Dodge Lake
(Schoolcraft County, T43N/R16W/S23)
Manistique River Watershed, last surveyed 2022

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Environment

Location
Dodge Lake is an 88-acre natural lake located in the Manistique River watershed in southwest Schoolcraft County (T43N/R16W/S23) in Michigan's Upper Peninsula (Figure 1). It is located within Hiawatha Township approximately 12 miles north of the City of Manistique, Michigan.

Geology and Geography
Dodge Lake lies within three geological regions of Michigan including the Big Hill Dolomite, Queenston Shale, and Manitoulin Dolomite bedrock formations (MDNR 2001). Surrounding surficial landforms of Dodge Lake consist mostly of moraine (76.1%) and `other' (23.9%) landforms. The adjacent landcover of Dodge Lake is comprised primarily of forest (70.2%), wetland (10.0%), urban (9.8%), water (5.6%), grassland (4.3%), and agriculture (0.1%, Figure 2). The surficial geology in this region is comprised of large coarse (76.1%) textured materials as well as organic material with no texture (23.9%). Coarse textured rock materials in this region are predominately sedimentary and provide nearshore habitat for lithophilic spawning fish. Coarse textured materials also facilitate the exchange of cool groundwater in deeper regions of the lake where cool- and cold-water species reside. The remaining shores consist of untextured materials (sand and organic matter) and have low to medium groundwater permeability. Soil types surrounding Dodge Lake are comprised largely of Stutts-Kalkaska fines and McMillan-Greylock sandy loam (USDA 2025). Fine substrates such as sand or sandy loam that surround the Dodge Lake lakeshed can negatively affect nearshore spawning habitat by filling in interstitial spaces that are occupied by developing fish eggs and embryo.

Watershed Description
There are no significant tributaries or outflows that connect Dodge Lake directly to the Manistique River. It is connected to Island Lake via a small channel located on the west end of the lake. The Dodge Lake lakeshed (Figure 3) encompasses 730 acres, of which nearly 25% is water (MGLP 2025). Approximately 90% of the lakeshed is currently unprotected and is vulnerable to residential and agricultural development. The immediate shoreland area of Dodge Lake encompasses a total 145 acres (MGLP 2025), 91% of which is unprotected and vulnerable to residential and agricultural development.

Chemical and Physical Characteristics
Dodge Lake is unique to the region due to the total lake depth and the presence of two basins that exceed 45 ft deep (Figure 1). The shoreline and littoral zone areas are comprised of steep sloped contours that decline in depth quickly. The eastern region of the lake includes a marsh area that appears man-made, but no information exists pertaining to its origin.

Total Alkalinity - Total alkalinity is a measure of buffering capacity and plays an important role in determining a waterbody's acidity (Wetzel 2001, Wehrly et al. 2015). Alkalinity values in Michigan inland lakes can be classified into low (< 49.5 mg/L CaCO3), medium (49.5 mg/L CaCO3 to 141.5 mg/L

CaCO3) and high (>141.5 mg/L CaCO3) categories. Alkalinity was most recently measured in Dodge Lake in 2004 at two locations (the eastern and western basins). In 2004, alkalinity reported from the two basins was 31.0 mg/L CaCO3 and 17.0 mg/L CaCO3, respectively. Results from alkalinity sampling suggest that Dodge Lake has a low alkalinity concentration compared to other inland lakes in Michigan (Wehrly et al. 2015). Typically, isolated lakes like Dodge Lake and Island Lake have low alkalinity values and support a lower biomass and diversity of aquatic organisms (Wehrly et al. 2015).

Nutrients - Phosphorus and nitrogen are two important nutrients which influence production, biomass, and species composition of aquatic and nearby terrestrial plants in lake ecosystems. Concentrations of these two nutrients vary naturally depending on geology, watershed, and the rate at which water cycles through a lake. Human-derived inputs of nutrients can lead to eutrophication and an increase in the production of phytoplankton and aquatic macrophytes, which can often become noxious or a nuisance. As plants decompose, oxygen in the water is consumed by microorganisms and can be reduced to levels that compromise fish habitat and subsequently fish abundance. Alternatively, inland lakes that are characterized as having `too few' nutrients tend to have lower levels of primary production and thus much lower growth rates and less biomass of fish per acre (e.g., standing crop).

Total phosphorus occurs in relatively low concentrations in the aquatic environment and as a result tends to be the limiting nutrient for primary producers (phytoplankton, periphyton, and aquatic vegetation) in an aquatic ecosystem. Phosphorus values typically vary quite widely across Michigan inland lakes having low (<0.009 mg/L), medium (0.009 mg/L to 0.020 mg/L), and high (>0.020 mg/L) concentrations. Total Phosphorus was most recently measured in Dodge Lake in 2004 at two locations (the eastern and western basins). In 2004, total phosphorus reported from the two basins was 0.015 mg/L and <0.004 mg/L, respectively. Results from total phosphorus sampling in the east and west basin of Dodge Lake suggest a low to moderate phosphorus concentration, respectively, compared to other inland lakes in Michigan.

In contrast to phosphorus, total nitrogen occurs in relatively higher concentrations in aquatic environments and as a result rarely limits primary production in lakes. Nitrogen values in Michigan inland lakes range from low (<0.430 mg/L), medium (0.430 mg/L to 0.750 mg/L), and high (>0.750 mg/L) concentrations (Wehrly et al. 2015). Total nitrogen was most recently measured in Dodge Lake in 2004 again at two locations, the eastern and western basins. In 2004, total nitrogen reported from the two basins was 0.440 mg/L and 0.354 mg/L, respectively. Results from total nitrogen sampling in the east and west basin of Dodge Lake suggest a moderate to low nitrogen concentration, respectively, compared to other inland lakes in Michigan.

Dissolved Oxygen - Dissolved oxygen (DO) is a critical component for life in aquatic ecosystems. Dissolved oxygen in lakes derives from the atmosphere as well as from aquatic plants during photosynthesis. Concentration of DO in lakes can limit the distribution and growth of fish as well as the size composition and biomass of zooplankton. Concentrations of DO begin to limit cool- and warmwater fish populations at approximately 3.0 mg/L and are often lethal below 0.5 mg/L (Schneider 2002). The areas within a lake that emerge as DO levels decrease are referred to as the hypoxic region, which is characterized by having low levels of DO (e.g., less than 2 mg/L to 4 mg/L), and the anoxic region which contains no DO.

Dodge Lake was sampled for DO during the winter and summer of 2022 (Figure 4). During winter and summer of 2022, the water column in Dodge Lake contained sufficient levels of DO to support aquatic life to a depth of 40 ft and 30 ft, respectively. Beyond 30 ft to 40 ft, Dodge Lake transitions from being hypoxic to anoxic quickly, creating unsuitable conditions for aquatic life. At these depths, low DO is expected due to the lack of sunlight and limited photosynthesis activity.

Temperature (stratification) - Thermal stratification occurs in deeper lakes during the summer months and is characterized by three water layers. The uppermost layer (epilimnion) is typically warmer and has adequate levels of sunlight to support photosynthesis. The middle layer (metalimnion) is the region where a more significant change in water temperature occurs. The point at which temperature change is the greatest in this middle layer is called the thermocline. The bottom layer (hypolimnion) lies directly below the thermocline and typically contains less DO compared to other layers. A temperature profile collected from Dodge Lake during the summer of 2022 (Figure 5) suggests that the lake does indeed stratify with a thermocline located at a depth of 15 ft.

Transparency - Water transparency measured using a Secchi disk provides an index of phytoplankton production and overall lake productivity. For example, lakes with greater transparency are often classified as oligotrophic, meaning there are low levels of lake productivity (e.g., lower standing crop biomass). Lakes with lower transparency are often classified as eutrophic, meaning there are higher levels of lake productivity, while mesotrophic lakes include those waterbodies with moderate transparency indicating moderate levels of productivity. Summer Secchi depths vary considerably across the state with lakes having low (<7.5 ft), medium (7.5 ft to 13.5 ft), and high (>13.5 ft) transparency. A Secchi depth reading was collected in Dodge Lake during the summer of 2022 and was reported to be 16.5 ft, which is high compared to other inland lakes in Michigan.

Chlorophyll-a - Summer chlorophyll-a concentrations in the upper water column also provide a measure of lake primary production by phytoplankton and can be used to evaluate overall lake productivity. Higher chlorophyl-a concentrations suggest high production of phytoplankton, high nutrient inputs, and higher overall lake productivity. Low chlorophyl-a concentrations suggest phytoplankton production is limited by low nutrient availability, or by high rates of grazing by zooplankton. Chlorophyl-a concentrations vary widely across Michigan inland lakes having low (1.9 ug/L), medium (1.9 ug/L to 4.8 ug/L), and high (>4.8 ug/L) values. In 2004, chlorophyl-a concentrations were collected from the two basins in Dodge Lake and were reported to be undetectable in the eastern basin and 2.0 ug/L in the western basin. Results from chlorophyl-a sampling in the east and west basin of Dodge Lake suggest a low to moderate productivity, respectively, compared to other inland lakes in Michigan.

Trophic Status - Trophic status refers to an index that allows managers to characterize Michigan's inland lakes into categories that define the level of primary production in a lake. The Carlson's Trophic State Index (TSI) uses measurements of phosphorus, Secchi depth, and chlorophyll-a and rescales these values to a 0 to 100 index (Fuller and Jodoin 2016). Threshold values for TSI are broken down into three categories where TSI <38 values are oligotrophic, values from 38 to 48 are mesotrophic, and those from 49 to 61 are eutrophic. In 2004, Secchi depth and chlorophyl-a data suggest a TSI value less than 38 (oligotrophic), while the phosphorus value reported in 2004 suggest a TSI value between 38 and 48 (mesotrophic). Based on values reported from data collected in 2004, Dodge Lake can be characterized as an oligo-mesotrophic inland lake with low to moderate levels of productivity.

History

Fisheries management of Dodge Lake and Island Lake began during the 1930s when stocking of warmwater species began (Table 2) and the lake was mapped (1936 to 1937) to gather acreage and depth information. Throughout the 1930s, Dodge and Island lakes were stocked with Bluegill, Largemouth Bass, Smallmouth Bass, and Walleye. The status of these species was unknown prior to stocking; however, the intent was likely to establish a recreational fishery as was a 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). Stocking of Bluegill, Largemouth Bass, Smallmouth Bass, and Walleye ceased in Dodge Lake by 1941 and Island Lake by 1942.

During the 1940s and 1950s, Dodge and Island Lake were stocked with a mixture of yearling and legal-sized Rainbow Trout with the intent of providing a recreational fishery. During 1942, stocked rainbow trout were tagged with metal clips so anglers could report their catch. Early stocking efforts were followed by concerns from area resort owners. Concerns by anglers included poor fishing, likely the result of stocking smaller (yearling) Rainbow Trout compared to the legal-size fish stocked in other years. Additionally, there were concerns pertaining to anglers trespassing as this lake was considered `semi-private' at the time, however, there were plans to establish a public access site. In 1957, the State of Michigan purchased a parcel of land for one dollar providing the opportunity to establish a public access site on Dodge Lake, through which anglers could also access Island Lake.

During the 1960s, Dodge Lake and Island Lake continued to be managed to provide recreational Rainbow Trout fisheries with additional angling opportunities for various panfish species. In the early 1960s, lake residents inquired about whether Walleye could be stocked in Dodge Lake to improve the fishery. There were also reports of poor Bluegill fishing and area residents were concerned that Rainbow Trout stocking and the increased presence of outboard motors was negatively impacting the Bluegill population. These inquiries were surprising to area fisheries managers given that Dodge Lake and Island Lake provided a good mix of species for anglers to target including Northern Pike, Largemouth Bass, Smallmouth Bass, Bluegill, Pumpkinseed, Rock Bass, Yellow Perch, Rainbow Trout, and suckers. Additionally, angler reports received by fisheries staff at that time suggested fishing had been favorable in Dodge Lake and Island Lake. The following year (February 1961), a 16-year-old harvested the state record Northern Pike by spear from Dodge Lake. This state record remains today (51.5 inches in total length, 39 pounds) (Figure 6). In response to concerns about Bluegill declines, managers suggested that Rainbow Trout, a planktivore, could be competing with Bluegill for food.

By the mid-1960s, fisheries managers began to receive letters regarding the concern of low water levels in Dodge and Island Lake. Letters were received from the local city manager, sheriff, and the area lake association stating the lake levels were so low the channel connecting Dodge Lake and Island Lake was without water. One anecdotal report suggested that the water level was down approximately 4 ft. During this period, regional water levels were especially low, confirming residents' observations.

During the late 1970s, land adjacent to Dodge Lake and Island Lake was being considered for the development of a subdivision. At that time, fisheries managers expressed concerns regarding the potential impacts such a development might have on the aquatic environment, like the addition of nutrients to the lake from septic systems or lawn fertilizers causing an increase in aquatic vegetation. Excessive vegetation was concerning as it had been suspected in the stunting of fish populations in other waterbodies. Additionally, there was a concern that increased residential development along the shoreline would result in the removal of brush, fallen trees, and natural vegetation resulting in negative impacts to popular game species like Largemouth Bass.

During the 1970s and 1980s, Dodge and Island lakes continued to be stocked with Rainbow Trout. Additionally, in 1977 Dodge Lake was stocked once with large Lake Trout to provide angling opportunities for large trout and to retire broodstock within the state's hatchery system. By the mid-1970s the public access site was receiving steady use and compliments where shared with area fisheries managers regarding the upkeep and enforcement of the site. By the late 1970s conflicts had arisen between recreational boaters and fisherman. As a result, local township officials proposed local watercraft controls for Dodge and Island lakes to mitigate those conflicts. To date, it is unlawful to operate a vessel at high speed or to have in tow, or otherwise assist in the propulsion of, a person on water skis, surfboard, or other similar contrivance from 6:30 p.m. to 10:00 a.m. the following day. This watercraft control measure took effect during the winter of 1981.

During the mid- to late-1980s, the Dodge and Island lakes fishery had begun to change. Despite annual stocking of Rainbow Trout, fishing reports for Rainbow Trout were poor. Fishery managers responded to letters from area property owners suggesting two possible explanations for the poor survival of stocked Rainbow Trout. The first was the average size of stocked Rainbow Trout had declined, and second was that the Michigan Department of Natural Resources Fisheries Division had recently abandoned the captive broodstock program and had begun acquiring Rainbow Trout eggs from a private hatchery in Ennis, Montana. The later was unlikely to explain poor catches as interagency reports show that Rainbow Trout stocked up to 1983 were from a domestic source. Stocking of Rainbow Trout in Dodge Lake and Island Lake, sourced from Ennis, Montana, did not occur until 1985 when fisheries management staff had already received poor fishing reports pertaining the previous three years' fishing seasons. The size of fish stocked did provide a better explanation for fishing reports received during this period. Stocked Rainbow Trout averaged 7.8 inches in total length until 1983; in comparison fish stocked after 1983 average 6.9 inches in total length. However, in 1986 larger Rainbow Trout (7.4 inches) were stocked and anglers reported poor returns of those fish as well, suggesting size at stocking may not have been the limiting factor.

Research conducted throughout the mid-1960s to mid-1970s (Galbraith 1966, Galbraith 1975) showed that considerable cropping of zooplankton could occur in lakes stocked consistently with Rainbow Trout. Instances of cropping zooplankton populations in a relatively unproductive inland lake system (like that in Dodge and Island lakes) was also more likely given that there were competing species present such as Yellow Perch and Bluegill. During this period, Rainbow Trout were stocked in waterbodies with additional gamefish present, however, where Bluegill and Yellow Perch populations existed it became difficult to manage a lake to provide a consistent and reliable recreational fishery for Rainbow Trout.

In response to concerns expressed by area anglers, managers conducted a fishery survey that yielded no trout but noted that Dodge and Island lakes provided a variety of fishing opportunities that were used by

many people with diverse angling interests. Because the lakes supported populations of competing species that detracted from trout management potential, anglers were presented with three fisheries management alternatives to consider at this time: 1) manage for a single species such as Rainbow Trout (required chemical reclamation treatment of both lake basins), 2) manage Dodge and Island lakes as two-story trout lakes and that provide warmwater fishing opportunities and continue with stocking of Rainbow Trout and Splake, stocked in alternate years (required only a nearshore chemical treatment), and 3) manage for cool- and warmwater fish species and discontinue trout stocking.

In a letter provided by area residents, option 2 was chosen almost unanimously as the desired path forward for Dodge and Island lakes. This strategy required a nearshore chemical treatment with Fintrol 5-88 concentrate to reduce the abundant population of Yellow Perch. While costly, option 2 provided an alternative that still required chemical treatment, however, at a much lower cost compared to option 1. An additional benefit provided by option 2 was that alternate gamefish species (i.e., Largemouth Bass, Northern Pike) were not likely to be significantly affected by the nearshore treatment.

Following treatment that occurred during the late 1980s, Dodge and Island lakes were stocked continuously with Rainbow Trout and Splake to maintain the two-story fishery through the late 1990s. Netting surveys conducted by Fisheries Division in 1992 and 1997 to evaluate this stocking yielded a total of eight Splake, suggesting limited to no survival of stocked fish during that period. As a result, stocking of Rainbow Trout and Splake ceased in Dodge Lake in 1997, although Island Lake continued to receive annual plants of Splake until 2006. Stocking of Splake in Island Lake likely continued longer since surveys conducted in 1992 and 1997 only captured Splake in Island Lake.

During the early 2000s, Dodge Lake and Island Lake were surveyed by Fisheries Division to gather general fish community information. At that time, both fisheries appeared to be in fair condition. Island Lake supported a simple fish community consisting primarily of a Bluegill and Largemouth Bass fishery with lesser numbers of other fish species. Young Bluegill were reportedly growing slowly, which was expected due to strong year classes of natural reproduction that was produced from 2002 to 2004. Large Bluegill (greater than 7 inches) were reportedly available to the anglers and appeared to have outgrown the forage limitations of the small size classes. A decline of Bluegill above 7 inches was reported in 2006, suggesting that anglers were removing many Bluegill from the fishery just as they become attractive to harvest. Yellow Perch were reported to be in stable abundance and angler reports from that period suggested that some large Yellow Perch were available for harvest. Splake that had been stocked during this period were not well represented during surveys conducted in the 2000s, suggesting limited to no survival of trout stocked in previous years. Splake stocking ceased during this period.

In the 2010s, fisheries management in Dodge and Island lakes was focused on gathering information about the panfish community and a new non-native species, the Freshwater Jellyfish (Craspedacusta sowerbii), that was found in Dodge Lake in 2013. The Freshwater Jellyfish has been documented in several inland lakes throughout Michigan and they are typically observed in shallow water during the later summer to early fall. Freshwater Jellyfish feed on zooplankton including daphnia and copepods, however, it is unknown to what extent this non-native species might impact food resources for the native fish community in Michigan's inland lakes.

During the mid-2010s, anglers had reported a severe decline in the Bluegill fishery in Dodge Lake and Island Lake. Therefore, to gather information about the panfish community in Dodge and Island lakes,

a netting survey was conducted by Fisheries Division. Results from this survey demonstrated that while the average size of Bluegill was small, the abundance of Bluegill was considered healthy with multiple year-classes present. Managers recommended that habitat deficiency issues be addressed to improve the abundance of nearshore physical habitat in Dodge and Island lakes.

During the 2020s, additional survey effort was given to Dodge and Island lakes to quantify the abundance of physical habitat in the lakes, while gathering more recent fish community information. A comprehensive survey of both lakes was conducted in 2022, and Fisheries Division managers attended a lake association meeting that summer to provide a summary of what information would be gathered as part of this survey. This most recent survey prompted drafting this Status of the Fishery Resource report and will guide fisheries management for Dodge and Island lakes into the future.

Current Status

Methods

Fisheries Division conducted a fish community survey to assess the status of the Dodge Lake beginning 13 June 2022. Survey protocols were consistent with the Status and Trends Inland Lakes survey program (Wehrly et al. 2015); a variety of gear types were used including two small- and four large-mesh fyke nets, two experimental gill nets, one seine, and boat electrofishing. The small- and large-mesh fyke nets were set for two and three net nights for a total effort of four and twelve net nights, respectively. Two experimental gill nets were set for two nights for a total effort of four net nights. Total seine effort was three seine hauls in nearshore areas. Boat electrofishing consisted of three transects approximately one-quarter mile in length totaling 30.15 minutes of effort.

To provide general information about the fish community composition in Dodge Lake, species captured were grouped into three categories. Black Crappie, Largemouth Bass, Northern Pike, Smallmouth Bass and Walleye were categorized as "piscivores"; Bluegill, Bluntnose Minnow, Pumpkinseed, Rock Bass, Sand Shiner, and Yellow Perch were categorized as "planktivores-insectivores"; and Iowa Darter were categorized as "benthivores".

Gamefish species including Bluegill, Pumpkinseed, Largemouth Bass, Smallmouth Bass, Northern Pike, Walleye, and Black Crappie were measured for total length to the nearest tenth of an inch which was used to compute the average size and range in size for each of these gamefish species, as well as a length-abundance distribution. The relative stock density 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 of regional and statewide CPUE data from inland lakes as part of the Status and Trends program (Wehrly et al. 2015).

Age structures (10 per inch group) were collected from each gamefish species for age analysis. Scale samples were collected from Bluegill, Pumpkinseed, and Black Crappie (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 as described by 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 Dodge Lake survey. Growth indices for age classes represented by a minimum of five fish were averaged to provide a mean growth

index (Schneider et al. 2000b). Fish growing slower than 1.00-inch below the state average are considered "below average", while fish growing faster than 1.00-inch above the state average are considered "above average". Bluegill are the exception where fish growing slower than 0.50-inches or faster than 0.50-inches compared to the state average are 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 and electrofishing (Schneider 2000b; Schneider 1990).

Results

A total of 1,197 fish weighing 194.9 pounds and representing 12 species were captured during the 2022 survey (Table 3). Piscivores, such as Black Crappie, Largemouth Bass, Northern Pike, Smallmouth Bass, and Walleye comprised 9% of the catch by number and 47% of the catch by biomass. Planktivores-Insectivores, such as panfish, Bluntnose Minnow, Sand Shiner, and Yellow Perch comprised 91% of the catch by number and 53% of the catch by biomass. Iowa Darter were the only species captured representing the category of `benthivores' and comprised less than 1% of the catch by number and biomass. The estimated standing crop (Schneider 2000b) of Dodge Lake in 2022 was approximately 31.3 pounds of fish per acre.

Bluegill - A total of 618 Bluegill were captured across all gear types. Bluegill averaged 4.9 inches total length and comprised 51.6% of the catch by number and 30.5% by biomass. Bluegill size ranged from 1.0 inch to 10.0 inches long (Table 4) with 17% of the catch meeting or exceeding the 6-inch preferred size for harvest. The CPUE for Bluegill captured in Dodge Lake using large-mesh fyke nets and electrofishing was 34.3 fish per net night and 1.7 fish per minute, respectively. A total of 6 age classes of Bluegill were represented in the catch. Enough samples were gathered from ages 4 through 7 years old to make inferences about growth in Dodge Lake (Table 5). Age and growth analysis suggests that 4- and 5-year-old Bluegill are growing below the state average, while ages 6 and 7 are growing above or comparable to the state average (Table 5). According to the Bluegill size score index (Schnieder 1990), fish captured by large-mesh fyke nets and electrofishing were rated as "acceptable" to "satisfactory", respectively.

Largemouth Bass - A total of 95 Largemouth Bass were captured across all gear types. Largemouth Bass averaged 10.2 inches total length and comprised 7.9% of the catch by number and 29.1% by biomass. Largemouth Bass size ranged from 5.0 inches to 16.0 inches (Table 4) with 3% of the catch meeting or exceeding the 14-inch minimum size for harvest. The CPUE for Largemouth Bass captured in Dodge Lake by boat electrofishing was 2.2 fish per minute. A total of 11 age classes of Largemouth Bass were represented in the catch. Enough samples were gathered from ages 2 through 6 years old to make inferences about growth in Dodge Lake (Table 5). Age and growth analysis suggests that age 2- and 6-year-old Largemouth Bass are growing below the state average, while ages 3 to 5 are growing near the state average (Table 5).

Pumpkinseed - A total of 69 Pumpkinseed Sunfish were captured across all gear types. Pumpkinseed averaged 6.1 inches and comprised 5.8% of the catch by number and 7.8% by biomass. Pumpkinseed size ranged from 2.0 inches to 9.0 inches (Table 4) with 46% of the catch meeting or exceeding the 6-inch minimum preferred size for harvest. The CPUE for Pumpkinseed captured in Dodge Lake using large-mesh fyke nets and electrofishing was 4.3 fish per net night and 0.6 fish per minute, respectively. A total of 5 age classes of Pumpkinseed were represented in the catch. Enough samples were gathered

from ages 4 and 5 years old to make inferences about growth in Dodge Lake (Table 5). Age and growth analysis suggests that age 4 Pumpkinseed are growing comparable to the state average, while age 5 Pumpkinseed are growing above the state average (Table 5).

Additional gamefish - Black Crappie, Northern Pike, Rock Bass, Smallmouth Bass, Walleye, and Yellow Perch were also captured in Dodge Lake during the 2022 survey. However, too few individuals were captured to make robust conclusions about their growth. Catch rates for most of these species were low relative to other Michigan lakes sampled using the Status and Trends inland lake sampling protocol. Catch rates of Rock Bass (large-mesh fyke) and Smallmouth Bass (inland gill net) were moderate to high. The catch rate of Walleye in large-mesh fyke nets was low to moderate.

Forage fishes - Species of forage fish, including Bluntnose Minnow, Iowa Darter, and Sand Shiner were also captured in Dodge Lake during the 2022 survey. Catch rates for these species were considered average or moderate compared to other Michigan lakes sampled using the Status and Trends inland lakes sampling protocol.

Analysis and Discussion

Dodge Lake is a small deep lake with low to moderate levels of productivity. Results of the most recent and previous habitat surveys suggest that residential development along the Dodge Lake shoreline is above average to high, resulting in limited physical habitat available to the nearshore fish community. Despite low to moderate productivity and limited physical habitat (e.g., submerged trees), Dodge Lake provides anglers with an acceptable mixed-bag fishery comprised of panfish and Largemouth Bass with occasional catches of good-sized Northern Pike, Rock Bass, Smallmouth Bass, Walleye, and Yellow Perch.

Chemical and biological parameters measured in Dodge Lake are dated (2004) but likely reflect the current conditions in lake. Dodge Lake is relatively deep, providing thermal refugia to cool-water fishes, and has sufficient levels of DO to support aquatic life during the harsh periods of late winter and summer. Dodge Lake has relatively low to moderate productivity, which is characteristic of deep inland lakes in Michigan that have high transparency. However, the threat of invasive species (namely, Zebra Mussels) is a concern for Dodge Lake. The introduction of Zebra Mussels in Dodge Lake could reduce lake productivity resulting in a disruption to the food chain. The introduction of Zebra Mussels is especially concerning given that they were documented in Indian Lake in 2019, which is located close to Dodge Lake. Invasive species outreach, education, and prevention measures are needed in Dodge Lake to ensure Zebra Mussels are not introduced. In addition to improving efforts to reduce the likelihood of introducing invasive species, improvements of nearshore physical habitat should be considered.

Measured physical habitat parameters indicate that the Dodge Lake shoreline has been altered from its natural state and that the rate of shoreline modification has increased in the past 20 years. Shoreline modification projects like installation of seawalls can have adverse impacts on populations of fish, reptiles, and amphibians, and the overall ecological integrity of a lake. Therefore, lakeshore property owners are encouraged to adopt natural shoreline principles supported by the Michigan Natural Shoreline Partnership (MNSP 2025). As mentioned, the density of large woody debris in Dodge Lake (100 logs per mile) is less than half the observed density in the region (205 logs per mile). Natural undeveloped lakes throughout northern Michigan and Wisconsin have large woody debris densities ranging from 470 to 1,545 logs per mile of shoreline (O'Neal and Soulliere 2006). Protection and rehabilitation strategies

that maintain or improve the abundance of woody debris in nearshore areas are well developed (WI DNR 2014) and should be adopted in Dodge Lake.

The number of fish species (or species richness) in Dodge Lake is comparable to other inland lakes in the northern region of the state (Wehrly et al. 2015). Oddly, very few benthivores like suckers or bullhead have been captured in Dodge Lake historically, and that has not changed. Benthivores, or bottom dwelling species, play an important role in defining a healthy inland lake ecosystem (Cook et al. 2005). Benthivores such as suckers serve as forage for a variety of piscivores including bass, Northern Pike, and Yellow Perch at varying life periods. Suckers are highly fecund and deposit eggs each spring that are consumed by Yellow Perch just prior to their own annual spawning cycle. The absence of benthivores, such as the Common White Sucker, suggest that additional predation pressure may be placed on species such Yellow Perch, Bluegill, and Pumpkinseed resulting in fluctuations in the abundance and size structures of those species.

Panfish - Catch rates of Bluegill and Pumpkinseed in Dodge Lake are comparable to the region and suggest that an acceptable or satisfactory fishery exists for anglers. However, the abundance of Bluegill and Pumpkinseed declines quickly after they reach 6-inches in length, suggesting that fishing pressure and harvest for these species may be high. Although the average size of Bluegill is relatively small, opportunities to catch higher quality individuals exist. The average size of Pumpkinseed in Dodge Lake is higher compared to Bluegill, suggesting a more attractive fishery exists for that species. Anglers are encouraged to selectively harvest smaller Bluegill and Pumpkinseed while releasing larger individuals to help maintain an abundance of larger fish. Black Crappie and Yellow Perch are less numerous, but those captured were of high quality, providing incidental catches of good-sized panfish for anglers.

Largemouth Bass - The catch rate of Largemouth Bass in Dodge Lake was high compared to other lakes in the region and across the state. The growth rate is generally slow compared to the state average with Largemouth Bass taking approximately 7 years to reach legal size. Anglers should expect to catch many medium-sized individuals making this a good fishery to try new techniques. For example, anglers interested in learning new topwater techniques could target Dodge Lake during the early summer with artificial surface baits. If the nearshore density of woody debris were improved in Dodge Lake, this could also provide good opportunities to experiment with artificial frogs.

Management Direction

Fish Community - The Dodge Lake fish community currently offers satisfactory angling opportunities for a variety of species including panfish, bass, and Northern Pike. At this time, there are no fisheries regulation changes needed for Dodge Lake. However, if statewide management plans are developed for panfish and bass species, additional or alternative regulatory options may become available. Anglers and area stakeholders interested in improving the fish community are encouraged to focus their efforts on invasive species prevention and nearshore habitat protection and improvement projects.

Invasive Species - Fisheries Division recommends that representatives from the Dodge and Island Lake Property Owners Association, 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 toward outreach and education to prevent future introduction of invasive species in the Dodge and Island lakes 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 2025).

Habitat Protection and Improvement - Shoreland and shoreline development can cause poor water quality, erosion, and additional losses to fish habitat. The density of dwellings on Dodge Lake is stable, however, the rate of shoreline alteration or armoring has increased in the past two decades (Table 1). 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. Dodge Lake landowners are encouraged to consider adopting natural shoreline principles to help reduce wave energy and stabilize fine sediments that exist in the nearshore areas of Dodge Lake. Rehabilitation projects designed to restore areas of shoreline impacted by alteration could be focused along the northwest shore (Figure 7). For more information about how to identify contractors and incorporate natural shoreline principles, landowners can visit the Michigan Natural Shoreline Partnership website: Michigan Natural Shoreline Partnership - Home (MNSP 2025).

The density of nearshore woody habitat is limited in Dodge Lake. The Dodge and Island Lake Property Owners Association and the Schoolcraft County Conservation District are encouraged to work collaboratively with the Michigan Department of Natural Resources Fisheries Division and the Michigan Department of Environment, Great Lakes, and Energy to improve the density of nearshore woody habitat in Dodge Lake. An example of a project that serves to improve the density of nearshore woody habitat includes the "Fish Sticks" program (WI DNR 2014). 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 are less than 200 (Figure 8). 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 2025).

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Table 1. Physical indicators including dwelling density (dwellings per mile), boat docks (docks per mile), shoreline armoring (average percent armored), and large woody debris (trees per mile) measured in Dodge Lake. The regional average, 25th percentile, and 75th percentile for other lakes in the Northern Lake Michigan Management Unit, and the 2022 status for Dodge Lake, are provided for comparison.

	Physical Indicator			
Year	Dwelling Density	Boat Docks	Shoreline Armoring	Large Woody Debris
2004	20.0	17.9	13.8	31.4
2006	24.9	17.5	13.3	342.9
2022	18.5	15.1	17.8	100.3
Regional Avg.	13.3	9.7	10.1	205.4
25th Percentile	1.3	1.3	0.0	21.7
75th Percentile	21.8	16.6	14.7	230.3
2022 Status	Above Average	Above Average	High	Below Average

Table 2. Year, species, and number of fish stocked in Dodge Lake, Schoolcraft County, Michigan, 1930s to 1990s.

Decade	Species	Number Stocked
1930s	Bluegill	18,740
	Largemouth Bass	900
	Smallmouth Bass	1,100
	Walleye	90,000
1940s	Bluegill	6,000
	Rainbow Trout	2,800
	Smallmouth Bass	656
1950s	Rainbow Trout	5,800
1960s	Brown Trout	1,300
	Rainbow Trout	27,650
1970s	Lake Trout	97
	Rainbow Trout	38,139
1980s	Rainbow Trout	31,724
	Splake	2,000
1990s	Rainbow Trout	12,150
	Splake	12,150

Table 3. Species, number captured, total weight, average total length, and range in total length of fish captured in Dodge Lake, Schoolcraft County during the 2022 fish community survey.

Species	Number	Total Weight (lbs)	Average Total Length (in)	Range in Total Length (in)
Black Crappie	1	0.5	-	-
Bluegill	618	59.4	4.9	1.0 to 10.0
Bluntnose Minnow	92	7.7	2.2	1.0 to 3.0
Iowa Darter	5	0.0	2.4	1.0 to 2.0
Largemouth Bass	95	56.8	10.2	5.0 to 16.0
Northern Pike	3	13.2	26.8	25.0 to 29.0
Pumpkinseed	69	15.1	6.1	2.0 to 9.0
Rock Bass	114	26.6	5.8	1.0 to 10.0
Sand Shiner	185	0.6	2.1	1.0 to 2.0
Smallmouth Bass	3	6.2	15.8	15.0 to 16.0
Walleye	4	14.6	22.3	20.0 to 23.0
Yellow Perch	8	1.7	7.3	4.0 to 10.0
Grand Total	1,197	194.9		

Table 4. Frequency distribution of select species, by inch group, collected during the 2022 fish community survey in Dodge Lake, Schoolcraft County.

Inch Group	Bluegill	Largemouth Bass	Pumpkinseed
1	96		
2	21		1
3	74		5
4	213		17
5	112	1	14
6	46	5	13
7	26	13	8
8	20	11	10
9	8	21	1
10	2	18	
11		8	
12		4	
13		11	
14			
15		1	
16		2	

Table 5. Species age (years), number aged (N), range in total length (TL Range), State of Michigan average size at age (State Avg. TL), average total length in Dodge Lake (Avg. TL) and the mean growth index of Bluegill, Largemouth Bass, and Pumpkinseed collected in Dodge Lake, Schoolcraft County, 2022.

Species	Age	N	TL Range (in)	State Avg. TL (in)	Avg. TL (in)	Growth Index*
Bluegill	3	2	4.1 - 4.2	5.3	4.15	
	4	22	4.0 - 8.2	6.2	4.84	-1.36
	5	24	5.2 - 8.6	6.9	6.14	-0.76
	6	6	7.1 - 9.2	7.4	8.07	+0.67
	7	8	6.1 - 10.0	8.0	8.02	+0.02
	8	2	10.0 - 10.3	8.4	10.15	
Largemouth Bass	1	1	5.4	5.4		
	2	21	6.2 - 8.5	8.7	7.49	-1.21
	3	25	8.2 - 11.2	10.6	9.71	-0.89
	4	9	10.6 - 12.1	12.0	11.52	-0.48
	5	6	11.6 - 13.4	13.7	12.71	-0.99
	6	5	13.3 - 13.7	15.0	13.46	-1.54
	7	2	13.7 - 13.9	16.7	13.80	
	8	1	15.4	17.6		
	10	1	16.9	19.3		
	11	1	16.0			
Pumpkinseed	3	1	4.7	5.2		
	4	27	4.2 - 7.4	5.8	5.49	-0.31
	5	15	5.5 - 8.6	6.3	7.31	+1.01
	6	4	6.7 - 9.5	6.8	8.16	
	7	1	8.8	7.2		

*Growth index is the average deviation from the state average length at age.

Figure 1. Bathymetry map of Dodge Lake, Schoolcraft County.

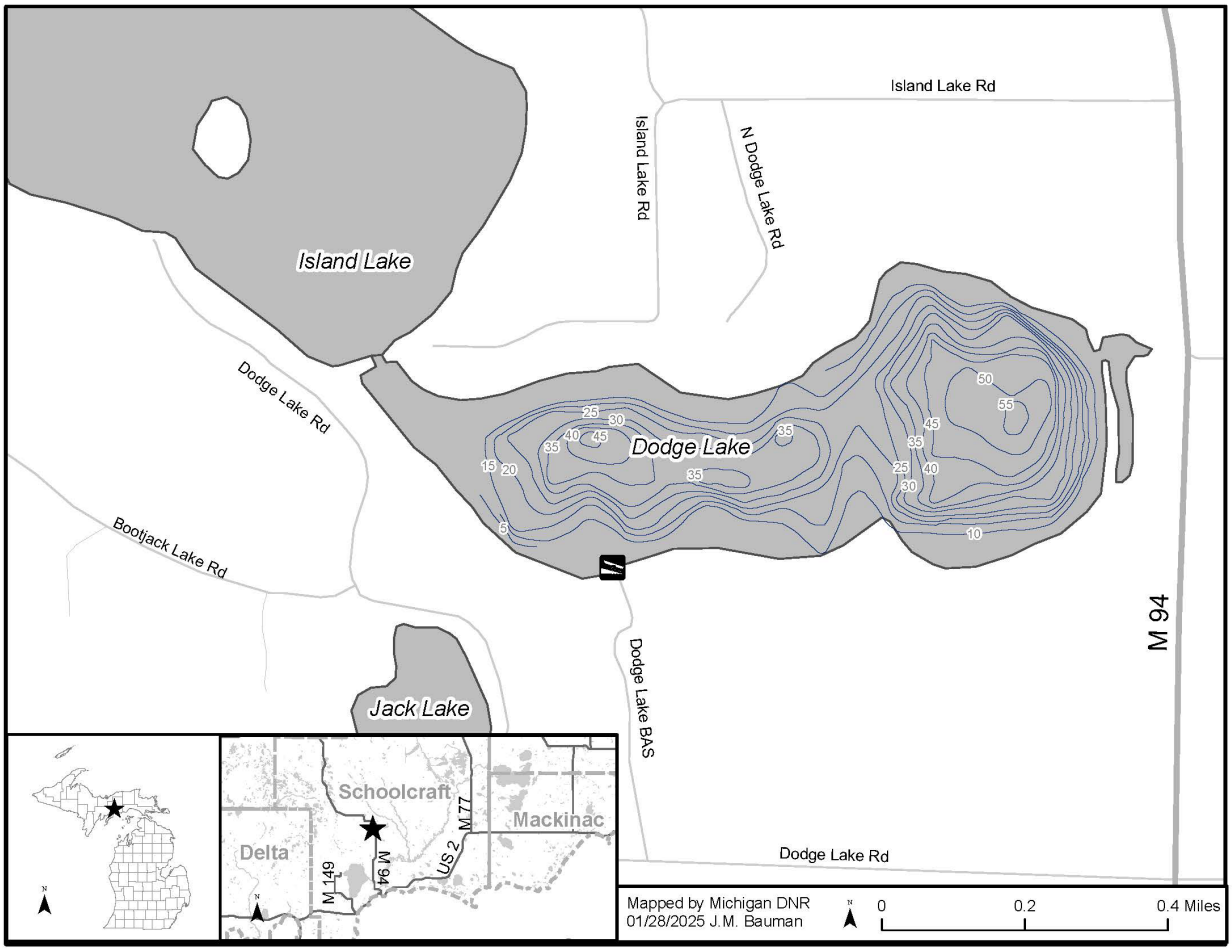


Figure 2. Land use map for the Dodge and Island lakes region, Schoolcraft County.

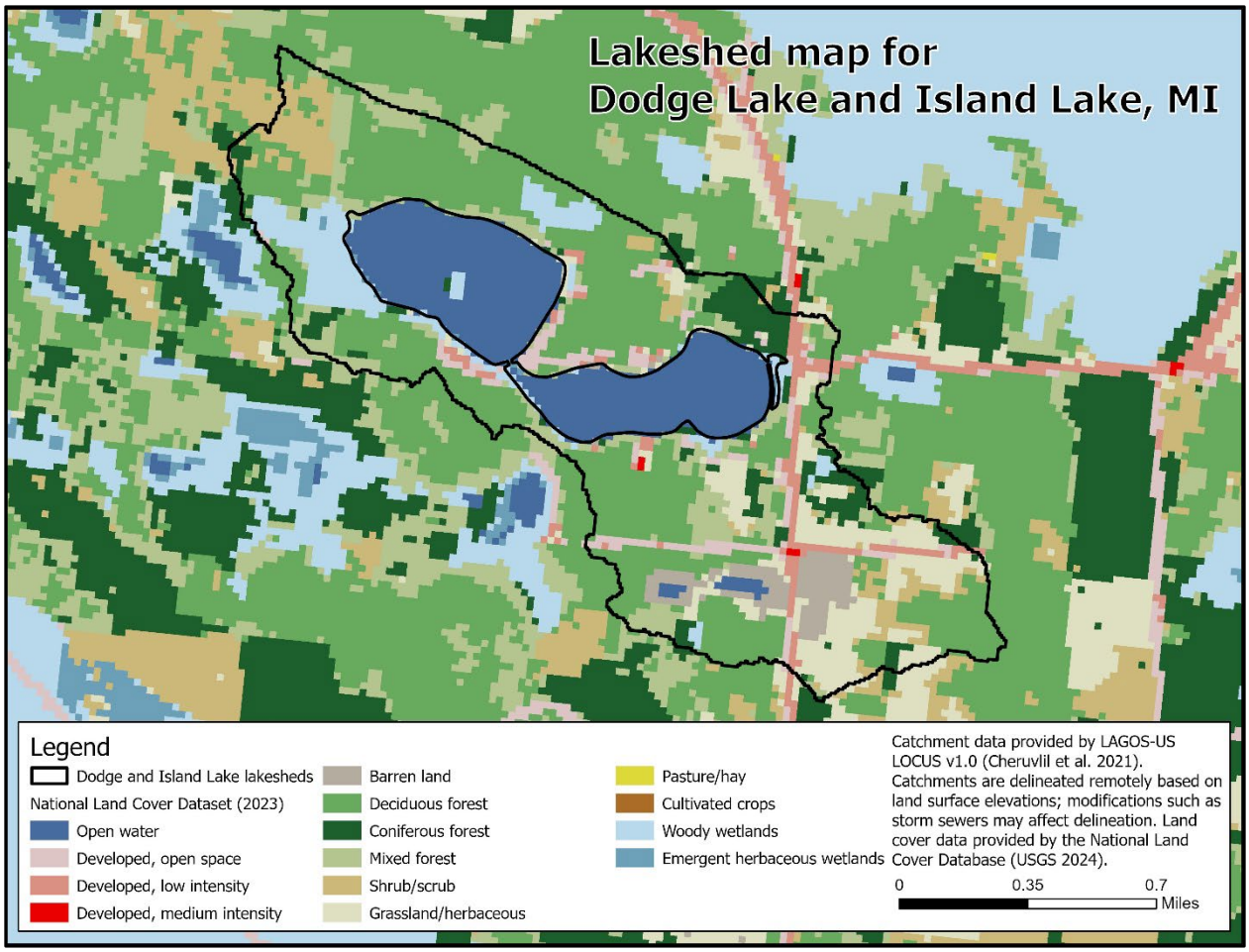


Figure 3. Catchment, or lakeshed, map for the Dodge and Island lakes region, Schoolcraft County.

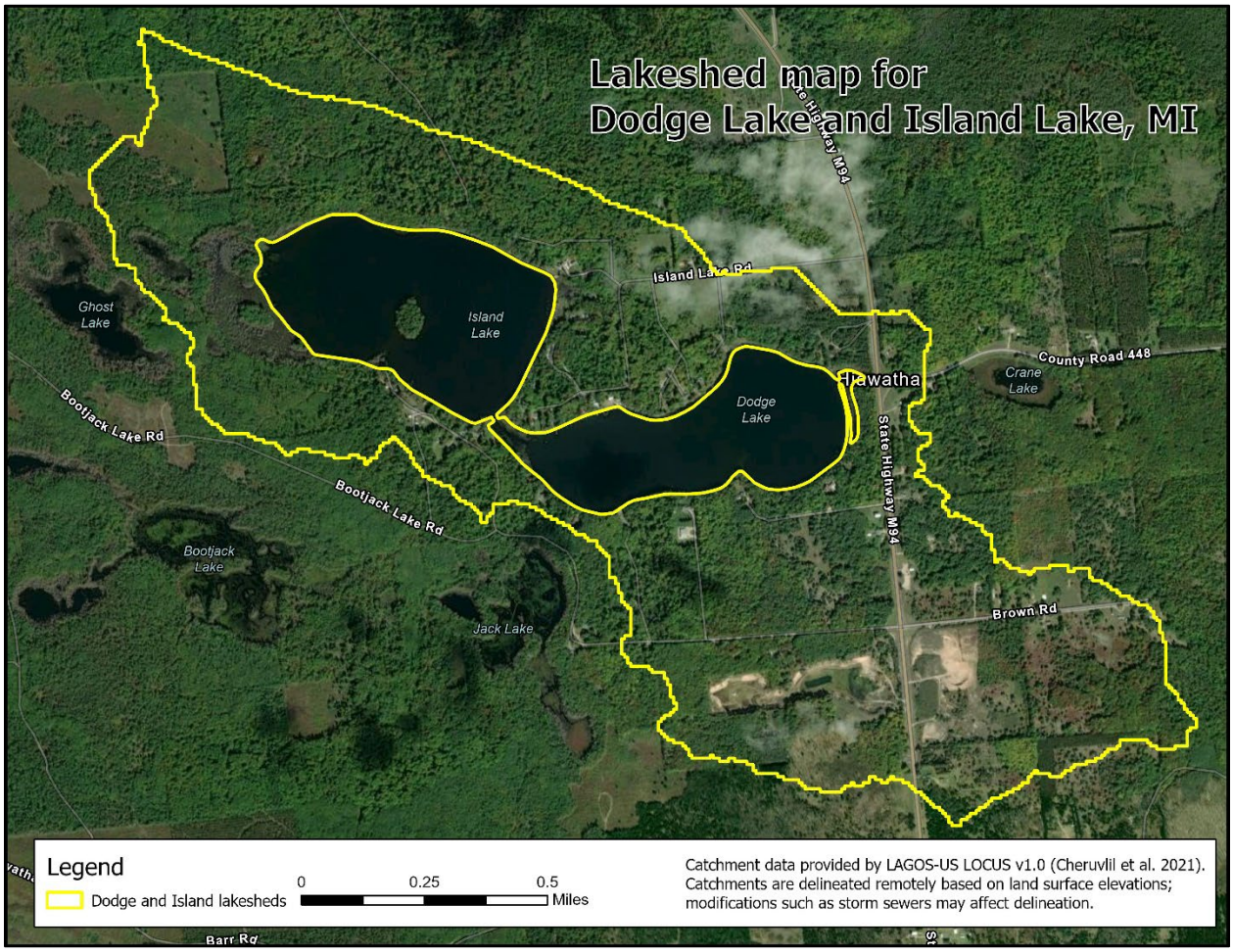


Figure 4. Depth and dissolved oxygen profile for Dodge Lake, Schoolcraft County, collected during winter (triangles) and summer (circles) of 2022.

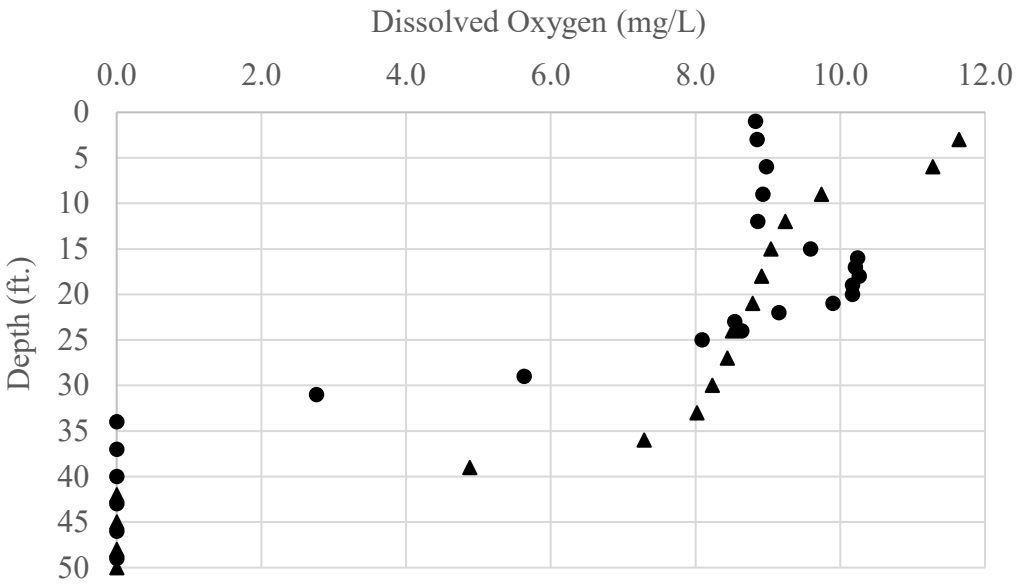


Figure 5. Depth and temperature profile for Dodge Lake, Schoolcraft County, collected 18 August 2022.

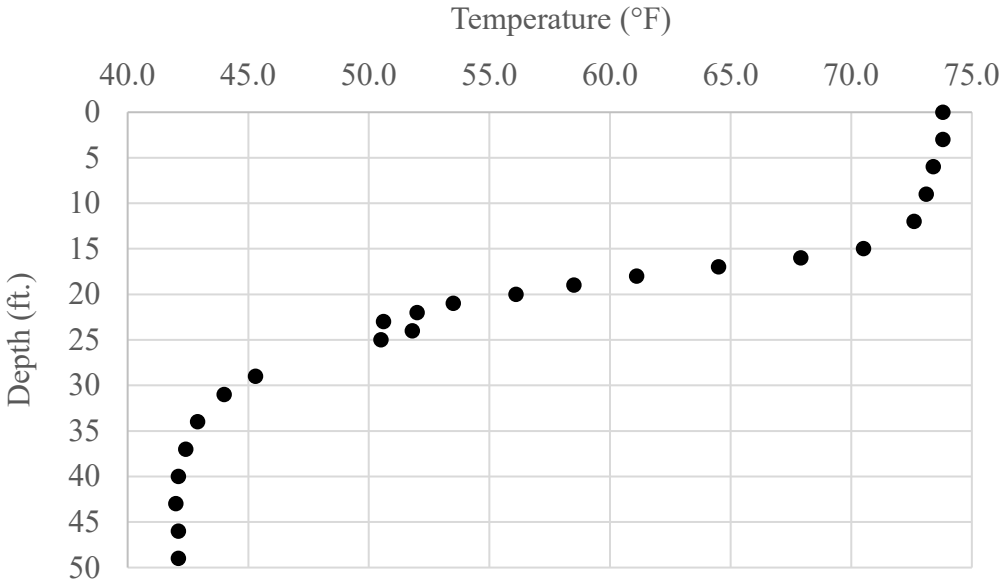
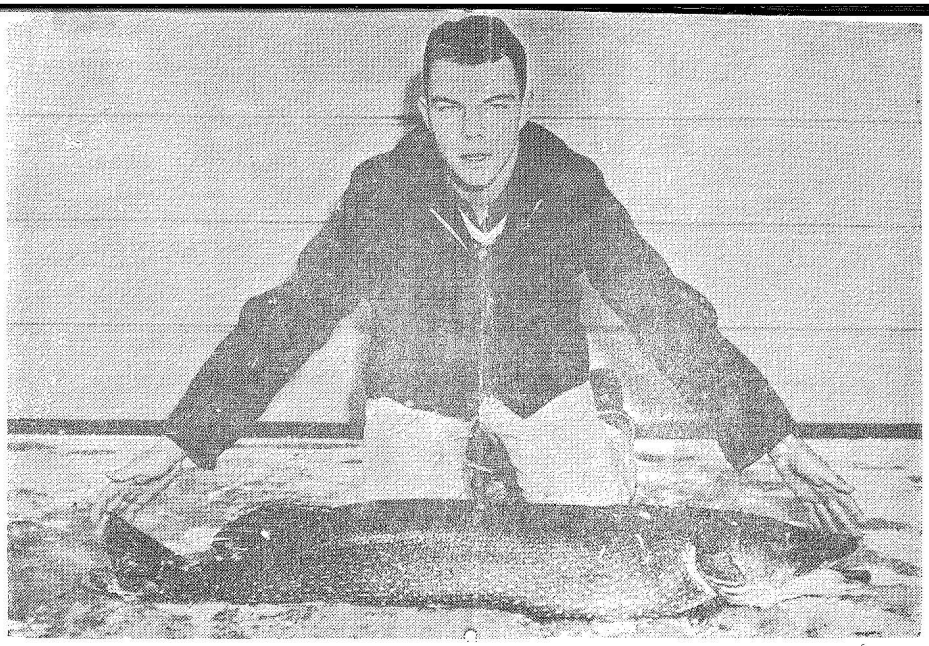


Figure 6. Newspaper article (Manistique Pioneer Tribune, February 9th, 1961) depicting the current Michigan state record Northern Pike (51.5 inches total length, 39.0 pounds) harvested from Dodge Lake, Schoolcraft County.



Larry Clough and His Record Pike, 51½ Inches Long and Weighing 39 Pounds

Dodge Lake Pike Breaks State Record

Dodge Lake, some 10 miles north of Manistique, may well prepare for a big influx of anglers as word gets around that a northern pike speared there last month set a new state record.

A 16-year-old Ludington youth speared only one northern on his week's fishing trip to Dodge Lake —but that catch weighed an even 39 pounds on grocery store scales and measured 51½ inches. It surpassed the previous record pike caught in Michigan by nearly four pounds and the largest taken in any manner by three pounds.

"It didn't put up much of a fight," the Ludington youth, Larry Clough said. "I was disappointed until I found out it set a new record." He speared the fish at 2:30 p. m. on Jan. 6.

The previous record holders both weighed 35 pounds. One was 52 inches long and was speared seven years ago in Millecoquins Lake in Mackinac County by Leonard Durga of Newberry. The other was 44 inches long and was speared in Lake Superior four years ago by Don Pickert.

Last year newspapers carried the story of a 36-pound pike, 47 inches long, which set a new mark as the largest recorded pike ever taken in Michigan, but it had been poisoned in Courtney Lake, Baraga County, during chemical treatment of the lake to reduce panfish populations.

also of Ludington, spent a week's vacation at Brady's resort on the connected Dodge and Island Lakes, for the sole purpose of spearing pike.

"The lake has a reputation for few fish, but big ones," Larry was quoted as saying, "and I guess it's well earned, for this was the only pike we got there. Dad got two small ones in a different lake nearby, and I sat in the shanty four days before I saw a pike, on Thursday. It seemed to be as big as this one (maybe it was the same) but it didn't come into the hole so I could get a crack at it.

"Then, Friday afternoon I stood up to leave the shanty, leaned my spear against the wall and opened the door," Larry said.

"Something made me look back and here was the big fellow squarely below the hole in the ice. I grabbed the spear and heaved it. It was a light spear and didn't penetrate very deeply, but it caught him squarely."

Michigan has no foolproof system of maintaining fish records and bigger fish may have been taken. But the conservation department's fish division keeps track of all claimants which reach its attention, by direct reports from the field or in newspapers, but bigger fish could be caught and go unreported, which would be likely if the fish were taken illegally, for instance.

ant about a 45-pound pike taken in the dim past by a Chicago reporter at Caribou Lake, but it was an old mounting with many coats of varnish and could not be identified positively or verified. Indeed, it looked to many observers more like a muskie than a pike.

The national pike record was set in 1940 when a 46 pounder was taken from Sacandaga Reservoir in New York State.

Figure 7. Dodge Lake, Schoolcraft County, shoreline status depicting the percent of shoreline that has been altered from its natural state.

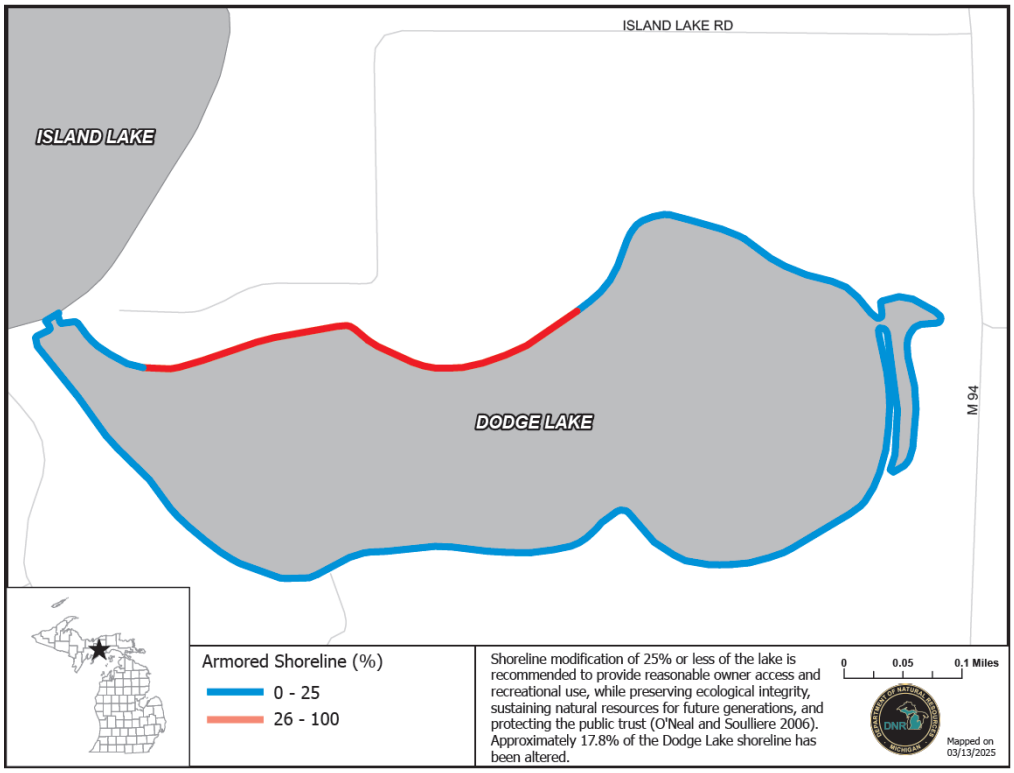
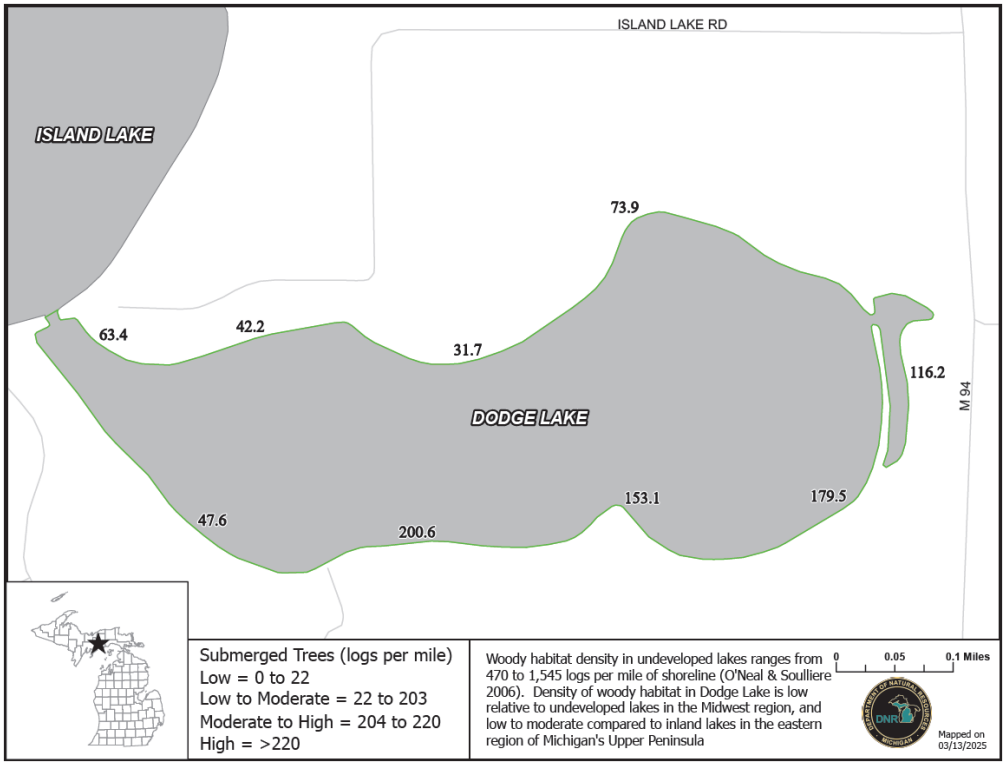


Figure 8. Dodge Lake, Schoolcraft County, shoreline status depicting the density of submerged trees (logs per mile) at each 1,000-ft transect.



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