass.

Fisheries Management of McDonald Lake began during the 1930s when fish stocking occurred. From 1933 to 1938, a total of 430,000 fry Walleye and 7,000 fall fingerling Yellow Perch were stocked in McDonald Lake (Table 1). The status or abundance of these species was unknown prior to stocking; however, the intent was likely to establish a recreational fishery as this was common practice during this period. During the 1930s and 1940s, warm- and cool-water species such as Bluegill, Largemouth Bass, Walleye, Smallmouth Bass, and Yellow Perch were stocked in many inland lakes in Michigan. However, by the early 1940s stocking of these species had already been largely reduced given their ability to reproduce naturally beyond state hatchery capabilities (Cooper 1948). By 1946, the Michigan Fish Commission had a policy to curtail stocking of many of these species given the “incontestable evidence that the average planting of these species has involved an insignificant number of fish compared to the number already present” (Cooper 1948, pp. 8).

Following stocking that occurred in McDonald Lake during the 1930s, fisheries managers worked towards developing a public access site, while township and other agency staff sought to construct a water level control structure at the lake outlet. A public access site was developed in 1961, and a water

level control structure was constructed by local or county officials in 1963. More intensive fisheries management actions followed for the next two decades.

During the 1960s and 1970s, property owners and anglers alike shared some displeasure about the fishing opportunities in McDonald Lake. Information shared throughout this period was mostly consistent with panfish abundance reportedly being 'low', but their size was impressive. Netting surveys conducted during this period corroborated angler reports by documenting growth rates generally comparable to or above the state average for panfish. Anglers and cabin owners also reported occasional catches of bass. The focus of much displeasure during this period was related to the overabundance of undersized Northern Pike, which were referred to at this time as "hammer-handles". In 1969, the Northern Pike regulation was changed, eliminating the minimum size limit. The goal of the regulation change was to reduce overabundance, improve size structure, while maximizing sustainable harvest. Following the change in Northern Pike regulations, fisheries managers conducted numerous surveys throughout the 1960s and 1970s.

Surveys conducted during the 1960s and 1970s included a creel survey, manual removals of various fish species, fish transfers, feeding studies, and additional netting surveys. Creel surveys from this period estimated that anglers harvested nearly nine thousand Northern Pike over two sampling years and by the late 1970s, more than six thousand Northern Pike had been netted, removed or were transferred to nearby inland lakes (e.g., North Manistique Lake, Luce County). Additionally, during spring netting operations, fisheries managers collected eggs and milt from adult Northern Pike and transferred them to the Thompson State Fish Hatchery for propagation. To summarize removal efforts, subsequent netting surveys found little evidence that removals, transfers, or angler harvest reduced the abundance of Northern Pike or improved the size structure of the population.

Following intensive survey efforts that occurred during the 1960s and 1970s, fisheries managers noted that Northern Pike were abundant and slow growing causing panfish and bass populations to remain low due to predation. Additionally, fisheries managers concluded that the manual removal of small Northern Pike was not a practical management strategy going forward. In 1974, fisheries managers presented residents and anglers with three management proposals. Proposal 1 was to continue removing Northern Pike with netting gear, focusing on fish less than 16 inches. Proposal 2 was to build fish shelters on the south side of McDonald Lake, and Proposal 3 was to stock Muskellunge. Residents and anglers responded unanimously in opposition to proposals 2 and 3 and requested that Largemouth Bass be stocked. A total of 9,000 Largemouth Bass fingerlings were stocked in McDonald Lake in fall of 1974 (Table 1). Manual removals and transfers of Northern Pike had largely ceased during the mid- to late-1970s. Subsequent netting surveys suggested that Largemouth Bass stocked in McDonald Lake showed minimal returns, likely due to heavy predation by Northern Pike. Since Largemouth Bass stocking was reportedly unsuccessful, managers noted that stocking bass or other gamefish was not feasible due to the abundance of Northern Pike.

A retrospective summary of the previous two decades was noted by fisheries managers in 1977. During the late 1950s and early 1960s fishing reports were reportedly favorable in McDonald Lake. However, after experiencing low water levels in the late 1950s and early 1960s, a control structure was built to stabilize water levels in the lake. As noted in the geology section of this document, the surrounding landscape of McDonald Lake is flat, and wetland vegetation dominates the landscape. Following construction of the water level control structure, Northern Pike were provided with significantly more spawning habitat and were therefore able to produce large year classes annually. The result was an increase in what was already considered to be an abundant Northern Pike population. As the population continued to expand, their growth rates diminished considerably as forage resources (e.g., Yellow Perch, and Bluegill) became limited. A stunted and abundant Northern Pike population

provided 'top-down' predation pressure on other fish species, reducing their diversity and abundance, which subsequently explained the more favorable growth rates of panfish. The few panfish that were able to survive and grow beyond the gape-width of Northern Pike grew fast providing anglers with a low catch rate, yet preferred or memorable size fishing experience.

During the early 1980s, fisheries managers developed two management strategies for McDonald Lake residents and anglers to consider for the future. The goal of the first strategy was to continue managing McDonald Lake as a 'no minimum size limit, five fish bag limit' lake for Northern Pike. The goal of the second strategy was to remove all fish in McDonald Lake with a toxicant (e.g., Rotenone) and manage the lake for Walleye, Yellow Perch, Bluegill, and bass. Fisheries managers shared these alternatives with the public requesting a vote to determine a preferred path forward. A total of 173 people responded with 165 in support of the first strategy. Moving forward, McDonald Lake would be managed for species already present in the lake, with a 'no minimum size limit' regulation for Northern Pike. The goal of the no minimum size limit for Northern Pike was meant to reduce abundance, improve size structure, and maximize sustainable harvest.

During the 1990s, fisheries management of McDonald Lake included several fish community surveys, Walleye stocking, and fall Walleye recruitment surveys. In the summer of 1991, McDonald Lake was surveyed to assess the fish community. Panfish abundance was documented to have increased with a decrease in growth, while numbers of Largemouth Bass and Northern Pike had decreased compared to results from a survey conducted in 1984. At that time, managers recommended that additional manual removal surveys be conducted to remove Common White Suckers and all panfish less than 6 inches. The goal of the manual removals was to reduce the abundance of competing species and improve growth of panfish.

In May of 1993 a manual removal survey was conducted and 1,725 pounds of Brown Bullhead, 526 pounds of Common White Sucker, and 1,190 pounds of small panfish (Bluegill, Pumpkinseed, and Rock Bass) were removed from McDonald Lake. Additionally, fisheries managers met with anglers to suggest that Walleye stocking might provide an additional means of improving the size of panfish. From 1993 to 2001, a total of 292,184 spring fingerling Walleye were stocked in McDonald Lake. The goal of stocking Walleye at that time was to establish a self-sustaining population, while providing additional predation pressure on panfish (e.g., Bluegill) to improve their size structure. Walleye stocking events were followed by conducting fall recruitment surveys to evaluate the survival of fall fingerling and yearling stocked Walleye. Fall recruitment surveys were conducted in 1993, 1994, and 1996 and found relatively few fall fingerling or yearling Walleye, indicating poor survival of stocked fish from those years.

A general fish community survey was conducted in summer of 1997 to evaluate Walleye stocking and assess the impacts of manual removals completed in 1993. Walleye were present after five years of stocking, however only five fish were captured. Fisheries managers at that time prescribed a continuation of Walleye stocking, however, on a biennial schedule as opposed to every year. Results from the 1997 netting survey found that Bluegill, Northern Pike, and Yellow Perch all exhibited poor growth compared to the state average. In 1999 (a Walleye stocking year, Table 1) an additional fall recruitment survey was conducted, and a significant number of fall fingerling Walleye were captured. At that time, fisheries managers did not document any evidence of natural reproduction and there were no management changes recommended at the time.

As fisheries management of McDonald Lake continued through the 21<sup>st</sup> century Walleye stocking ceased in 2001. In spring of 2006, a general fish community survey was conducted on McDonald Lake. Fisheries managers stated at that time that the fish community was found to be in good

condition as all panfish and gamefish species showed growth comparable to or better than the state average. Results from the 2006 survey also showed that natural reproduction of Walleye was occurring. In October of 2006 a fall recruitment survey was conducted to evaluate the extent to which natural reproduction of Walleye was occurring. A total of ten fall fingerling and twenty-five yearling Walleye were captured suggesting natural reproduction of Walleye was occurring and that growth was relatively slow. Fisheries managers reported at that time that Walleye were an integral part of the fish community and unless Bluegill exhibited an unfavorable size structure, no stocking should occur in the future.

During the early 2000s, the Michigan Department of Natural Resources Fisheries Division initiated a statewide Status and Trends monitoring program to assess fish populations and aquatic habitat in Michigan's inland waters. The goals of the Status and Trends program are to 1) collect data needed to establish an inventory of inland lake habitat and fish community characteristics, 2) develop reference points for local, regional, and statewide management needs, and 3) evaluate the status and monitor changes in aquatic habitats and fish communities across Michigan.

The Status and Trends program initiated statewide use of standardized survey data collection and procedures as part of its 'random sites' sampling component, which is intended to provide a comprehensive survey of all types of inland lakes in Michigan. In 2022, Fisheries Division conducted a random survey of McDonald Lake following Status and Trends inland lake survey protocols to gather water chemistry, physical habitat, and fish community information. Results from this survey are presented here and prompted the writing of this report.

Current status of the fish community

#### *Methods*

From 8 March to 12 August 2022, Fisheries Division conducted a Status and Trends inland lake survey in accordance with established protocols (Wehrly et al. 2015). The Status and Trends survey consisted of a fish component to assess the status of lake fishes, and a limnological component to gather water chemistry, as well as oxythermal and physical habitat.

#### *Status of Lake Habitat*

On 8 March and 12 August 2022, limnological surveys were conducted at the deepest basin of McDonald Lake to evaluate oxythermal habitat. During the March survey, only water temperature, dissolved oxygen, pH, and specific conductance were collected. During the August survey, the same water quality parameters were collected as the March, however, water chemistry samples were also collected to determine alkalinity, concentrations of nutrients (e.g., nitrogen and phosphorus), and chlorophyll a. The McDonald Lake littoral zone and lake shore were also visually surveyed in August to quantify physical habitat parameters including residential development (dwellings per mile), boat dock density (docks per mile), woody habitat (submerged logs per mile), and the average percent shoreline armored.

#### *Status of Fish Community*

MDNR Fisheries Division conducted a fish community survey to assess the status of McDonald Lake beginning 06 June 2022. A variety of gear types were used including three small- and eight large-mesh fyke nets, two trap nets, four experimental gill nets, one seine, and boat electrofishing. The small- and large-mesh fyke nets were set for two and three nights for a total effort of six and twenty-four net nights, respectively. Trap nets were set for three net nights for a total effort of six net nights. Three experimental gill nets were set for a single night, and one experimental gill net was set for two nights for a total gill net effort of five net nights. Total seine effort was six seine hauls completed in

nearshore areas. Boat electrofishing consisted of three transects approximately one-quarter mile in length totaling 30 minutes of effort. The boat electrofishing component of the fish survey was conducted at night on 18 July 2022.

To provide general information about the fish community composition in McDonald Lake, species captured were grouped into three categories. Black Crappie, Bowfin, Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye were categorized as “piscivores”; Bluegill, Bluntnose Minnow, Common Shiner, Golden Shiner, Central Mudminnow, Pumpkinseed, Rock Bass, Sand Shiner, and Yellow Perch were categorized as “planktivore-insectivores”; and Black Bullhead, Common Carp, Common White Sucker, Johnny Darter, and Logperch were categorized as “benthivores”. A per acre estimated standing crop was calculated for McDonald Lake following Schneider (2000).

Gamefish species including Black Crappie, Bluegill, Largemouth Bass, Northern Pike, Pumpkinseed, Rock Bass, Smallmouth Bass, Walleye, and Yellow Perch were measured for total length to the nearest tenth of an inch which was used to compute the average size and range for each gamefish species, as well as a length-distribution. The relative abundance for each species was assessed using catch per unit effort (CPUE) calculated as the number of fish captured per unit of effort (e.g., net night, seine haul, electrofishing minutes). The CPUE data from this survey were compared to the summary regional CPUE data from inland lakes surveyed in the Fisheries Division’s Northern Lake Michigan Management Unit as part of the Status and Trends survey program.

Age structures (10 per inch group) were collected from each gamefish species for age analysis. Scale samples were collected from Black Crappie, Bluegill, and Pumpkinseed (panfish) less than 6.0-inches and bass less than 10.0-inches. Anal fin spines were collected from panfish greater than 6.0-inches, bass greater than 10.0-inches, and all Northern Pike. Dorsal spines were collected from all Walleye captured. Weighted age compositions using length and age references for each gamefish species were calculated according to Schneider (2000a). A mean growth index for each age class was calculated by subtracting the state average mean length-at-age from that of the 2022 McDonald Lake survey. Only those age classes represented with a minimum of five age samples were used to calculate a mean growth index (Schneider et al. 2000b). Fish growing slower than 1.00-inch below the state average were considered "below average", while fish growing faster than 1.00-inch above the state average were considered "above average". Bluegill and Pumpkinseed are the exception where fish growing slower than 0.50-inches or faster than 0.50-inches compared to the state average were considered below or above the state average, respectively. Bluegill size structure was rated using an index based on the mean growth index and the proportion of fish greater than 6, 7, and 8 inches captured using large-mesh fyke nets, trap nets, and electrofishing (Schneider 1990, Schneider 2000).

## Results

### Status of Lake Habitat

#### *Water chemistry –*

Alkalinity (105 mg/L CaCO<sub>3</sub>) was reportedly high, and the concentrations of Nitrogen (0.348 mg/L) and Phosphorus (0.007 mg/L) were both reportedly low compared to the typical range in values for the region (Table 2). The concentration of Chlorophyll-a was moderate compared to the typical range in values for the region (Table 2).

#### *Oxythermal habitat –*

During the winter, McDonald Lake was unstratified and water temperature ranged from 36.0°F just below the ice (at surface) to 40.3°F at 7 feet deep (Table 3). Dissolved oxygen ranged from 2.43 mg/L below the ice to 0.0 mg/L at 7 feet deep (Table 3). During the summer, McDonald Lake was unstratified and water temperature ranged from 71.0°F at the surface to 69.0°F at 8 feet deep (Table 3). From the water surface to 8 feet deep, the concentration of dissolved oxygen in McDonald Lake ranged from 8.47 to 8.71 mg/L (Table 3).

#### *Physical habitat -*

Among the physical habitat indicators measured, the number of dwellings and docks per mile of shoreline were rated as moderate compared to the typical range in values for the region (Table 4). The average percent shoreline armored or altered from its natural state is rated high (Table 4, Figure 4) for the region and the density of woody habitat, or submerged trees per shoreline mile, was rated as ‘moderate’ (Table 4, Figure 5).

### Status of Fish Community

A total of 3,881 fish weighing 937 pounds and representing 20 species were captured during the 2022 survey (Table 5). Piscivores, such as Black Crappie, Bowfin, Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye comprised 5% of the catch by number and 34% of the catch by biomass. Planktivore-Insectivores, such as Bluegill, Bluntnose Minnow, Common Shiner, Golden Shiner, Central Mudminnow, Pumpkinseed, Rock Bass, Sand Shiner, and Yellow Perch comprised 87% of the catch by number and 14% of the catch by biomass. Benthivores, such as Black Bullhead, Common Carp, Common White Sucker, Johnny Darter, and Logperch comprised 8% of the catch by number and 51% of the catch by biomass. The estimated standing crop of McDonald Lake in 2022 was approximately 74 pounds of fish per acre. The CPUE and total number of all species captured by gear type in McDonald Lake are presented in Table 6 and Table 7, respectively.

#### *Bluegill –*

A total of 336 Bluegill were captured across all gear types (Table 5 and Table 6). Bluegill averaged 6.4 inches total length and comprised 8.7% of the catch by number and 6.2% of the catch by biomass. Bluegill size ranged from 1.0 to 11.0 inches long with 50% of the catch meeting or exceeding the 6-inch preferred size for harvest (Table 5, Figure 6). The CPUE of Bluegill in McDonald Lake was ‘moderate’ to ‘high’ across all gear types, with gill nets being reported as ‘high’ compared to regional values (Table 8). The CPUE for Bluegill captured in McDonald Lake using trap nets, large-mesh fyke nets, and electrofishing was 3.00, 6.08, and 0.86, respectively (Table 6). The CPUE for Bluegill captured electrofishing was 0.86 fish per minute (Table 6). A total of seven age classes of Bluegill were represented and the mean growth index for ages 4-, 5-, 8-, and 9-year-olds was  $\pm 0.0$  compared to the state average (Figure 6). The Schneider index scores for Bluegill in McDonald Lake were rated as “good” across all gear types.

*Largemouth Bass -*

A total of 28 Largemouth Bass were captured across all gear types except small-mesh fyke nets and seines (Table 5 and Table 6). Largemouth Bass averaged 15.2 inches total length and comprised 0.7% of the catch by number and 6.4% of the catch by biomass. Largemouth Bass ranged in size from 1.0 to 19.0 inches long with 79% of the catch meeting or exceeded the minimum size of 14-inches (Table 5, Figure 7). The CPUE of Largemouth Bass captured in gill and trap nets scored 'high' while those captured electrofishing and in large-mesh fyke nets scored 'moderate' (Table 8). A total of ten age classes of Largemouth Bass were represented, and the mean growth index of 8-year-olds was -1.0 below the state average (Figure 7).

*Northern Pike -*

A total of 99 Northern Pike were captured across all gear types except electrofishing and seines (Table 5 and Table 6). Northern Pike averaged 18.1 inches total length and comprised 2.6% of the catch by number and 14.9% of the catch by biomass. Northern Pike ranged in size from 8.0 to 29.0 inches long with 2% of the catch meeting or exceeding 24-inches long (Table 5, Figure 8). The CPUE of Northern Pike captured in gill nets scored 'high' while the CPUE score for remaining gear types was 'moderate' (Table 8). A total of six age classes of Northern Pike were represented, and the mean growth index of 2-, 3-, and 4-year-olds was -3.8 below the state average (Figure 8).

*Pumpkinseed -*

A total of 31 Pumpkinseed were captured across all gear types except seines (Table 5 and Table 6). Pumpkinseed averaged 7.3 inches total length and comprised 0.8% of the catch by number and 1.2% of the catch by biomass. Pumpkinseed ranged in size from 2.0 to 9.0 inches long with 90% of the catch meeting or exceeded the minimum preferred size (Table 5, Figure 9). The CPUE of Pumpkinseed captured ranged from moderate to high with gill nets scoring 'high' and all other gear that captured Pumpkinseed score 'moderate' (Table 8). A total of seven age classes were represented, and the mean growth index of 4-, 5-, and 8-year-olds was +1.2 above the state average (Figure 9).

*Smallmouth Bass -*

A total of 19 Smallmouth Bass were captured across all gear types except seines (Table 5 and Table 6). Smallmouth Bass averaged 14.2 inches total length and comprised 0.5% of the catch by number and 3.2% of the catch by biomass. Smallmouth Bass ranged in size from 7.0 to 19.0 inches long with 58% of the catch meeting or exceeding the minimum size of 14-inches (Table 5, Figure 10). The CPUE of Smallmouth Bass captured ranged from 'moderate' to 'high' with gill nets scoring 'high' and all other gear types scoring 'moderate' (Table 8). A total of seven age classes of Smallmouth Bass were represented, and the mean growth index for 2- and 4-year-olds was +1.2 above the state average (Figure 10).

*Walleye -*

A total of 31 Walleye were captured across all gear types except small-mesh fyke nets and seines (Table 5 and Table 6). Walleye averaged 16.4 inches total length and comprised 0.8% of the catch by number and 5.1% of the catch by biomass. Walleye ranged in size from 7.0 to 20.0 inches long with 74% of the catch meeting or exceeding the minimum size of 15-inches (Table 5, Figure 11). The CPUE of Walleye captured scored 'moderate' across all gear types (Table 8). A total of eight age classes were represented, and the mean growth index for 3-, 4-, and 5-year-olds was -0.1 compared to the state average (Figure 11).

#### *Yellow Perch –*

A total of 2,851 Yellow Perch were captured across all gear types except large-mesh fyke nets and trap nets (Table 5 and Table 6). Yellow Perch averaged 3.7 inches total length and comprised 73.5% of the catch by number and 1.9% of the catch by biomass. Yellow Perch ranged in size from 2.0 to 8.0 inches long with no fish meeting or exceeding the preferred size (Table 5, Figure 12). The CPUE of Yellow Perch captured ranged from low to high, with electrofishing, large-mesh fyke nets, and trap nets scoring ‘low’ (Table 8). The CPUE of Yellow Perch captured in gill nets was ‘moderate’, while small-mesh fyke nets and seines scored ‘high’ (Table 8). A total of five age classes were represented, and the mean growth index for 2-year-olds was -1.5 below the state average (Figure 12).

#### *Other Gamefish Species Present -*

Black Bullhead, Black Crappie, Bowfin, Common Carp, and Rock Bass were also captured during the 2022 McDonald Lake survey (Table 5). Black Crappie and Common Carp were captured too infrequently to make inferences about their relative abundance. The CPUE of Bowfin was ‘moderate’ to ‘high’ for those fish captured in trap nets and large-mesh fyke nets, respectively (Table 8). A total of 183 Black Bullhead were captured in fyke nets ranging in size from 6.0 to 14.0 inches (Table 5). A total of 105 Rock Bass were captured across all gear types, and their average size was 8.3 inches long (Table 5 and Table 6). Rock Bass ranged from 2.0 to 12.0 inches long and 71% met or exceeded the minimum preferred size (Table 5).

#### *Forage Fish Species Present -*

A total of eight species categorized as ‘forage fish’ were captured during the 2022 McDonald Lake survey. Bluntnose Minnow and Central Mudminnow were caught too infrequently to make inferences about catch rates. Other forage species including Common Shiner, Golden Shiner, Johnny Darter, Logperch, and Sand Shiner were typically captured in small-mesh fyke nets and seines and were generally in ‘moderate’ relative abundance. A total of 132 Common White Sucker were captured (Table 5) across all gear types except small-mesh fyke nets and seines (Table 6). Common White Sucker ranged from 13.0 to 20.0 inches long with an average total length of 17.9 inches (Table 5). The CPUE for Common White Sucker ranged from moderate to high (Table 8).

### **Analysis and Discussion**

Based on the environment, water chemistry, and standing crop biomass, McDonald Lake is a moderate to highly productive lake with high fish diversity and limited to moderate densities of nearshore habitat. Since McDonald Lake is shallow, the lake is likely to experience periods of hypoxic or anoxic conditions that may limit fish abundance and feeding activity during the more stressful periods of the year, particularly winter and summer. That said, based on the diversity, abundance, and growth of various panfish and gamefish species captured, McDonald Lake offers an attractive recreational fishery that is currently supported entirely by natural reproduction. McDonald Lake and the adjoining tributaries and marshes provide favorable conditions for species that require aquatic vegetation to spawn (namely, Northern Pike and Yellow Perch). Therefore, these species are likely to persist in high abundance with less than favorable growth rates and longevity.

McDonald Lake panfish species include Bluegill, Pumpkinseed, Yellow Perch, and Black Crappie. Catch rates of Bluegill and Pumpkinseed suggest moderate to high relative abundance and the growth for these two popular panfish species was good compared to the state average. Additionally, the percentage of fish (50 to 90%) that met or exceeded the preferred size for Bluegill and Pumpkinseed suggests that McDonald Lake provides an attractive recreational fishery for these species. The Schneider Index is rated ‘good’ for Bluegill, which supports this statement, and a ‘good’ rating is rare

for many waterbodies in the region. On the other hand, the fishery for Yellow Perch and Black Crappie is less favorable. Yellow Perch in McDonald Lake are abundant and undersized, suggesting that natural recruitment is high, growth is slow and lifespans are limited. Yellow Perch are likely being consumed by Northern Pike, bass, and Walleye as they reach 4 to 6 inches preventing many young perch from surviving to a larger size, while smaller fish remain abundant. Black Crappie exist in low numbers providing an enjoyable incidental catch now and then. Except for Black Crappie, all other panfish species showed annual recruitment suggesting that sufficient habitat is available for each of these species to reproduce annually on their own.

McDonald Lake large gamefish species include Largemouth Bass, Smallmouth Bass, Walleye, and Northern Pike. Catch rates of all large gamefish species ranged from moderate to high, suggesting a high relative abundance compared to other lakes in the region. Interestingly, a large percentage (58 to 79%) of gamefish captured met or exceeded the minimum size suggesting an attractive recreational fishery exists. Growth among gamefish species was variable with Largemouth Bass and Northern Pike exhibiting poor growth, while Walleye and Smallmouth Bass were either comparable to or higher than the state average growth, respectively. The high catch rates coupled with favorable growth suggest that sufficient forage exists in McDonald Lake to support the abundant and diverse gamefish population with one more notable exception.

Northern Pike are the exception where catch rates are high, but growth is very slow compared to the state average. Displeasure with the overabundance and small size of Northern Pike has been a point of contention by anglers for more than 70 years, or as far back as written records indicate. Despite many attempts to reduce abundance and improve the size structure of the population, the Northern Pike population remains similar. This does not suggest that 'something is wrong' with the lake. Rather, McDonald Lake is likely one of the most productive lakes in the region and perhaps the state for Northern Pike. McDonald Lake is large and shallow, with an abundance of aquatic vegetation that populates nearly the entire surface acreage of the lake. Additionally, surrounding landforms include low lying marsh areas with two small, but not insignificant tributaries that all provide habitat to satisfy various life history requirements for species like Northern Pike. Based on a review of the surrounding environment, productivity, and recent surveys, McDonald Lake provides excellent opportunities to introduce young or new anglers to Northern Pike fishing during the open- or hard-water fishing seasons. McDonald Lake also provides angling opportunities for other gamefish species including Black Bullhead, Bowfin, Common Carp, and Rock Bass.

Forage fishes including shiners, darters, and suckers were found in moderate relative abundance which is higher than expected given the number of large predators in the lake and moderate habitat levels. Large woody habitat was found to be in moderate density compared to other waterbodies in the region, but in low density compared to undeveloped lakes (O'Neal and Soulliere 2006). The rate of shoreline armoring is high relative to neighboring waterbodies, suggesting habitat loss is occurring which has the potential to negatively impact forage fish populations in the future. Presently, forage fish species appear to be holding their own, but might benefit from anglers and riparian landowners adopting best management practices that serve to maintain or improve nearshore habitat when modifications are proposed.

## Management Direction

### Fish Community

The McDonald Lake fish community is managed as a 'mixed bag' fishery and currently offers attractive recreational angling opportunities for a variety of species including panfish, bass, Northern Pike, and Walleye. At this time there are no fisheries regulation changes needed for McDonald Lake. Anglers and area stakeholders interested in maintaining or improving the fish community are encouraged to focus their efforts on invasive species prevention and nearshore habitat protection and improvement.

### Habitat Protection and Improvement

Shoreland and shoreline development can cause poor water quality, erosion, and additional losses to fish habitat. The rate of shoreline alternation is high in McDonald Lake compared to other waterbodies in the region. Based on a national lake assessment (USEPA 2024), the loss of natural shorelines is the biggest threat to the overall health of inland lakes in Michigan. McDonald Lake landowners are encouraged to consider adopting natural shoreline principles to help reduce additional nearshore habitat loss. For more information about how to identify contractors and incorporate natural shoreline principles, landowners can visit the Michigan Natural Shoreline Partnership website (MNSP 2026).

The density of nearshore woody habitat is moderate in McDonald Lake. It is plausible that projects that serve to maintain or improve the density of nearshore habitat in McDonald Lake will benefit the forage fish community providing subsequent benefits to panfish and gamefish populations. McDonald Lake riparians, anglers, and the Schoolcraft County Conservation District are encouraged to work collaboratively with the MDNR Fisheries Division and Michigan Department of Environment, Great Lakes, and Energy to maintain or improve the density of nearshore woody habitat in McDonald Lake. Rehabilitation projects designed to improve the density of nearshore woody habitat could target regions of the lake shoreline where the number of logs per mile is low (Figure 5). Funding for additional monitoring and improvement of nearshore woody habitat may also be available through the MDNR Fisheries Aquatic Habitat Grant program Fisheries Habitat Grant Program (MDNR 2026).

### Invasive Species

Currently, other than Common Carp, there are no known occurrences of invasive species in McDonald Lake. That said, it is likely that Zebra Mussels exist within the outflow (Bulldog Creek) of McDonald Lake. Also, there are documented occurrences of invasive species such as Zebra Mussels and Invasive Watermilfoil in the region which suggests McDonald Lake is vulnerable to future introductions. Fisheries Division recommends that representatives from McDonald Lake, as well as staff from the Schoolcraft County Conservation District and Cooperative Invasive Species Management Area (or CISMA) work collaboratively to apply for funding to implement programs geared towards outreach and education to prevent future introduction of invasive species in the McDonald Lake region. For example, funding for prevention, detection, eradication, and control of aquatic invasive species may be possible through the Michigan Invasive Species Grant Program (MISGP 2026).

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**Tables and Figures**

Table 1. Year of stocking, number stocked, age at stocking, and the species of fish stocked into McDonald Lake from 1933 to 2001.

Species	Year	Number	Age
Walleye	1933	60,000	Spring Fry
Yellow Perch	1933	2,000	Fall Fingerling
Walleye	1935	120,000	Spring Fry
Yellow Perch	1935	5,000	Fall Fingerling
Walleye	1936	150,000	Spring Fry
Walleye	1938	100,000	Spring Fry
Largemouth Bass	1974	9,000	Fingerling
Walleye	1993	40,441	Spring Fingerling
Walleye	1994	33,004	Spring Fingerling
Walleye	1995	42,845	Spring Fingerling
Walleye	1996	63,540	Spring Fingerling
Walleye	1997	35,878	Spring Fingerling
Walleye	1999	35,795	Spring Fingerling
Walleye	2001	22,686	Spring Fingerling
Walleye	2001	17,995	Spring Fingerling

Table 2. Water chemistry parameters, the typical range (25<sup>th</sup> to 75<sup>th</sup> percentile) in values for each parameter, the number (N) of inland lakes in the region sampled in accordance with Status and Trends inland lake survey protocols, McDonald Lake, Schoolcraft County survey results, and the rating of McDonald Lake compared to the typical regional values.

Water Chemistry Parameter	Typical Range	N	McDonald Lake	Rating
Alkalinity (mg/L)	25 to 101	71	105	High
Chlorophyll a (ug/L)	1.7 to 4.1	73	3.3	Moderate
Total Nitrogen (mg/L)	0.447 to 0.696	62	0.348	Low
Total Phosphorus (mg/L)	0.008 to 0.022	70	0.007	Low

Table 3. Depth, water temperature, dissolved oxygen, pH, and specific conductivity results measured during the winter (top table) and summer (bottom table) in McDonald Lake, Schoolcraft County as part of the 2022 Status and Trends inland lake survey.

Depth (ft)	Water Temperature (°F)	Dissolved Oxygen (mg/L)	pH	Conductivity (uS/cm)
3	36.0	2.43	6.88	0.242
4	37.8	0.83	6.80	0.251
5	39.6	0.00	6.70	0.267
6	40.3	0.00	6.64	0.282
7	40.3	0.00	6.60	0.286

Depth (ft)	Water Temperature (°F)	Dissolved Oxygen (mg/L)	pH	Conductivity (uS/cm)
1	71.0	8.62	8.72	0.188
2	70.2	8.62	8.73	0.187
3	70.1	8.70	8.73	0.187
4	69.8	8.47	8.69	0.187
5	69.0	8.70	8.75	0.187
6	69.0	8.71	8.74	0.187
7	69.0	8.70	8.74	0.187
8	69.0	8.71	8.75	0.187

Table 4. Physical habitat parameters, the typical range (25<sup>th</sup> to 75<sup>th</sup> percentile), the number (N) of lakes surveyed in the Northern Lake Michigan Management Unit, the measured value at McDonald Lake, and the rating for McDonald Lake compared to other inland lakes in the region.

Physical Habitat Parameter	Typical Range	N	McDonald Lake	Rating
Dwellings	1.3 to 20.0	80	12.2	Moderate
Boat Docks	1.3 to 15.1	81	7.7	Moderate
Shoreline Armoring	0.0 to 11.5	81	12.7	High
Large Woody Habitat	25.0 to 219.6	81	58.3	Moderate

Table 5. Species, number captured, total weight, average total length, range in total length, and percent legal size of fish captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

Species	Number	Total Weight (lbs.)	Average Total Length (in.)	Range in Total Length (in.)	Percent Legal or Preferred Size
Black Bullhead	183	155.7	12.2	6.0 to 14.0	99
Black Crappie	1	0.7	10.5	-	100
Bluegill	336	58.0	6.4	1.0 to 11.0	50
Bluntnose Minnow	1	0.0	2.5	-	100
Bowfin	14	44.1	20.6	18.0 to 22.0	100
Common Carp	2	27.8	30.5	24.0 to 36.0	100
Common Shiner	16	0.2	3.0	2.0 to 4.0	100
White Sucker	132	297.8	17.9	13.0 to 20.0	100
Golden Shiner	4	0.0	3.3	2.0 to 4.0	100
Johnny Darter	4	0.0	1.5	1.0 to 2.0	100
Largemouth Bass	28	60.2	15.2	1.0 to 19.0	79
Logperch	4	0.1	4.0	3.0 to 5.0	100
Mudminnow	2	0.0	3.0	2.0 to 4.0	100
Northern Pike	99	139.6	18.1	8.0 to 29.0	2
Pumpkinseed	31	11.3	7.3	2.0 to 9.0	90
Rock Bass	105	46.5	8.3	2.0 to 12.0	71
Sand Shiner	18	0.1	2.6	2.0 to 3.0	100
Smallmouth Bass	19	30.3	14.2	7.0 to 19.0	58
Walleye	31	47.4	16.4	7.0 to 20.0	74
Yellow Perch	2,851	17.9	3.7	2.0 to 8.0	0

Table 6. Catch per unit effort (CPUE) by species and by gear type for fish captured in McDonald Lake, Schoolcraft County during the June 2022 Status and Trends survey.

Species	Electrofishing	Large-Mesh Fyke Net	Gill Net	Small-Mesh Fyke Net	Seine	Trap Net
Black Bullhead	0.03	4.92	5.00	0.00	0.00	6.50
Black Crappie	0.00	0.00	0.20	0.00	0.00	0.00
Bluegill	0.86	6.08	4.00	20.50	0.50	3.00
Bluntnose Minnow	0.00	0.00	0.00	0.17	0.00	0.00
Bowfin	0.00	0.33	0.20	0.00	0.00	0.83
Mudminnow	0.00	0.00	0.00	0.33	0.00	0.00
Common Carp	0.00	0.00	0.40	0.00	0.00	0.00
Common Shiner	0.13	0.00	0.00	2.00	0.00	0.00
Golden Shiner	0.03	0.00	0.00	0.50	0.00	0.00
Johnny Darter	0.00	0.00	0.00	0.17	0.50	0.00
Largemouth Bass	0.07	0.13	2.60	0.00	0.00	1.67
Logperch	0.10	0.00	0.00	0.00	0.17	0.00
Northern Pike	0.00	1.46	9.00	0.17	0.00	3.00
Pumpkinseed	0.20	0.71	1.00	0.33	0.00	0.17
Rock Bass	0.00	2.63	0.60	4.00	0.00	2.50
Sand Shiner	0.17	0.00	0.00	1.83	0.33	0.00
Smallmouth Bass	0.07	0.42	0.20	0.17	0.00	0.83
Walleye	0.10	0.75	1.00	0.00	0.00	0.83
White Sucker	0.13	3.92	3.60	0.00	0.00	2.67
Yellow Perch	0.20	0.00	1.80	465.0	7.67	0.00

Table 7. Total number of fish captured by species and by gear type for McDonald Lake, Schoolcraft County during the June 2022 Status and Trends survey.

Species	Electrofishing	Large-Mesh Fyke Net	Gill Net	Small-Mesh Fyke Net	Seine	Trap Net	Total
Black Bullhead	1	118	25	0	0	39	183
Black Crappie	0	0	1	0	0	0	1
Bluegill	26	146	20	123	3	18	336
Bluntnose Minnow	0	0	0	1	0	0	1
Bowfin	0	8	1	0	0	5	14
Mudminnow	0	0	0	2	0	0	2
Common Carp	0	0	2	0	0	0	2
Common Shiner	4	0	0	12	0	0	16
Golden Shiner	1	0	0	3	0	0	4
Johnny Darter	0	0	0	1	3	0	4
Largemouth Bass	2	3	13	0	0	10	28
Logperch	3	0	0	0	1	0	4
Northern Pike	0	35	45	1	0	18	99
Pumpkinseed	6	17	5	2	0	1	31
Rock Bass	0	63	3	24	0	15	105
Sand Shiner	5	0	0	11	2	0	18
Smallmouth Bass	2	10	1	1	0	5	19
Walleye	3	18	5	0	0	5	31
White Sucker	4	94	18	0	0	16	132
Yellow Perch	6	0	9	2,790	46	0	2,851

Table 8. Typical range (25th percentile to 75th percentile) CPUE values for species captured during Status and Trends inland lake surveys in the Northern Lake Michigan Management Unit (N = 87, 2002 to 2025) compared to McDonald Lake. The number (N) column refers to the number of lakes where each species was captured during a Status and Trends survey.

Species	Gear Type	Typical Range	N	McDonald Lake CPUE	Rating
Black Bullhead	Large-Mesh Fyke	0.00 to 1.64	7	4.92	High
Black Bullhead	Small-Mesh Fyke	0.00 to 0.58	7	0.00	Low
Bluegill	Electrofishing	0.07 to 3.63	46	0.86	Moderate
Bluegill	Large-Mesh Fyke	0.73 to 37.27	62	6.08	Moderate
Bluegill	Gill Net	0.00 to 0.43	20	4.00	High
Bluegill	Small-Mesh Fyke	0.42 to 34.67	53	20.50	Moderate
Bluegill	Seine	0.00 to 3.00	29	0.50	Moderate
Bluegill	Trap Net	0.25 to 17.18	9	3.00	Moderate
Bowfin	Large-Mesh Fyke	0.09 to 0.14	6	0.33	High
Bowfin	Trap Net	0.61 to 1.28	3	0.83	Moderate
Common Shiner	Electrofishing	0.03 to 0.33	27	0.13	Moderate
Common Shiner	Small-Mesh Fyke	0.00 to 8.75	22	2.00	Moderate
Common Shiner	Seine	0.00 to 1.82	12	0.00	Low
Golden Shiner	Electrofishing	0.00 to 0.27	27	0.03	Moderate
Golden Shiner	Large-Mesh Fyke	0.00 to 0.13	14	0.00	Low
Golden Shiner	Small-Mesh Fyke	0.00 to 2.31	32	0.50	Moderate
Johnny Darter	Small-Mesh Fyke	0.00 to 1.69	19	0.17	Moderate
Johnny Darter	Seine	0.00 to 1.42	20	0.50	Moderate
Largemouth Bass	Electrofishing	0.03 to 1.28	41	0.07	Moderate
Largemouth Bass	Large-Mesh Fyke	0.06 to 1.98	43	0.13	Moderate
Largemouth Bass	Gill Net	0.00 to 0.75	19	2.60	High
Largemouth Bass	Small-Mesh Fyke	0.00 to 0.50	21	0.00	Low
Largemouth Bass	Seine	0.00 to 0.17	12	0.00	Low
Largemouth Bass	Trap Net	0.25 to 1.22	8	1.67	High
Logperch	Electrofishing	0.03 to 0.17	10	0.10	Moderate
Logperch	Small-Mesh Fyke	0.25 to 11.08	8	0.00	Low
Logperch	Seine	0.00 to 0.35	5	0.17	Moderate
Northern Pike	Electrofishing	0.00 to 0.07	32	0.00	Low
Northern Pike	Large-Mesh Fyke	0.74 to 1.58	65	1.46	Moderate
Northern Pike	Gill Net	0.25 to 4.29	49	9.00	High
Northern Pike	Small-Mesh Fyke	0.00 to 0.25	22	0.17	Moderate
Northern Pike	Trap Net	0.95 to 3.42	11	3.00	Moderate

Table 8 (continued). Typical range (25th percentile to 75th percentile) CPUE values for species captured during Status and Trends inland lake surveys in the Northern Lake Michigan Management Unit (N = 87, 2002 to 2025) compared to McDonald Lake. The number (N) column refers to the number of lakes where each species was captured during a Status and Trends survey.

Species	Gear Type	Typical Range	N	McDonald Lake CPUE	Rating
Pumpkinseed	Electrofishing	0.06 to 0.78	52	0.20	Moderate
Pumpkinseed	Large-Mesh Fyke	0.40 to 5.36	65	0.71	Moderate
Pumpkinseed	Gill Net	0.00 to 0.08	18	1.00	High
Pumpkinseed	Small-Mesh Fyke	0.19 to 3.56	55	0.33	Moderate
Pumpkinseed	Seine	0.00 to 0.33	23	0.00	Low
Pumpkinseed	Trap Net	0.16 to 3.53	9	0.17	Moderate
Rock Bass	Electrofishing	0.13 to 1.05	55	0.00	Low
Rock Bass	Large-Mesh Fyke	2.06 to 10.56	66	2.63	Moderate
Rock Bass	Gill Net	0.00 to 0.62	28	0.60	Moderate
Rock Bass	Small-Mesh Fyke	0.50 to 3.81	58	4.00	High
Rock Bass	Trap Net	0.67 to 3.89	13	2.50	Moderate
Sand Shiner	Small-Mesh Fyke	0.17 to 631.08	8	1.83	Moderate
Sand Shiner	Seine	0.46 to 31.13	11	0.33	Low
Smallmouth Bass	Electrofishing	0.06 to 0.55	43	0.07	Moderate
Smallmouth Bass	Large-Mesh Fyke	0.11 to 0.81	49	0.42	Moderate
Smallmouth Bass	Gill Net	0.00 to 0.19	18	0.20	High
Smallmouth Bass	Small-Mesh Fyke	0.00 to 0.50	19	0.17	Moderate
Smallmouth Bass	Trap Net	0.15 to 1.45	9	0.83	Moderate
Walleye	Electrofishing	0.03 to 0.37	42	0.10	Moderate
Walleye	Large-Mesh Fyke	0.17 to 1.11	52	0.75	Moderate
Walleye	Gill Net	0.17 to 2.34	40	1.00	Moderate
Walleye	Trap Net	0.33 to 1.67	8	0.83	Moderate
White Sucker	Electrofishing	0.00 to 0.18	36	0.13	Moderate
White Sucker	Large-Mesh Fyke	0.17 to 1.75	62	3.92	High
White Sucker	Gill Net	0.42 to 4.28	50	3.60	Moderate
White Sucker	Trap Net	0.33 to 1.34	10	2.67	High
Yellow Perch	Electrofishing	0.38 to 3.76	67	0.20	Low
Yellow Perch	Large-Mesh Fyke	0.08 to 2.00	67	0.00	Low
Yellow Perch	Gill Net	0.38 to 8.20	60	1.80	Moderate
Yellow Perch	Small-Mesh Fyke	0.00 to 11.50	54	465.00	High
Yellow Perch	Seine	0.00 to 2.33	35	7.67	High
Yellow Perch	Trap Net	0.00 to 0.33	5	0.00	Low

Figure 1. Inland contour map of McDonald Lake, Schoolcraft County Michigan.

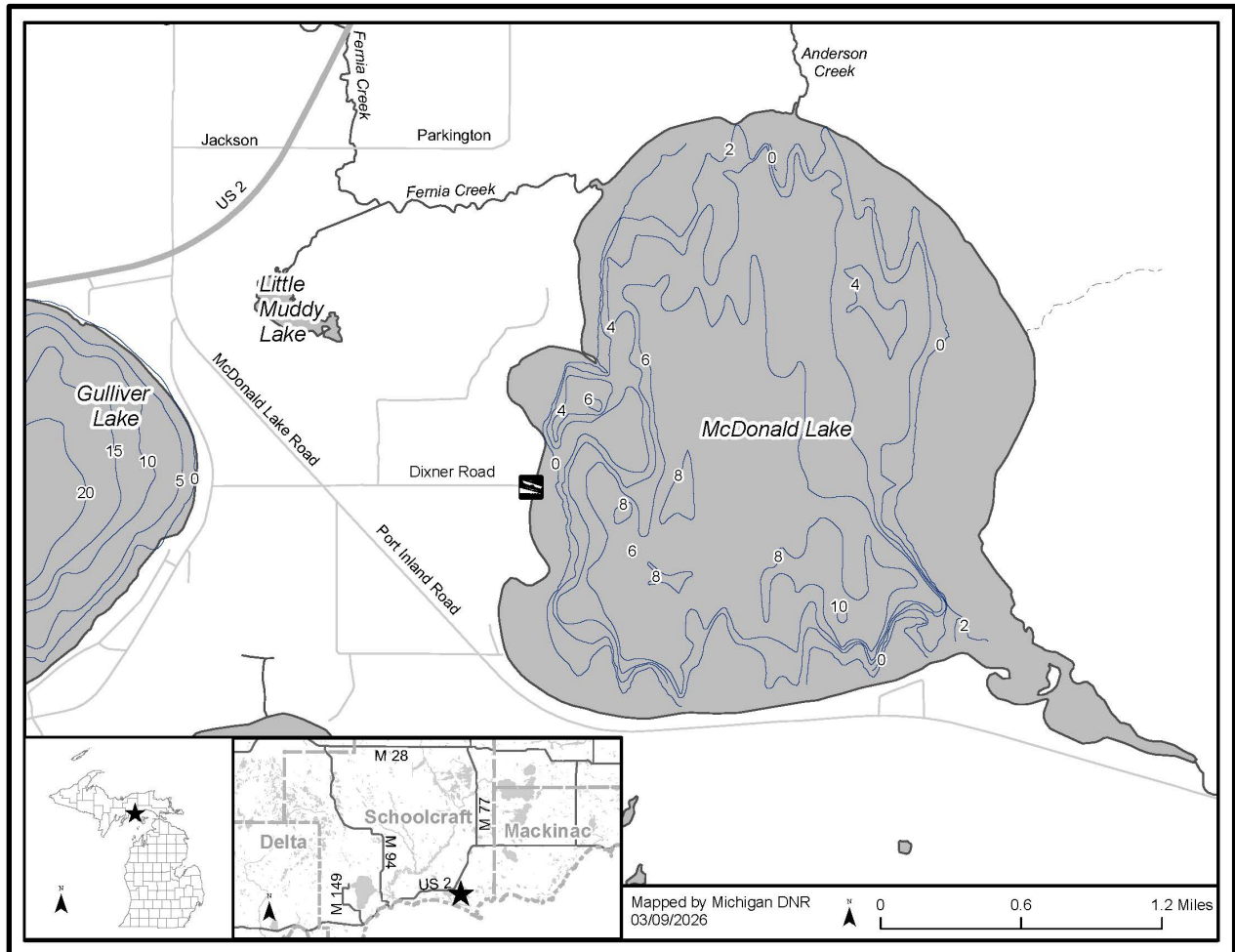


Figure 2. Land use map for the McDonald Lake lakeshed region.

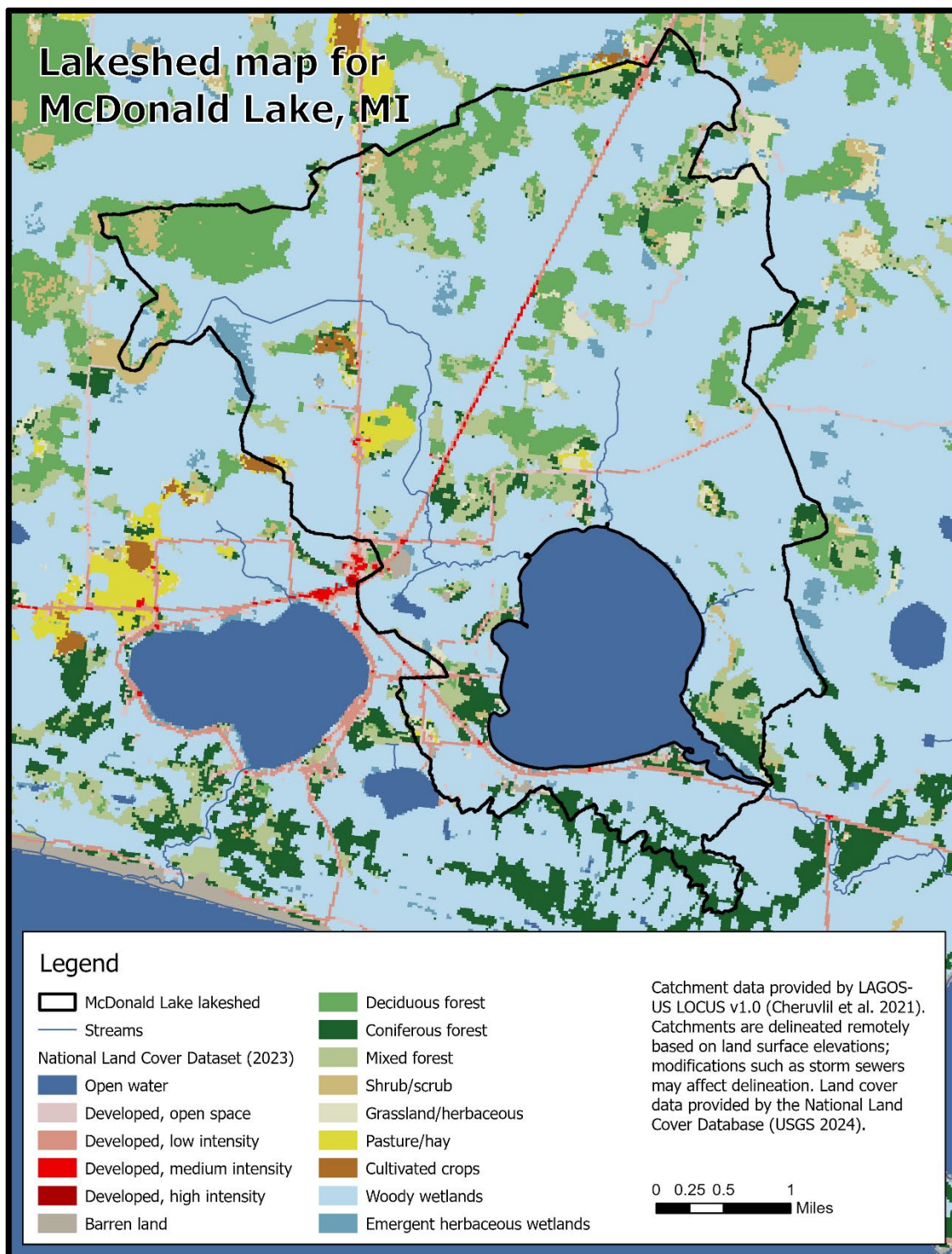


Figure 3. Catchment or 'lakeshed' map for the McDonald Lake region.

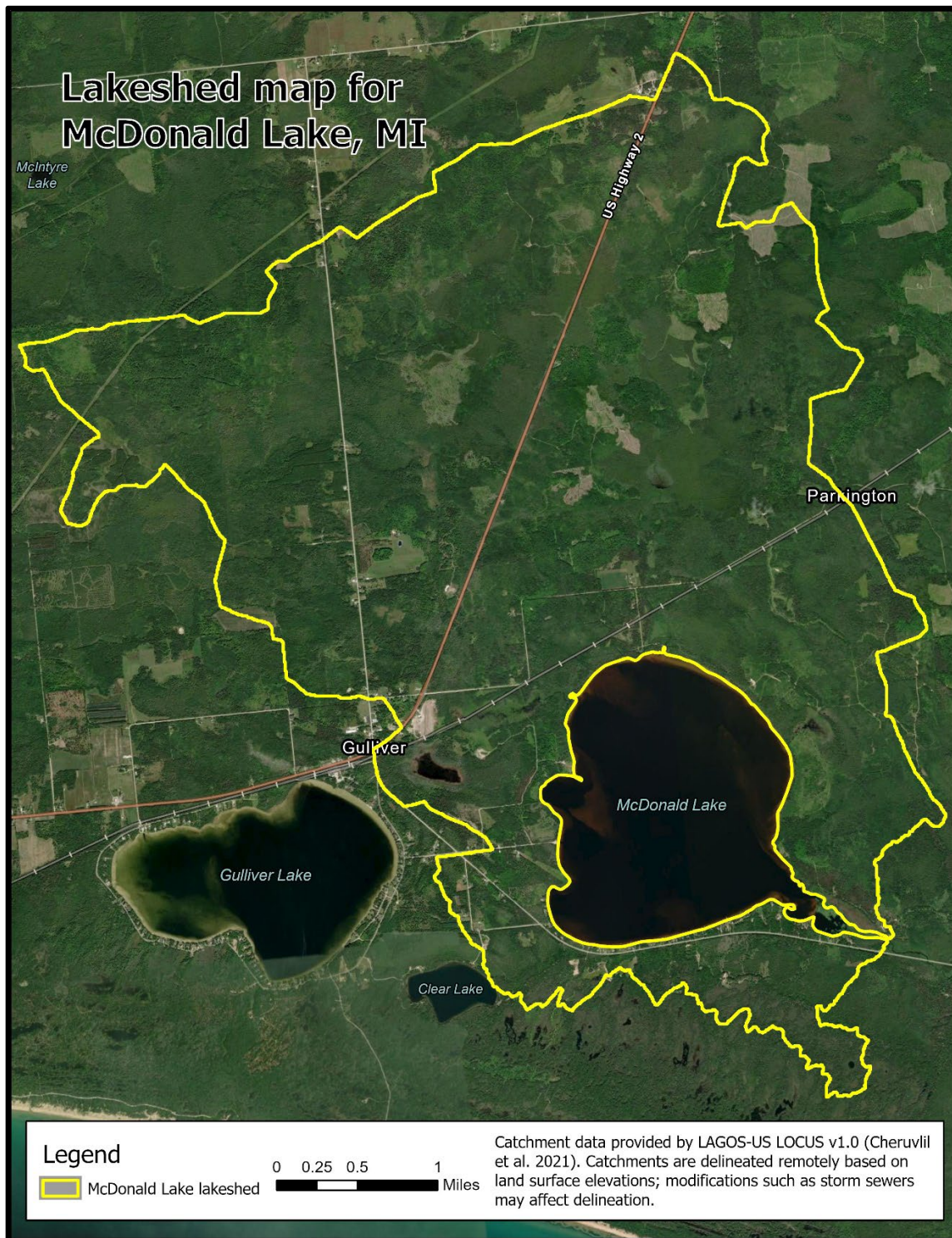


Figure 4. The percent of shoreline in McDonald Lake, Schoolcraft County that has been armored or altered from its natural state. The rate of shoreline armoring in McDonald Lake is 'moderate' or below levels recommend (<25%) by O'Neal & Soulliere (2006) but is 'high' compared to other waterbodies in the region.

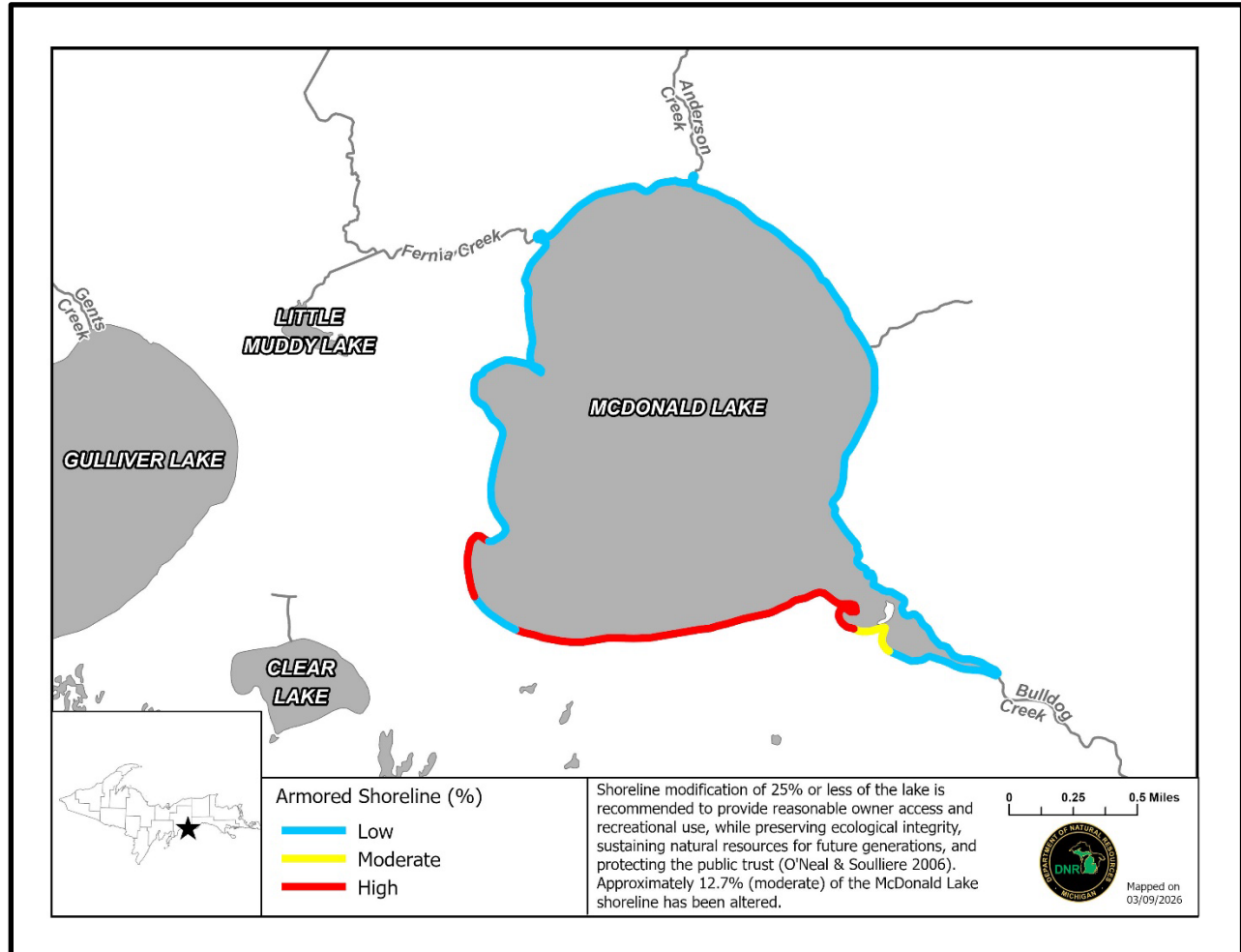


Figure 5. The density of shoreline woody habitat in McDonald Lake, Schoolcraft County.

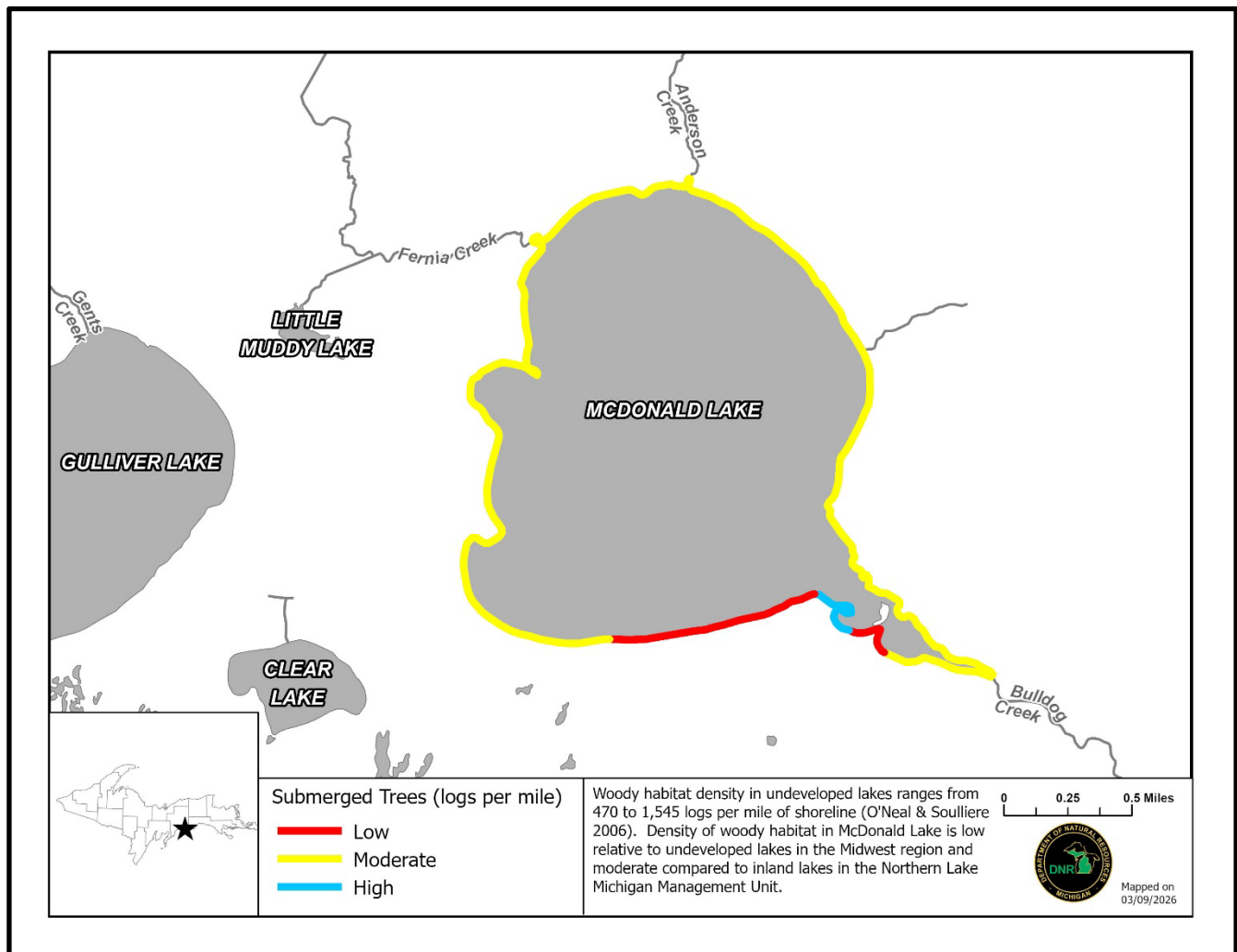


Figure 6. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Bluegill captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

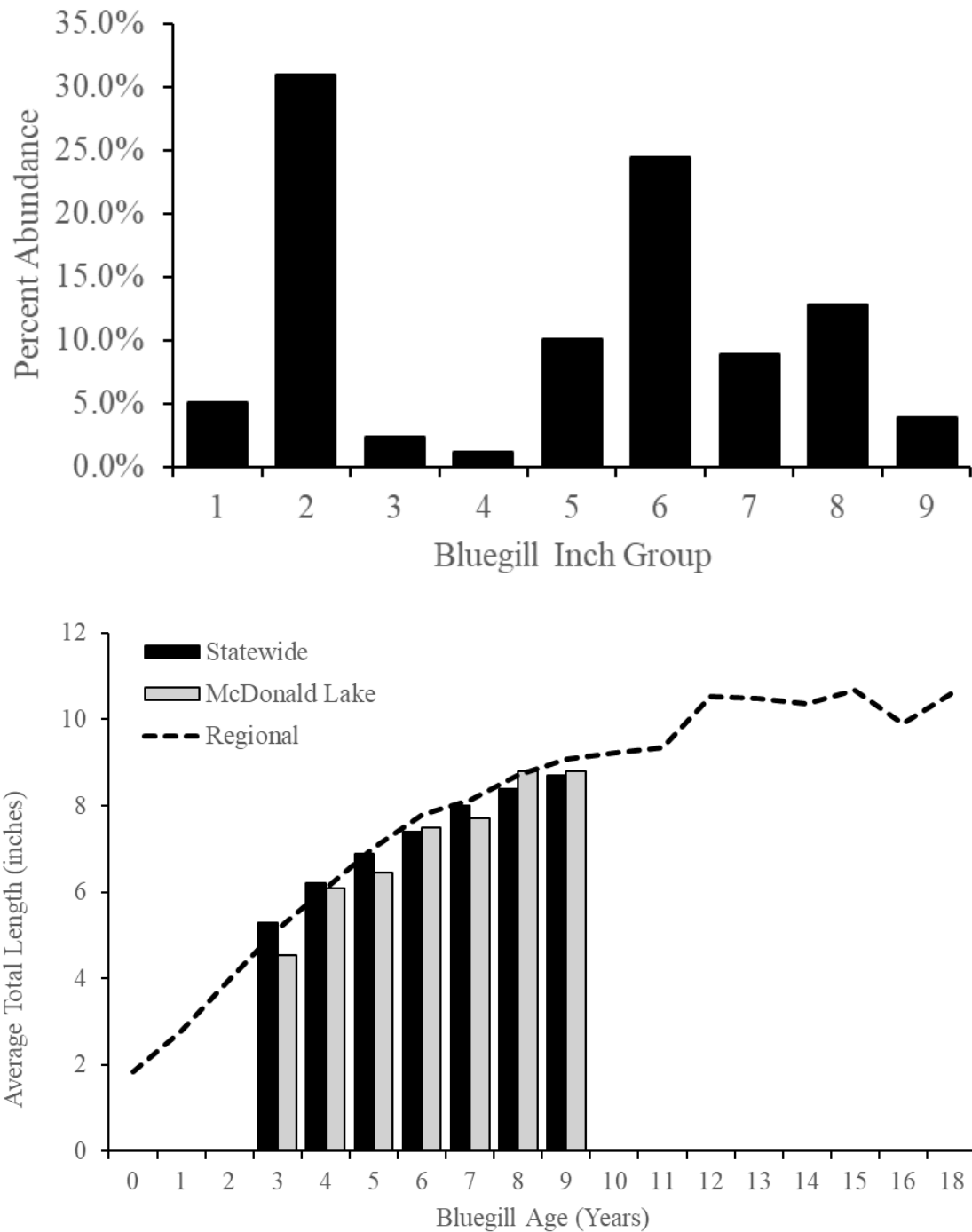


Figure 7. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Largemouth Bass captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

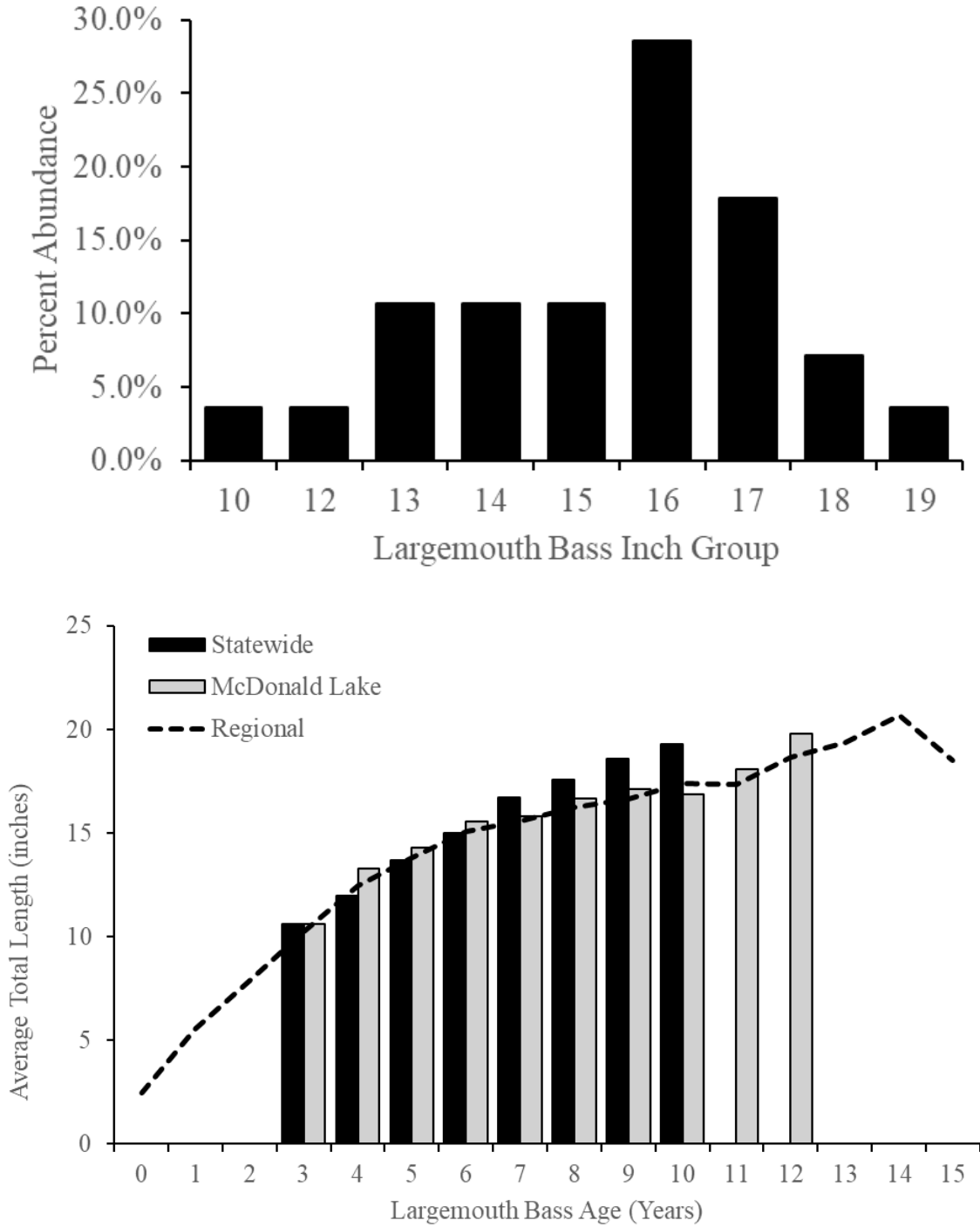


Figure 8. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Northern Pike captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

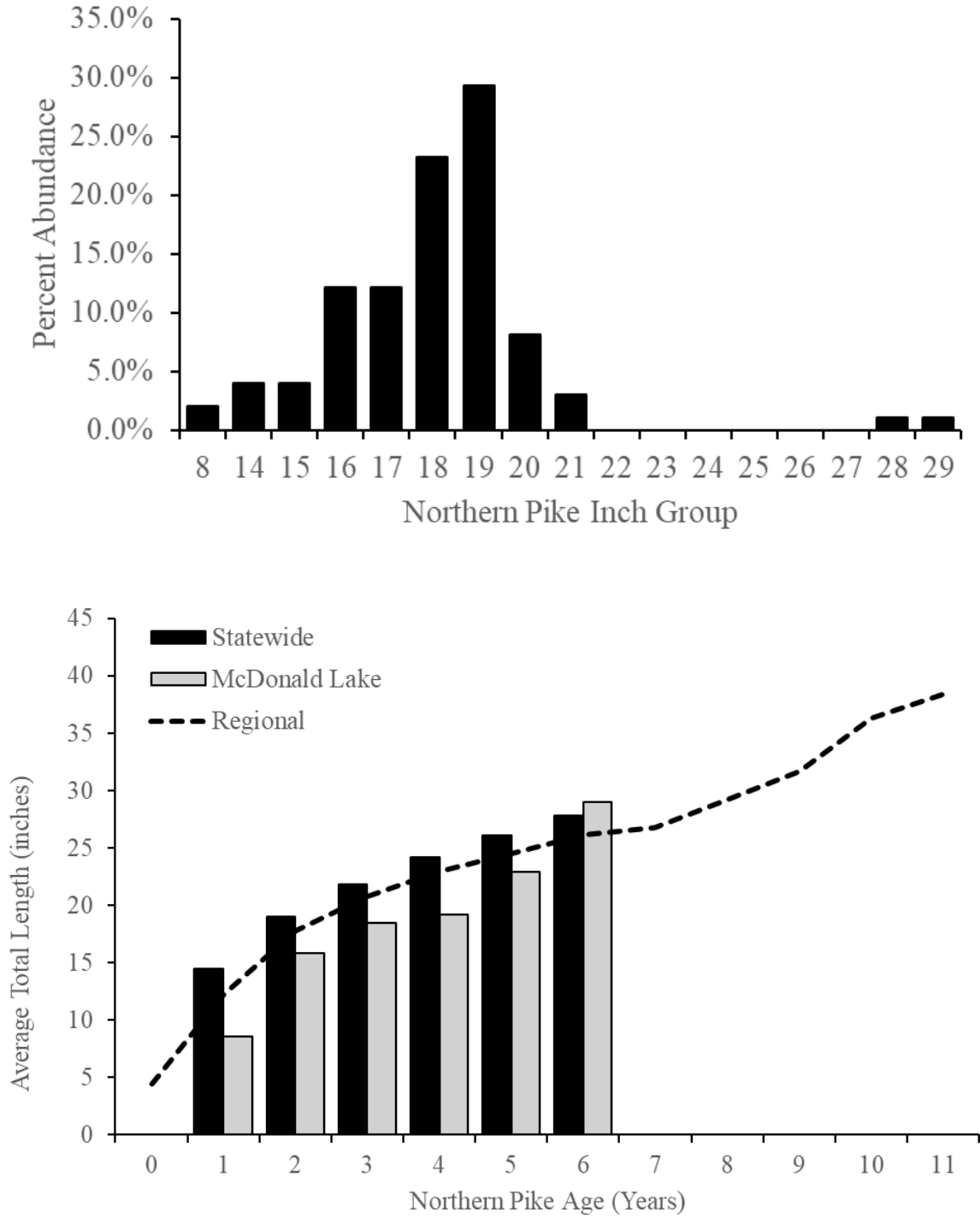


Figure 9. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Pumpkinseed captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

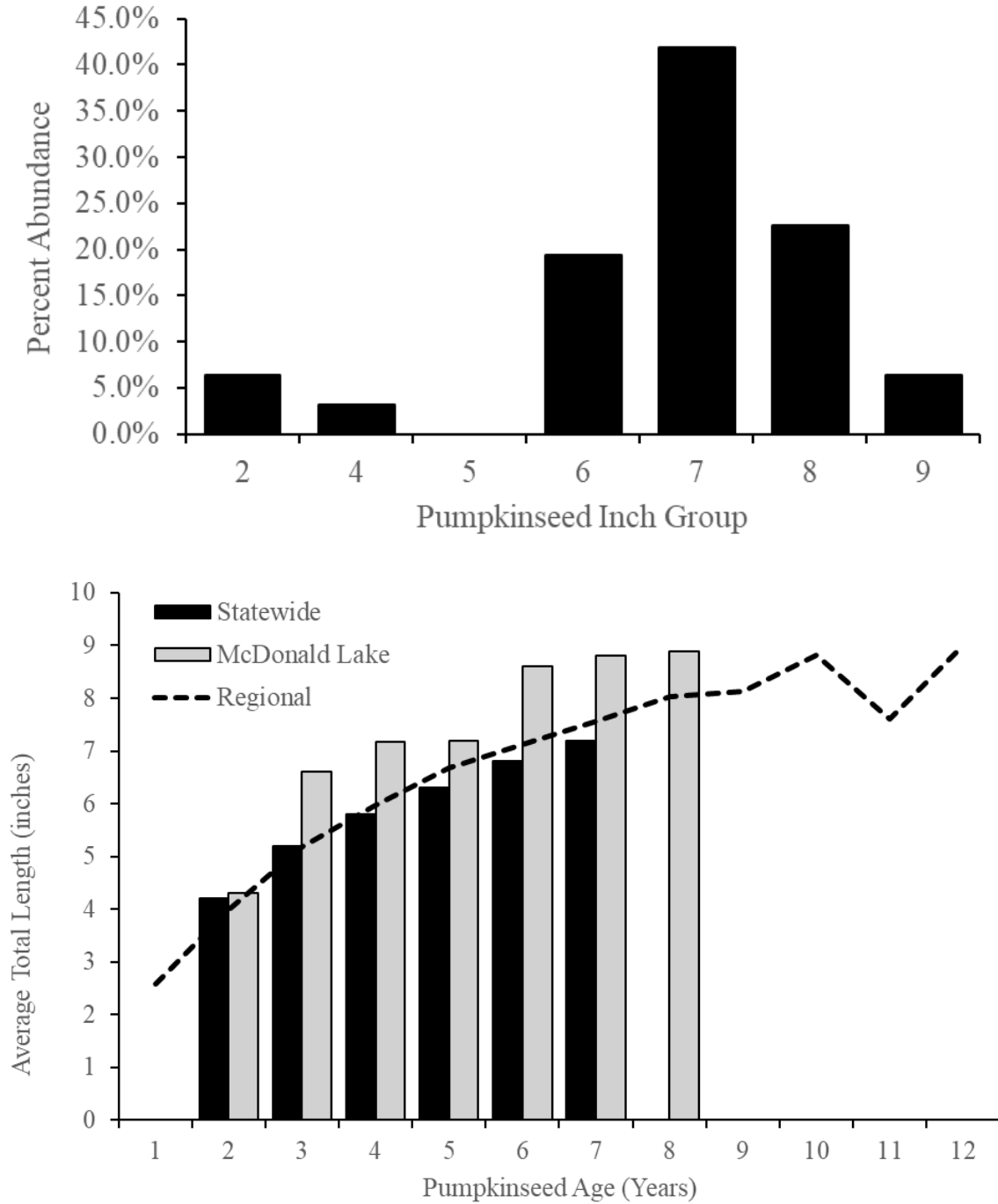


Figure 10. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Smallmouth Bass captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey compared to statewide and regional averages.

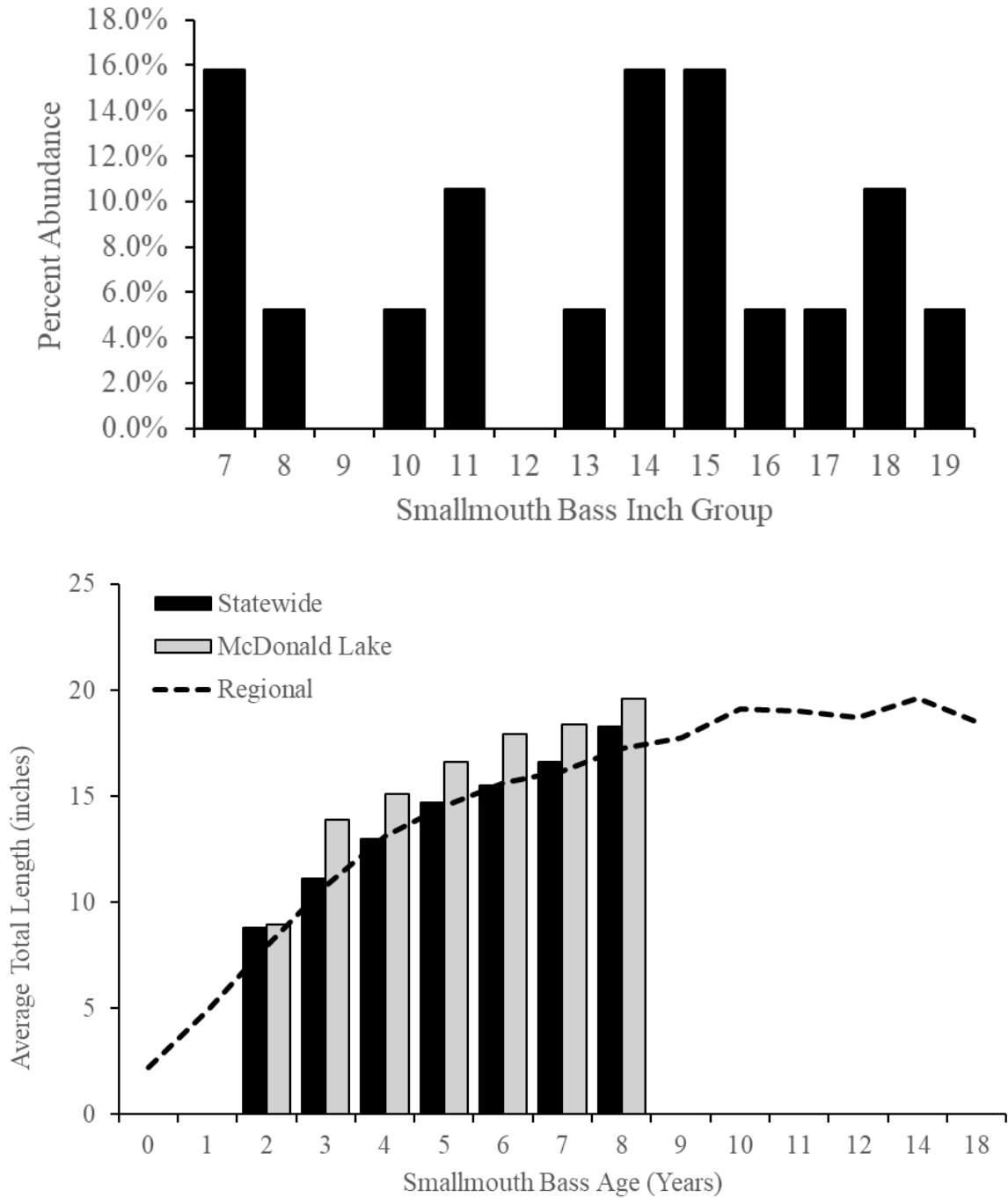


Figure 11. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Walleye captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.

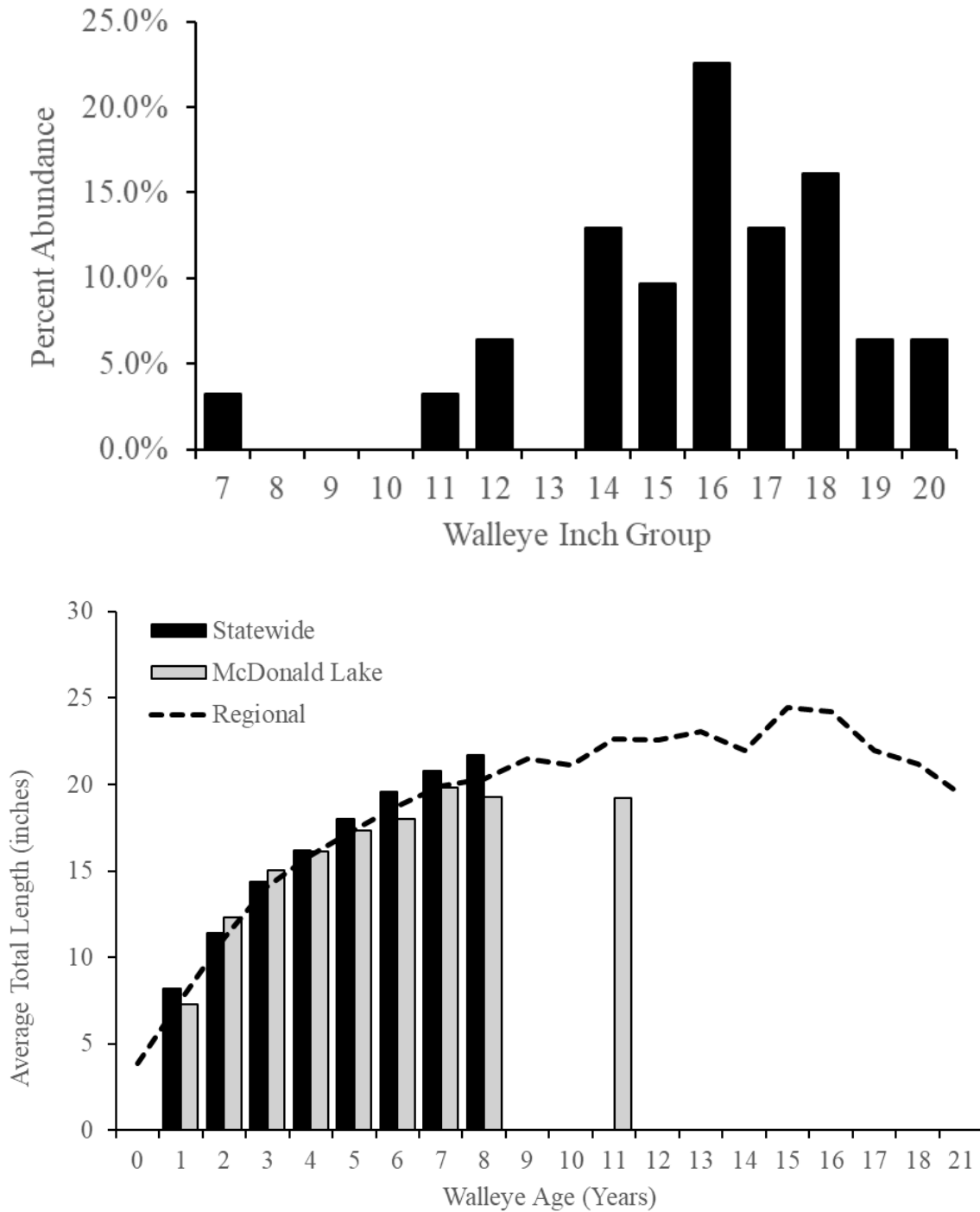
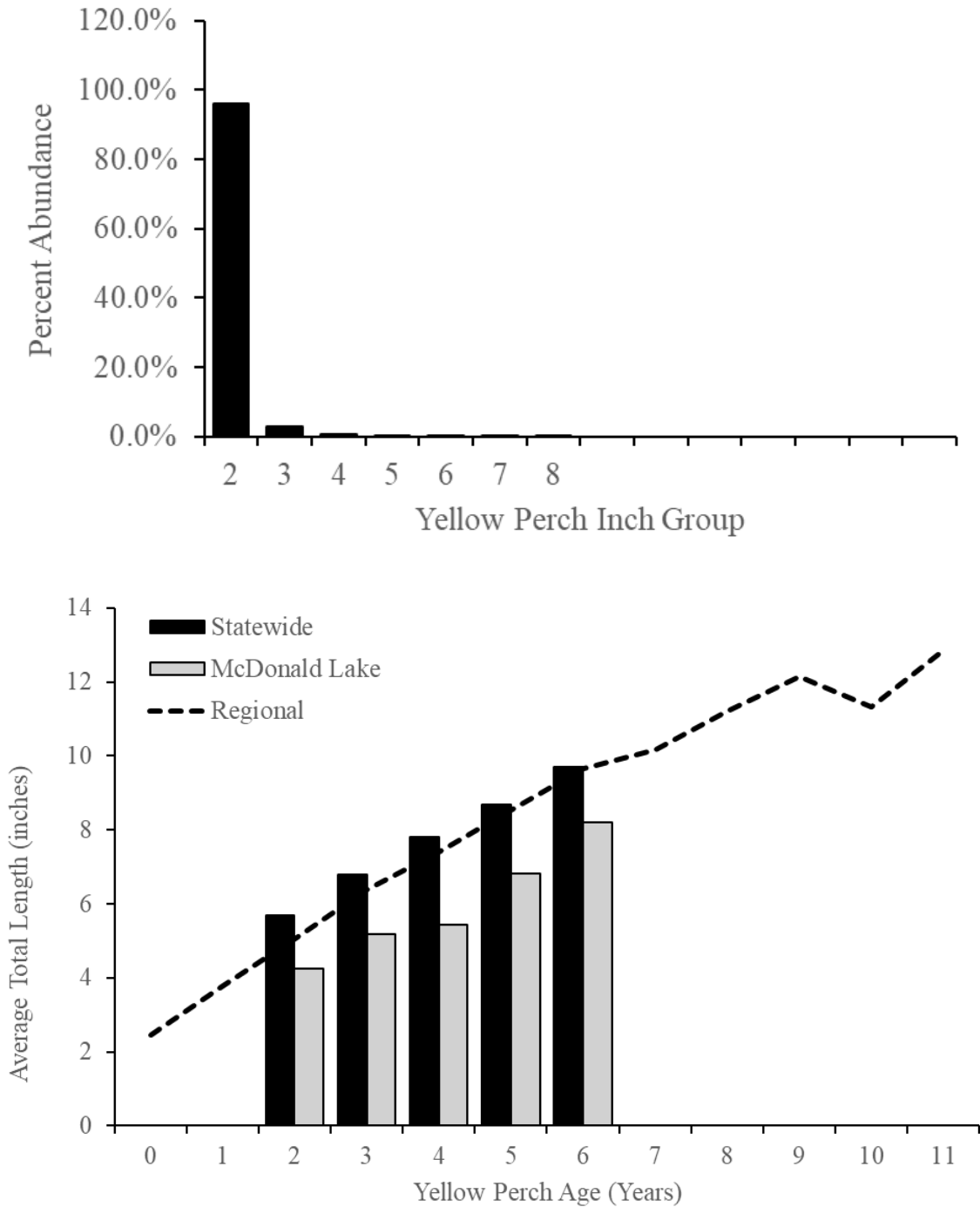


Figure 12. Percent abundance by inch group (top) and the average total length (inches) at age (bottom) of Yellow Perch captured in McDonald Lake, Schoolcraft County during the 2022 Status and Trends survey.



**Literature Path**

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John Bauman, SFR Facilitator

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