

**Big Bass Lake**  
Otsego County, T30N/R2W/Sections 1, 2, 11, and 12  
North Branch Au Sable watershed  
Last Surveyed 2025

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**Environment**

#### Location

Big Bass Lake is a 70-acre inland lake located in Chester Township, southern Otsego County, Michigan. The lake lies approximately 14 miles south of Gaylord and 15 miles northwest of Lewiston, roughly midway between the two communities. The lake occupies a headwater position within the Crapo Creek drainage of the North Branch Au Sable River system (Figure 1).

#### Geology and geography

Big Bass Lake is a glacially formed basin typical of northern Michigan's outwash landscape. The watershed is underlain by coarse sand and gravel deposits that promote groundwater interaction and stable hydrology. Surrounding terrain is gently rolling, reflecting minor glacial undulations.

Lake substrates transition from sand and marl shoals in littoral areas to peat-dominated sediments in deeper zones. Marl deposits reflect calcareous glacial parent material and contribute to high alkalinity, buffering capacity, and water clarity. These substrate conditions support diverse macrophyte growth and productive benthic communities.

#### Watershed description

The Big Bass Lake watershed encompasses approximately 1,366 acres, of which roughly 21% is surface water. Land cover within the catchment is dominated by forest (72%), with smaller proportions of grassland or scrub/shrub, limited developed land, and minor wetland areas. Agricultural land use is negligible. This largely forested landscape reduces sediment and nutrient inputs and supports stable water quality conditions (Figure 2).

Hydrologically, Big Bass Lake forms the headwaters of a small chain of lakes including Little Bass Lake and Crapo Lake. These lakes collectively drain to Crapo Creek and ultimately to the North Branch Au Sable River. Hydrologic connectivity with wetlands and downstream waters allows periodic exchange of small-bodied forage fishes which may contribute to the lake's forage base.

#### Chemical and physical characteristics

Water clarity measured during the 2025 survey indicated high transparency, with a Secchi disk depth of 14.0 feet. This level of clarity is consistent with historical descriptions of generally clear water and reflects the combined influence of marl substrates, groundwater inputs, and a well-developed native macrophyte community.

Thermal and dissolved oxygen profiles collected in late summer 2025 showed well-defined stratification. A warm epilimnion overlaid a cooler hypolimnion, with a distinct thermocline separating the two layers. Dissolved oxygen levels were generally good through the upper water column, with suitable conditions for fish extending down to approximately 18 feet. Below this depth, oxygen levels declined rapidly. Around 19 feet, oxygen concentrations were low enough to limit fish use, and below roughly 21 feet conditions were effectively unsuitable for most fish during summer stratification.

This thermal and oxygen structure delineates the vertical extent of usable summer habitat and the depth at which habitat becomes restricted (Figure 3).

Water chemistry profiles indicate a well-buffered, mineral-rich system typical of marl-influenced lakes in northern Michigan. Alkalinity measured 70 mg/L, reflecting a strong natural buffering capacity derived from calcium-rich soils and sediments that help stabilize water chemistry. Surface pH ranged from 9.2 to 9.4 and gradually declined to approximately 8.1 near the bottom. Specific conductivity increased from about 134  $\mu\text{S}/\text{cm}$  at the surface to nearly 200  $\mu\text{S}/\text{cm}$  at depth, indicating moderate mineral content and groundwater influence. These chemical conditions are typical of marl-influenced northern Michigan lakes and are associated with high water clarity, stable nutrient cycling, and robust macrophyte production.

Nutrient concentrations were low, with total phosphorus measured at 0.0049 mg/L and nitrate/nitrite below detection, while ammonia concentrations remained low (0.061 mg/L). These chemical conditions are typical of marl-influenced northern Michigan lakes and are associated with high water clarity, stable nutrient cycling and favorable conditions for aquatic vegetation and fish production.

Aquatic vegetation in Big Bass Lake is diverse and indicative of a high-quality, groundwater-influenced inland lake. Field notes from 1963 described abundant pondweeds, muskgrass, water lilies, and water milfoil. A detailed macrophyte survey conducted in 2023 by Michigan State University (Hartsock 2023) documented an aquatic plant community was composed entirely of native species and included several taxa commonly associated with clear, low-nutrient lakes, such as muskgrass (*Chara* spp.), pipewort, and multiple pondweed species. The presence of bladderworts and diverse pondweeds suggests a structurally complex littoral zone, providing important habitat for invertebrates, juvenile fish, and forage species. Overall, the plant community is consistent with good water clarity, stable water chemistry, and intact nearshore habitat conditions.

#### Development, public ownership, and access

Shoreline development at Big Bass Lake is typical of small northern Michigan inland lakes. Effectively all (98.9%) of the shoreline is privately owned (Midwest Glacial Lakes Partnership 2025). Dwelling density and dock density are comparable to statewide benchmarks. Shoreline armoring is minimal, and large woody debris nearshore density is high, indicating substantial natural structural habitat along the shoreline (Table 2). Although dock density is relatively high compared to undeveloped lakes, most shoreline lots retain natural vegetation and show limited structural hardening.

Public access exists on the west shore (Figure 1) via an unimproved ramp with enough parking for three vehicles with trailers, and the site is managed by the Michigan Department of Natural Resources (MDNR) Parks and Recreation Division.

## Fishery Resource

### History

The fisheries history of Big Bass Lake indicates a long-standing, self-sustaining warmwater fish community typical of small, productive northern Michigan inland lakes. The earliest documented fisheries management action occurred in 1939, when the lake was stocked with 2,000 Smallmouth Bass and 11,375 Bluegill fingerlings. This represents the only known stocking event for the lake. Subsequent surveys indicate that the fish community has remained naturally reproducing, and no additional stocking has been recorded.

A limited fisheries survey conducted in 1963 employed four experimental gill nets set for one net-night each. Field notes described the lake as having only one cottage along the shoreline and generally high water clarity. Shoals consisted primarily of sand and marl substrates, transitioning to pulpy peat in deeper areas. Aquatic vegetation was described as diverse and included pondweeds (*Potamogeton* spp.), muskgrass (*Chara* spp.), water lilies (*Nymphaea* spp.), and water milfoil (*Myriophyllum* spp.). Despite the presence of aquatic vegetation, spawning habitat for Bluegill, Pumpkinseed, and Largemouth Bass was noted to be limited, likely reflecting substrate composition and localized sediment conditions rather than an absence of vegetation. Gill-net sampling documented a warmwater fish community dominated by panfish and Largemouth Bass, with Northern Pike, Yellow Perch, and Rock Bass also present. Bluegill ranged from 4 to 7 inches. Length-at-age data indicated that growth of Bluegill and Pumpkinseed was generally comparable to statewide averages for these species. Northern Pike exhibited relatively rapid early growth, while Yellow Perch and Rock Bass growth was slightly below statewide averages. Although sample sizes were limited, these records suggest favorable growing conditions and adequate forage resources during the early period of record. These early surveys by the Michigan Department of Conservation (MDOC) were used more to determine presence and absence of species since very little was known for many northern Michigan lakes.

A survey conducted on June 30, 1966, by MDOC used boat electrofishing to sample nearshore habitats. Substrates were described as muck with extensive aquatic vegetation, including lily pads. The survey documented a warmwater fish community dominated by sunfish and Largemouth Bass. Largemouth Bass ranged from 3 to 10 inches, Pumpkinseed ranged from 3.0 to 7.1 inches, Bluegill ranged from 6.1 to 6.4 inches, and Yellow Perch ranged from 4.4 to 5.6 inches. Rock Bass and Bluntnose Minnow were present in low numbers. Numerous small Pumpkinseed were observed but not collected. Archived aging records indicate that growth of Bluegill, Pumpkinseed, and Largemouth Bass was generally comparable to or above statewide averages, while Yellow Perch and Rock Bass growth was slightly below statewide norms. Although sample sizes were limited, results confirm that Big Bass Lake supported a productive warmwater fish community with favorable growth conditions in vegetated littoral habitats.

Biologist correspondence from 1976 described Big Bass Lake as an “excellent bluegill lake”, consistent with field observations of abundant sunfish and well-vegetated nearshore habitat supporting panfish production. Big Bass Lake was included in a district-wide aerial creel survey conducted in 1982, which estimated approximately 3,000 boat angler hours annually ( $\pm 1,660$  hours) (Rykman and Lockwood 1985). Relative to other lakes surveyed in the region at that time, Big Bass Lake supported low to moderate levels of angling pressure.

A general fish community survey was conducted from June 26 to July 3, 1985, using trap nets. Although ten trap nets were reportedly used, the total sampling effort (including net deployment duration, number of lifts, and detailed effort by net) was not clearly documented. As a result, quantitative catch-per-effort metrics from this survey should be interpreted cautiously.

The survey documented a warmwater fish community dominated by Bluegill and Largemouth Bass, with additional representation from Pumpkinseed, Rock Bass, Yellow Perch, Northern Pike, and a small number of hybrid sunfish. Bluegill were the most abundant species and ranged from 2 to 10 inches in length, while Largemouth Bass ranged from 3 to 17 inches. Northern Pike were present in low numbers but included individuals up to 36 inches. Age data were not collected for any species during this survey; however, observed size distributions suggested a productive system capable of supporting quality-size individuals.

The most recent survey prior to 2025 was conducted in 2000 using trap nets, fyke nets, and experimental gill nets to assess species composition, size structure, and growth. Results documented a healthy, self-sustaining warmwater fish community dominated by Bluegill and Largemouth Bass, with Northern Pike and Black Crappie also present (Table 3). Growth of Bluegill and other panfish was considered good relative to statewide averages. Size structure was consistent with moderate fishing pressure typical of inland lakes. Overall, the survey indicated continued productivity and a balanced fish community consistent with historical patterns.

Collectively, fisheries surveys conducted from 1963 through 2000 document a diverse warmwater fish community that has remained compositionally stable over time. Bluegill, Pumpkinseed, Rock Bass, Yellow Perch, Largemouth Bass, and Northern Pike have been persistent components of the fish community. Length-at-age data from the 1960s and 2000 indicate growth conditions generally at or above statewide averages for most species, suggesting long-term stability in lake productivity.

Master angler Awards for Big Bass Lake are dominated by panfish species, consistent with survey findings of high bluegill abundance (Table 4).

#### Current status of the fish community

A fish community survey was conducted on Big Bass Lake in Otsego County during spring of 2025 to assess species composition, size structure, and growth of the fish community. This survey represents the first comprehensive assessment of the lake since 2000 and provides updated information on fish community and population characteristics.

#### Methods

Sampling followed MDNR Status and Trends protocols for inland lakes, which standardize methods based on lake size to ensure consistent and comparable data collection statewide. A combination of sampling gears and randomly selected sites was used to provide a representative assessment of species diversity, size structure, and age composition.

The 2025 survey occurred in late spring between May 19 and June 25, 2025, using the following sampling effort:

- Three shoreline seine hauls
- Two experimental gill nets set for two nights each with daily checks (four net lifts)
- Two small mesh fyke nets set for two nights each with daily checks (four net lifts)
- Three large mesh fyke nets set for three nights each with daily checks (nine net lifts)
- Three 600-second boomshocker shoreline electrofishing transects

Fish were identified to species, counted, and measured for total length by inch group. Spine or scale samples were collected from the first 10 individuals of each gamefish species within each inch group for age and growth analysis. The total length for these individuals was recorded to the nearest tenth of an inch. Fish weights, in pounds, were estimated using established MDNR length-weight relationships (Schneider et al. 2000). Age composition summaries are based on aged subsamples; length-frequency distributions incorporate all sampled individuals.

Length and age data were used to evaluate population structure and growth relative to statewide standards. Total lengths were summarized as length-frequency distributions to describe size structure.

Predator–prey size relationships were evaluated using standard size-distribution indices that compare the proportion of quality-size fish among predators and prey. Proportional Size Distribution (PSD) indices were calculated for selected species to describe predator–prey size structure and population balance. Length categories (stock, quality, preferred, memorable, and trophy) follow species-specific benchmarks derived from stock length definitions (Gabelhouse 1984). PSD values were calculated using functions implemented in the FSA package in R (Ogle et al. 2025) and displayed using tic-tac-toe plots to visually evaluate predator–prey balance.

For Largemouth Bass and Northern Pike, legal size thresholds ( $\geq 14$  inches and  $\geq 24$  inches, respectively) were also shown on length–frequency plots to reflect current management regulations.

### Results

The 2025 survey collected 688 sport fish representing seven species and one hybrid (Table 5). Sunfish species dominated the catch, with Bluegill making up nearly half of all fish captured (46%). Pumpkinseed, Largemouth Bass, and Black Crappie were also common, along with Yellow Perch and Northern Pike. Although Northern Pike made up only 3% of the catch by number, they accounted for the largest share of total fish weight (42%) because of their larger size. An additional ten non-sport fish species were also captured in the 2025 survey (Table 3).

Bluegill were the most abundant sport species captured (Table 5). Lengths ranged from 1 to 9 inches, with most fish between 4 and 8 inches and a clear peak at 7 inches (Figure 4). About 61% of Bluegill exceeded the 6-inch quality size, though relatively few reached preferred length. Ages ranged from age-1 through age-8, and fish grew at rates near Michigan averages at younger ages and faster than average at older ages (Table 6). Size structure comparisons show Bluegill include a good proportion of quality-size fish relative to smaller individuals (Figures 10 and 11).

Pumpkinseed comprised a moderate portion of the sport fish catch (Table 5). Total lengths ranged from 2 to 8 inches, with a distribution centered on small to intermediate size classes (Figure 5). Approximately 44% of individuals exceeded the 6-inch quality-length benchmark. Age analysis identified multiple year classes, with mean length-at-age near statewide averages at younger ages and above statewide averages at older ages (Table 6). Predator–prey comparisons indicate Pumpkinseed show a balanced mix of size classes (Figures 10 and 11).

Black Crappie were represented primarily by larger individuals. Total lengths ranged from 8 to 12 inches with a mean of 10.2 inches (Figure 6). Nearly all individuals exceeded quality and preferred size benchmarks. Growth was at or above statewide averages across several age classes (Table 6). Predator–prey comparisons show crappie are well represented by larger fish relative to smaller size classes (Figures 10 and 11).

Yellow Perch ranged from 2 to 7 inches (Figure 7), with most individuals between 3 and 7 inches and few approaching quality length. Age data show representation of several younger age classes with growth generally near statewide averages (Table 6). Predator–prey comparisons indicate perch size structure is weighted toward smaller fish (Figures 10 and 11).

Largemouth Bass ranged from 2 to 19 inches, with most individuals between 8 and 12 inches (Figure 8). The length–frequency distribution was centered on intermediate size classes, with relatively few fish below 6 inches and several fish exceeding 14 inches. Approximately 29% of stock-length bass exceeded the 12-inch quality-length benchmark, and about 12% of individuals exceeded the 14-inch legal size limit.

Northern Pike ranged from 19 to 33 inches (Figure 9), with most between 22 and 30 inches. Approximately 83% exceeded quality length and 35% exceeded preferred length. Growth was near statewide averages at younger ages and above statewide averages at intermediate ages (Table 6). Predator–prey comparisons indicate pike include a satisfactory proportion of larger individuals. Together, these results suggest that the current 24-inch minimum size limit and two-fish daily bag limit appear appropriate for this system (Figures 10 and 11).

Predator–prey size comparisons (Figures 10 and 11) show how the sizes of predator fish like bass and pike relate to the sizes of panfish in the lake. Bluegill and Yellow Perch include many smaller fish along with some reaching desirable sizes, Pumpkinseed show a broad range of sizes, and Black Crappie are represented mostly by larger fish. Predators include both mid-sized and larger individuals. This mix of sizes across species indicates a functioning predator–prey system typical of moderately productive inland lakes.

### **Analysis and Discussion**

Big Bass Lake supports a productive warmwater fish community typical of small, groundwater-influenced inland lakes in northern Michigan. Species present in 2025 closely match those documented in surveys dating back to the 1960s (Table 3), indicating that the overall fish community has remained stable for decades. Bluegill, Pumpkinseed, Rock Bass, Yellow Perch, Largemouth Bass, and Northern Pike have been consistent components of the fishery over time. Black Crappie were likely introduced or expanded in abundance in more recent decades.

Habitat conditions help explain this long-term stability. Clear water, alkaline chemistry associated with marl substrates, and abundant native aquatic vegetation support productive littoral zones. Shoreline surveys indicate minimal armoring and a high amount of large woody debris, much of it derived from the forested island and its undeveloped shoreline (Table 2). These features provide cover for juvenile fish, support invertebrate production, and contribute to overall habitat diversity.

Although shoreline development is present and dock density is relatively high compared to other regional inland lakes, most shorelines retain natural vegetation and show limited hard armoring. Continued retention of woody material and native vegetation will be important to maintain this habitat base as development pressure increases. Aquatic vegetation further supports the fish community by providing spawning areas, nursery habitat, and food resources. Together, these habitat features favor panfish production and support predator populations such as bass and pike.

The 2025 survey results reflect these favorable habitat conditions. Bluegill were the most abundant species and were represented by many small individuals along with some quality-size fish (Table 5). This pattern is common in productive inland lakes and likely reflects periodic acceptable year classes combined with moderate angler harvest of larger fish rather than growth limitation. Growth rates at or above statewide averages support this interpretation.

Pumpkinseed and Black Crappie exhibited broader size distributions and favorable growth, indicating adequate forage and habitat resources. Yellow Perch were represented primarily by smaller individuals, suggesting variable recruitment among year classes and/or size-selective predation or harvest influencing size structure. This pattern is commonly observed in vegetated lakes, where smaller perch can use dense cover to reduce predation risk. Under stratified summer conditions, the vertical extent of cool, well-oxygenated habitat is limited, which may further constrain growth beyond intermediate sizes and reduce the proportion of larger perch in the population.

Predator populations showed contrasting but complementary patterns. Largemouth Bass were dominated by small to intermediate fish, while Northern Pike included a higher proportion of larger individuals and accounted for a substantial share of total fish biomass. Pike size structure and biomass indicate a functional predator population capable of exerting size-selective predation on intermediate prey sizes. During summer stratification, the overlap of pike with prey species within the limited zone of suitable temperature and dissolved oxygen is consistent with the relative scarcity of mid-sized panfish.

Growth data further support system stability. Most species grew at rates near or above statewide averages (Table 6), indicating adequate food resources and habitat conditions. There is no evidence of slow growth, stunting, or recruitment failure. Long-term growth patterns (Table 7) also show consistent productivity over multiple survey periods despite gradual shoreline development and recreational use.

In comparison with prey species (Figure 10), Largemouth Bass tend to plot toward the left side of the shaded area, indicating a population dominated by small to intermediate-sized fish. This pattern is common in lakes with consistent bass recruitment and strong competition for food and does not suggest overharvest or poor population condition.

Prey species show varied but generally stable responses. Bluegill and Black Crappie include many quality-size individuals, indicating that bass predation does not suppress these populations. Pumpkinseed display a balanced size structure. Yellow Perch plot lower on the prey axis, reflecting dominance by smaller individuals, a pattern likely influenced by a combination of recruitment variability, vegetation use, and growth constraints rather than bass predation alone.

Northern Pike comparisons (Figure 11) show a different but complementary predator pattern. Pike plot farther to the right on the predator axis, reflecting a higher proportion of larger individuals and strong growth into quality and preferred sizes. This indicates that pike function as an effective top predator despite lower overall abundance relative to bass.

Prey responses to pike predation vary by species. Bluegill and Black Crappie continue to show strong representation of larger individuals, while Pumpkinseed remain balanced. Yellow Perch plot low on the prey axis when paired with pike, suggesting limited numbers of larger perch. This pattern is consistent with size-selective predation on intermediate-sized perch combined with habitat use that favors survival at smaller sizes but limits growth to larger sizes.

Taken together, these results indicate a functioning predator–prey system with complementary predator roles. Largemouth Bass primarily influence prey at smaller sizes, while Northern Pike exert stronger predation pressure on larger prey. Prey species remain present across multiple size classes, and no major imbalance is evident.

As with all surveys, gear selectivity influences representation of certain sizes and species. Very small fish and the largest, most mobile predators may be underrepresented. Thus, size distributions should be interpreted as general indicators of population structure rather than precise abundance measures.

Overall, habitat quality, growth rates, and species composition indicate that Big Bass Lake remains a stable and moderately productive fishery. Multiple species reach desirable angling sizes, predator populations are functioning as expected, and environmental conditions continue to support long-term sustainability.

## Management Direction

### Current

Big Bass Lake is currently managed under standard statewide warmwater regulations. No species-specific regulations, stocking programs, or special management actions are in place.

### Goals and expectations

- **Maintain statewide fishing regulations.** Current fish community structure and growth patterns indicate that existing statewide regulations are appropriate to support balanced fish populations and sustainable recreational fishing opportunities.
- **Maintain public access.** Preserving existing access sites helps ensure continued fishing opportunities while concentrating activity in established areas.
- **Anglers may consider selective harvest.** Harvest of smaller Bluegill, while releasing larger Largemouth Bass and Northern Pike when possible, can help maintain desirable size structure in both predator and prey species without the need for regulation changes.
- **Maintain natural shoreline structure.** Natural woody material along shorelines provides important habitat for juvenile fish, forage species, and invertebrates. Retaining this structure where compatible with recreation benefits the fishery.
- **Maintain forested shoreline buffers.** Natural riparian vegetation helps protect water quality, reduce erosion, provide shade, and maintain habitat complexity that supports healthy fish populations.
- **Encourage angler reporting.** Reports of notable catches from anglers to the local DNR Fisheries Biologist are a valuable resource for tracking population trends and guiding future management.

### Obstacles to attainment of goals

Potential threats to long-term fishery stability include increased shoreline development, removal of woody structure or aquatic vegetation, and nutrient enrichment that could reduce water clarity and alter littoral habitat conditions. Continued retention of natural shoreline features and vegetation will help preserve the habitat complexity that supports this fish community.

A proposed high-capacity groundwater withdrawal (approximately 1 million gallons per day) in the surrounding area also warrants consideration. While the magnitude of any lake-level response is uncertain, withdrawals of this scale have the potential to influence groundwater inflows that support lake water levels and thermal conditions. Given the lake's relatively limited volume of suitable summer habitat, changes to groundwater inputs could affect stratification dynamics and the availability of cool, well-oxygenated water. Careful review of potential hydrologic and thermal effects is appropriate to ensure long-term protection of the lake's fishery.

## References

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**Tables and Figures**

Table 1. Common and scientific name of aquatic macrophytes documented in Big Bass Lake (Hartsock et al. 2023).

| Common Name             | Scientific Name                  | Disposition |
|-------------------------|----------------------------------|-------------|
| Aquatic moss            | <i>Bryophyta sp.</i>             | Native      |
| Muskgrass               | <i>Chara sp.</i>                 | Native      |
| Needle spikerush        | <i>Eleocharis acicularis</i>     | Native      |
| Pipewort                | <i>Eriocaulon aquaticum</i>      | Native      |
| Water stargrass         | <i>Heteranthera dubia</i>        | Native      |
| White water lily        | <i>Nymphaea odorata</i>          | Native      |
| Various-leaved pondweed | <i>Potamogeton gramineus</i>     | Native      |
| White-stem pondweed     | <i>Potamogeton pralongus</i>     | Native      |
| Small-leaf pondweed     | <i>Potamogeton sp.</i>           | Native      |
| Flat-stem pondweed      | <i>Potamogeton zosteriformis</i> | Native      |
| Burreed                 | <i>Sparganium sp.</i>            | Native      |
| Flat-leaved bladderwort | <i>Utricularia intermedia</i>    | Native      |
| Lavender bladderwort    | <i>Utricularia resupinata</i>    | Native      |

Table 2. Physical shoreline indicators measured at Big Bass Lake compared to the regional average for the Northern Lake Huron Management Unit and statewide percentile benchmarks. Indicators include shoreline dwellings, boat docks, and large woody debris (all reported per mile of shoreline), and shoreline armoring (reported as percent of shoreline).

| Indicator          | Big Bass Lake | Regional Average (NLHMU) | Statewide 25 <sup>th</sup> Percentile | Statewide 75 <sup>th</sup> Percentile | Statewide Habitat Condition |
|--------------------|---------------|--------------------------|---------------------------------------|---------------------------------------|-----------------------------|
| Dwelling           | 11.9          | 14.5                     | 4.8                                   | 30.6                                  | Typical                     |
| Boat Docks         | 10.8          | 1.9                      | 1.9                                   | 21.8                                  | High                        |
| Large Woody Debris | 125.0         | 6.0                      | 1.1                                   | 22.6                                  | Very high                   |
| Shoreline Armoring | 1.5%          | 9.3%                     | 0.6%                                  | 30.1%                                 | Low                         |

Note: Large woody debris density was strongly influenced by inputs associated with the forested island and adjacent natural shoreline, which currently represent the primary sources of coarse woody material within the lake.

Table 3. History of fish species detected from surveys conducted in Big Bass Lake since 1963. All surveys were general fish community assessments using the gear types indicated for each year. “X” indicates species detection. Absence of a mark reflects differences in sampling gear and effort and does not indicate true absence from the lake.

| Species                | 1963     | 1966                | 1985     | 2000   | 2025   |
|------------------------|----------|---------------------|----------|--|--|
|                        | Gill net | Boat electrofishing | Trap net | Trap net, Large-mesh fyke, small-mesh fyke, gill net | Large-mesh fyke, small-mesh fyke, gill net, seine, boat electrofishing |
| Black Crappie          |          |                     |          | X  | X  |
| Blacknose Shiner       |          |                     |          | X  | X  |
| Bluegill               | X        | X                   | X        | X  | X  |
| Bluntnose Minnow       |          | X                   |          | X  |  |
| Brook Stickleback      |          |                     |          |  | X  |
| Brown Bullhead         |          |                     |          | X  |  |
| Central Mudminnow      |          |                     |          |  | X  |
| Hybrid sunfish         |          |                     | X        |  | X  |
| Iowa Darter            |          |                     |          |  | X  |
| Johnny Darter          |          |                     |          | X  | X  |
| Largemouth Bass        |          | X                   | X        | X  | X  |
| Northern Pike          | X        |                     | X        | X  | X  |
| Northern Redbelly Dace |          |                     |          |  | X  |
| Pumpkinseed            | X        | X                   |          | X  | X  |
| Rainbow Darter         |          |                     |          | X  |  |
| Rock Bass              | X        | X                   | X        | X  | X  |
| Tadpole Madtom         |          |                     |          |  | X  |
| Yellow Perch           | X        | X                   | X        | X  | X  |

Table 4. Michigan DNR Master Angler awards issued for fish caught in Big Bass Lake, 1998–present.

| Species         | Master Angler Awards |
|-----------------|----------------------|
| Bluegill        | 18                   |
| Largemouth Bass | 1                    |
| Northern Pike   | 2                    |
| Pumpkinseed     | 1                    |

Table 5. Catch summary of sport fish collected during the 2025 survey on Big Bass Lake. Weight is reported in pounds (lb.), and length in inches (in). Note that some individuals were measured to the nearest 0.1 inches, while others were recorded by whole-inch groups. Percent legal size is noted for species that have a size limit. Percentages reflect sport fish only; non-sport species not shown.

| Species         | Number | % by Number | Weight | % by Weight | Inch Group Range | Average Length | % Legal Size |
|-----------------|--------|-------------|--------|-------------|------------------|----------------|--------------|
| Black Crappie   | 19     | 1.9         | 11.2   | 4.0         | 8 – 12           | 10.2           | NA           |
| Bluegill        | 471    | 46.2        | 96.5   | 34.7        | 1 – 9            | 5.7            | NA           |
| Hybrid Sunfish  | 1      | 0.1         | 0.3    | 0.1         | 7                | 7.0            | NA           |
| Largemouth Bass | 59     | 5.8         | 35.2   | 12.7        | 2 – 19           | 10.1           | 12%          |
| Northern Pike   | 29     | 2.8         | 116.9  | 42.0        | 19 – 33          | 24.1           | 62%          |
| Pumpkinseed     | 36     | 3.5         | 7.1    | 2.6         | 2 – 8            | 5.5            | NA           |
| Yellow Perch    | 73     | 7.2         | 5.0    | 1.8         | 2 – 7            | 6.0            | NA           |

Table 6. Length-at-age metrics for gamefish collected during the 2025 survey on Big Bass Lake. Fish lengths are reported in inches (in) and were measured to the nearest 0.1 inch for all aged individuals. Schneider et al. (2000a) describes growth index equations.

| Bluegill | Number Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|----------|-------------|--------------|----------------------|----------------------|--------------|
| Age-1    | 6           | 1.3 – 2.5    | 1.9                  | 1.8                  | +0.1         |
| Age-2    | 10          | 2.5 – 3.8    | 3.3                  | 3.8                  | -0.5         |
| Age-3    | 13          | 3.8 – 5.6    | 4.3                  | 5.0                  | -0.7         |
| Age-4    | 21          | 4.6 – 6.7    | 5.8                  | 5.9                  | -0.1         |
| Age-5    | 13          | 5.7 – 8.3    | 7.2                  | 6.7                  | +0.5         |
| Age-6    | 12          | 7.5 – 9.0    | 7.9                  | 7.3                  | +0.6         |
| Age-7    | 5           | 8.3 – 9.5    | 8.6                  | 7.8                  | +0.8         |
| Age-8    | 2           | 9.2 – 9.5    | 9.4                  | 8.2                  | +1.2         |

| Pumpkinseed | Number Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|-------------|-------------|--------------|----------------------|----------------------|--------------|
| Age-1       | 2           | 2.4 – 3.2    | 2.8                  | 1.8                  | +1.0         |
| Age-2       | 4           | 3.0 – 3.8    | 3.4                  | 3.8                  | -0.4         |
| Age-3       | 11          | 3.7 – 5.2    | 4.3                  | 4.9                  | -0.6         |
| Age-4       | 12          | 5.4 – 7.3    | 6.4                  | 5.6                  | +0.8         |
| Age-5       | 3           | 6.1 – 8.7    | 7.3                  | 6.2                  | +1.1         |
| Age-6       | 5           | 7.8 – 8.8    | 8.3                  | 6.2                  | +2.1         |

| Black Crappie | Number Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|---------------|-------------|--------------|----------------------|----------------------|--------------|
| Age-3         | 1           | 8.2          | 8.2                  | 7.5                  | +0.7         |
| Age-4         | 6           | 8.6 – 10.4   | 9.5                  | 8.6                  | +0.9         |
| Age-5         | 9           | 9.6 – 10.1   | 9.9                  | 9.4                  | +0.5         |
| Age-6         | 3           | 10.4 – 11.4  | 11.0                 | 10.2                 | +0.8         |
| Age-7         | 1           | 12.2         | 12.2                 | 10.8                 | +1.4         |

| Yellow Perch | No. Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|--------------|----------|--------------|----------------------|----------------------|--------------|
| Age-1        | 23       | 2.9 – 4.8    | 4.0                  | 3.3                  | +0.7         |
| Age-2        | 19       | 4.1 – 6.6    | 5.4                  | 5.2                  | +0.2         |
| Age-3        | 16       | 5.7 – 7.3    | 6.5                  | 6.5                  | 0            |
| Age-4        | 3        | 6.3 – 7.5    | 6.9                  | 7.5                  | -0.6         |

Table 6 (continued). Length-at-age metrics for gamefish collected during the 2025 survey on Big Bass Lake. Fish lengths are reported in inches (in) and were measured to the nearest 0.1 inch for all aged individuals. Schneider et al. (2000a) describes growth index equations.

| Largemouth Bass | Number Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|-----------------|-------------|--------------|----------------------|----------------------|--------------|
| Age-1           | 15          | 2.8 – 6.6    | 4.5                  | 4.2                  | +0.3         |
| Age-2           | 10          | 7.1 – 9.8    | 8.1                  | 7.1                  | +1.0         |
| Age-3           | 11          | 8.5 – 11.0   | 9.6                  | 9.4                  | +0.2         |
| Age-4           | 12          | 10.3 – 12.8  | 11.6                 | 11.6                 | 0            |
| Age-5           | 3           | 10.8 – 15.3  | 13.4                 | 13.2                 | +0.2         |
| Age-6           | 3           | 14.5 – 15.6  | 14.9                 | 14.7                 | +0.2         |
| Age-8           | 1           | 17.0         | 17.0                 | 17.4                 | -0.4         |
| Age-10          | 1           | 19.8         | 19.8                 | 19.3                 | +0.6         |

| Northern Pike | Number Aged | Length Range | Weighted Mean Length | State Average Length | Growth Index |
|---------------|-------------|--------------|----------------------|----------------------|--------------|
| Age-4         | 7           | 19.6 – 23.2  | 21.9                 | 23.4                 | -1.5         |
| Age-5         | 13          | 19.3 – 32.4  | 24.7                 | 25.5                 | -0.8         |
| Age-6         | 6           | 25.8 – 31.6  | 28.9                 | 27.3                 | +1.6         |
| Age-7         | 2           | 27.8 – 32.4  | 30.1                 | 29.3                 | +0.4         |
| Age-13        | 2           | 33.5 – 33.6  | 33.6                 | Unavailable          | NA           |

Table 7. Long-term length-at-age growth patterns of gamefish in Big Bass Lake relative to Michigan statewide averages (Schneider et al. 2000a).

| Species         | 1960's Surveys | 2000 Survey | 2025 Survey | Long-Term Pattern |
|-----------------|----------------|-------------|-------------|-------------------|
| Black Crappie   | --             | Above Avg   | Above Avg   | Steady            |
| Bluegill        | At Avg         | Above Avg   | At Avg      | Steady            |
| Pumpkinseed     | At Avg         | At Avg      | Above Avg   | Improving         |
| Largemouth Bass | At Avg         | At Avg      | At Avg      | Steady            |
| Northern Pike   | Above Avg      | Above Avg   | At Avg      | Decreasing to Avg |
| Yellow Perch    | Below Avg      | Below Avg   | At Avg      | Improving         |

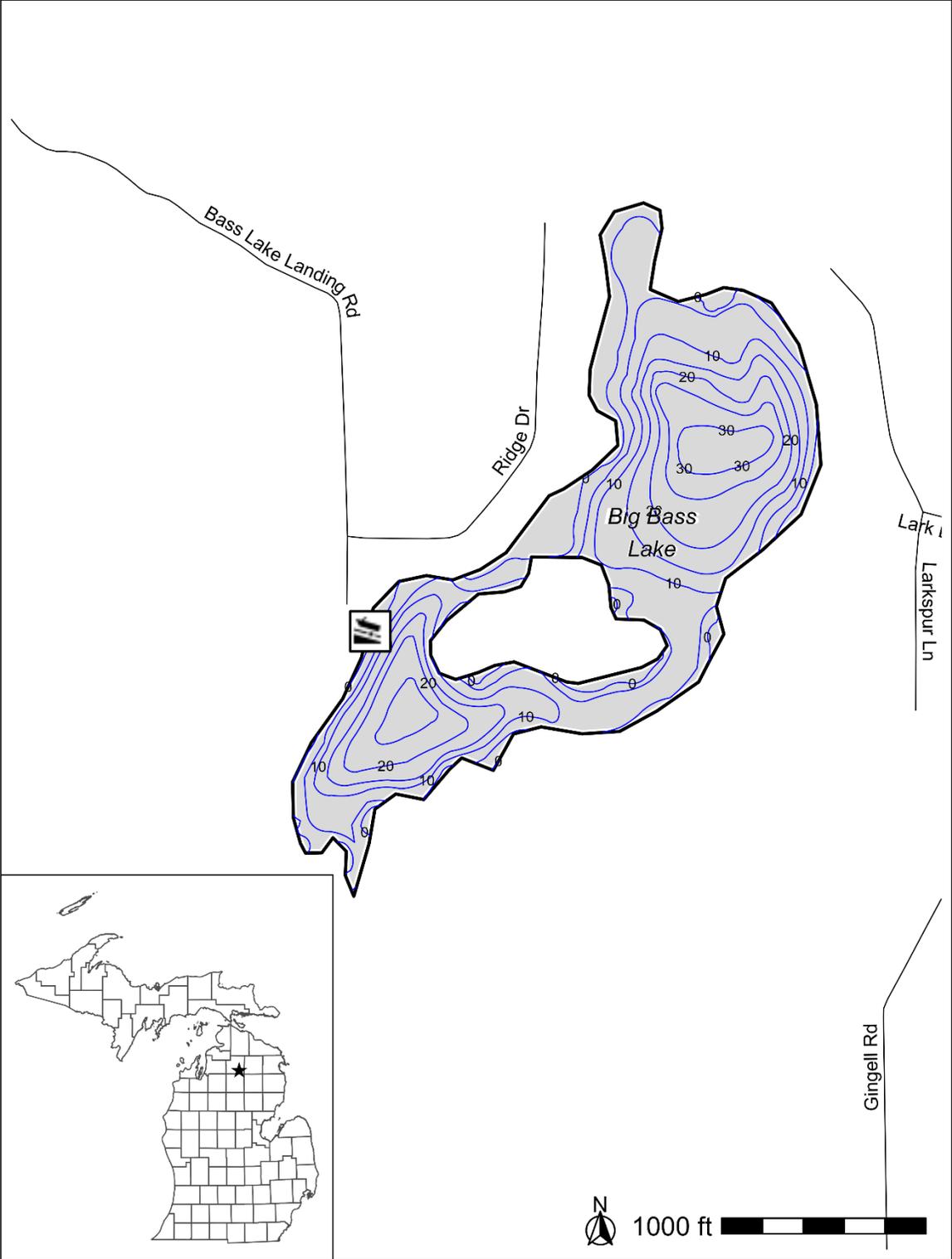


Figure 1. Bathymetric map of Big Bass Lake, Otsego County, Michigan.

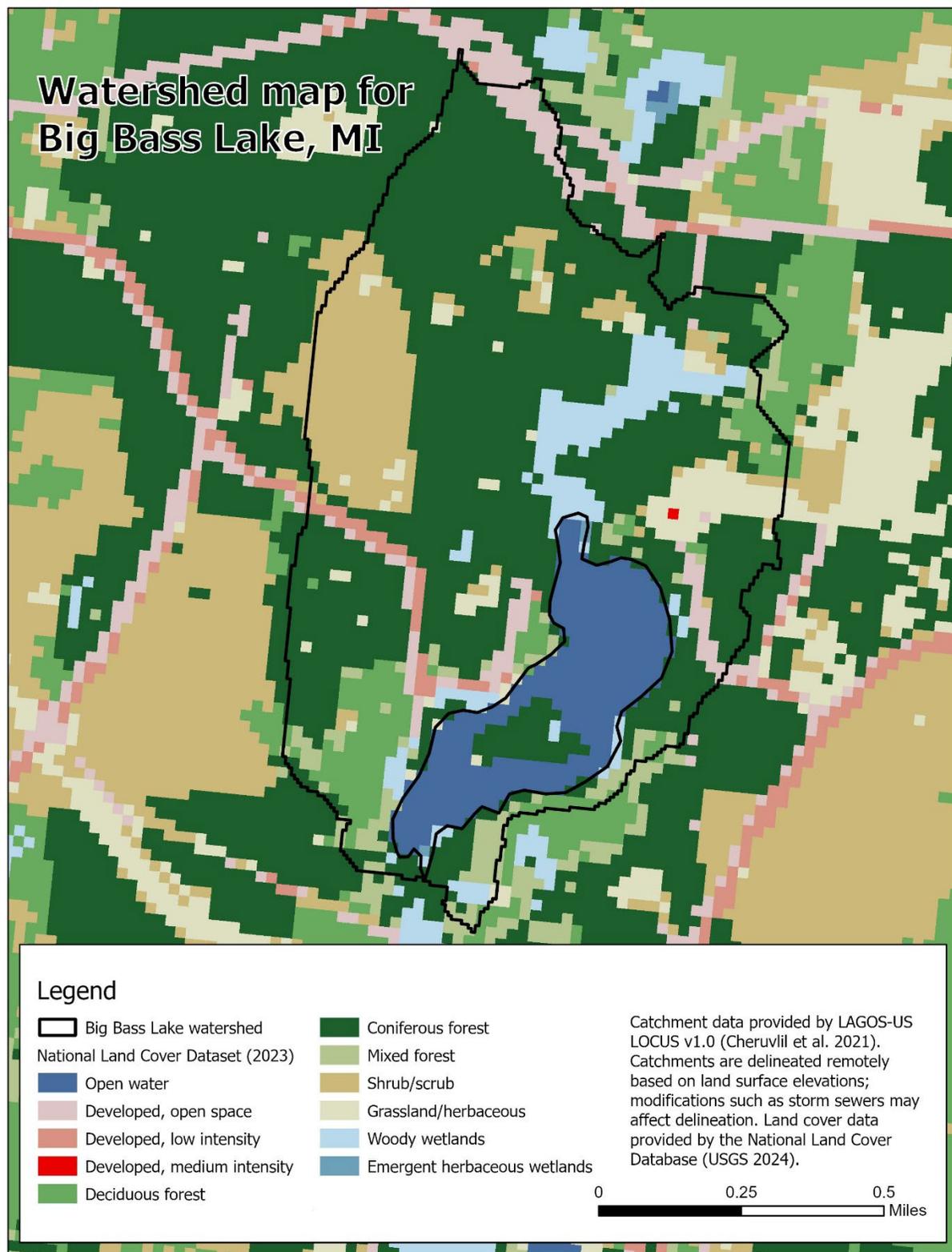


Figure 2. Land cover and catchment area (solid black line) map Big Bass Lake, Otsego County, Michigan (Cheruvilil et al. 2021 and Dewitz 2019).

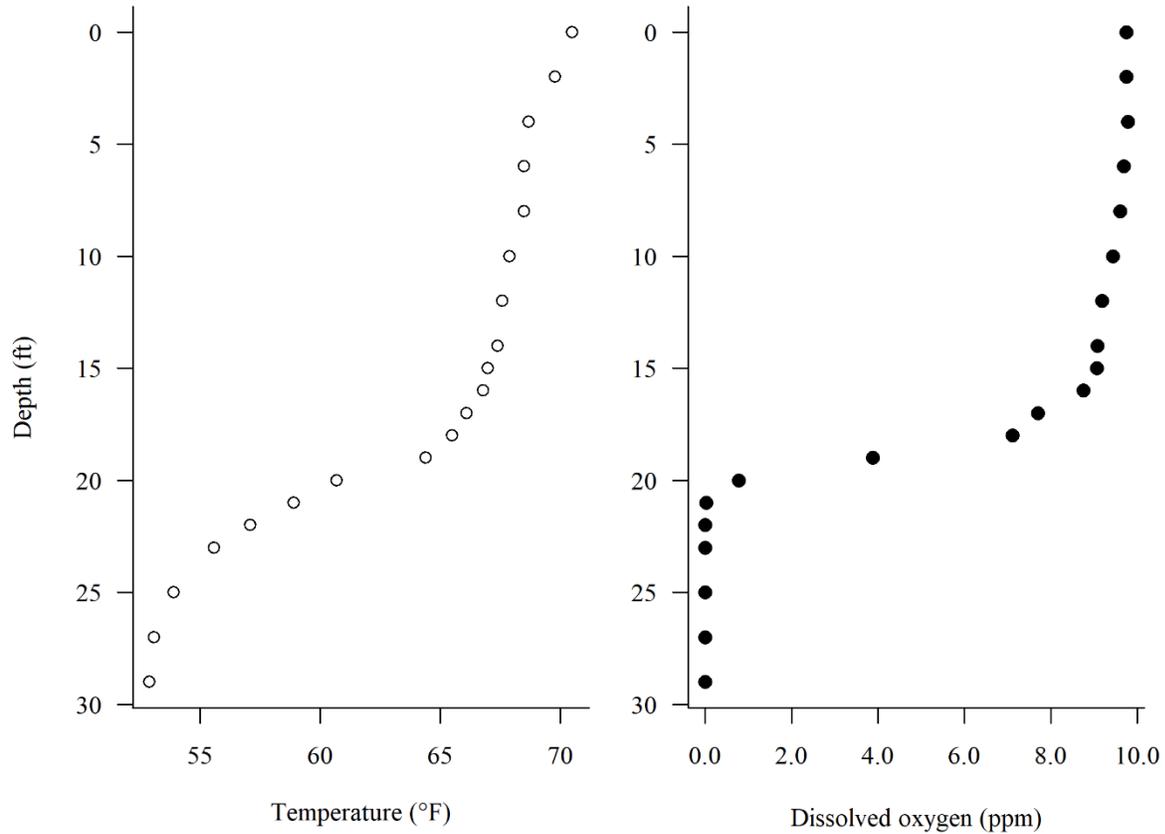


Figure 3. Temperature (open circles) and dissolved oxygen (filled circles) profiles collected September 2, 2025, from the deepest portion of Big Bass Lake. Profile indicates late-summer stratification with hypolimnetic oxygen depletion.

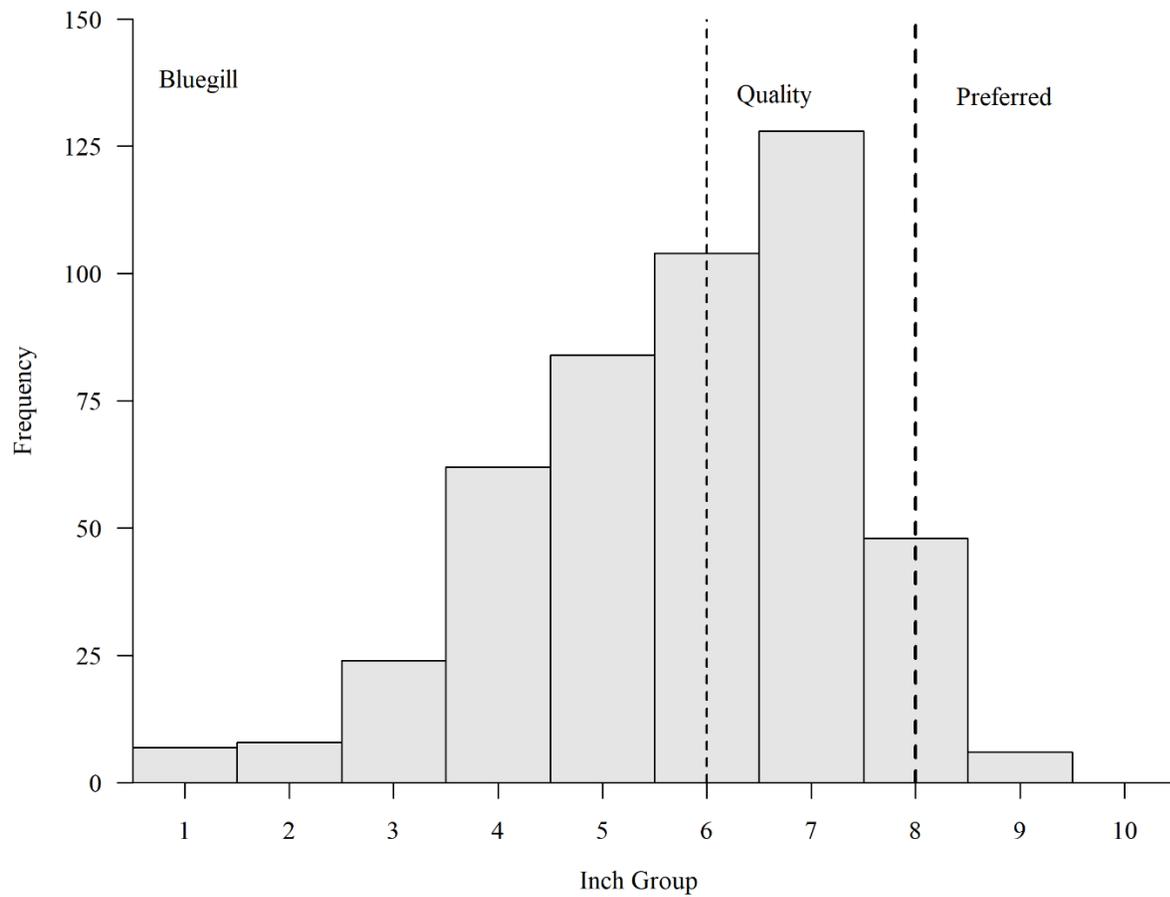


Figure 4. Length-frequency distribution of Bluegill collected during the 2025 survey at Big Bass Lake. Vertical lines indicate standard quality-size and preferred-size benchmarks used to evaluate fish size structure.

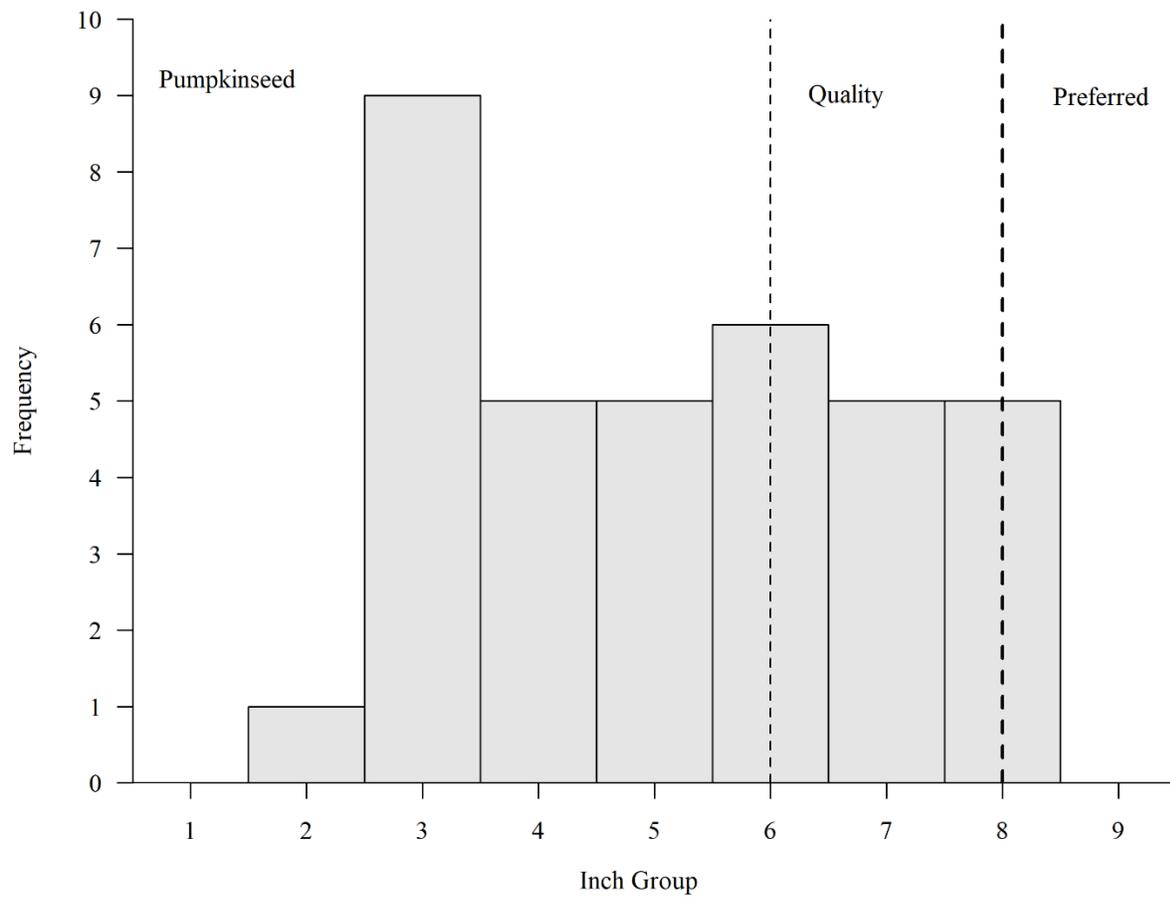


Figure 5. Length-frequency distribution of Pumpkinseed collected during the 2025 survey at Big Bass Lake. Vertical lines indicate standard quality-size and preferred-size benchmarks used to evaluate fish size structure.

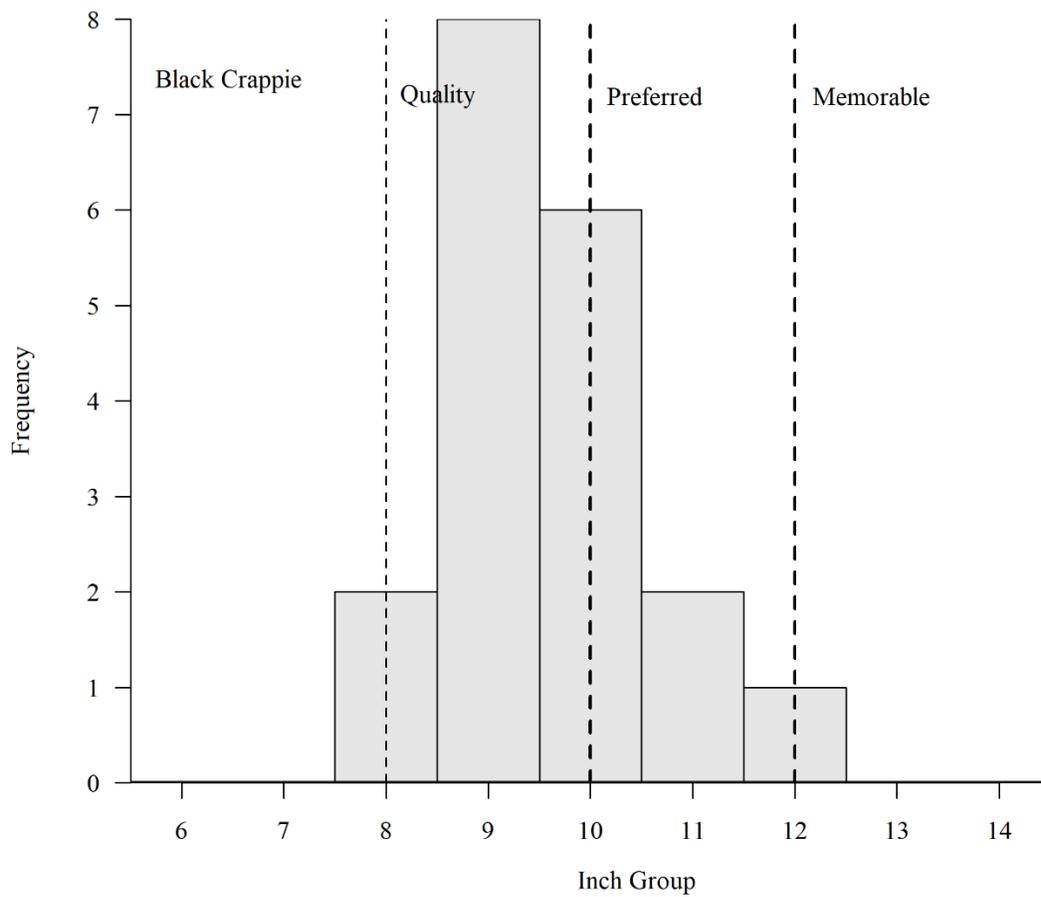


Figure 6. Length-frequency distribution of Black Crappie collected during the 2025 survey at Big Bass Lake. Vertical lines indicate standard quality-size and preferred-size benchmarks used to evaluate fish size structure.

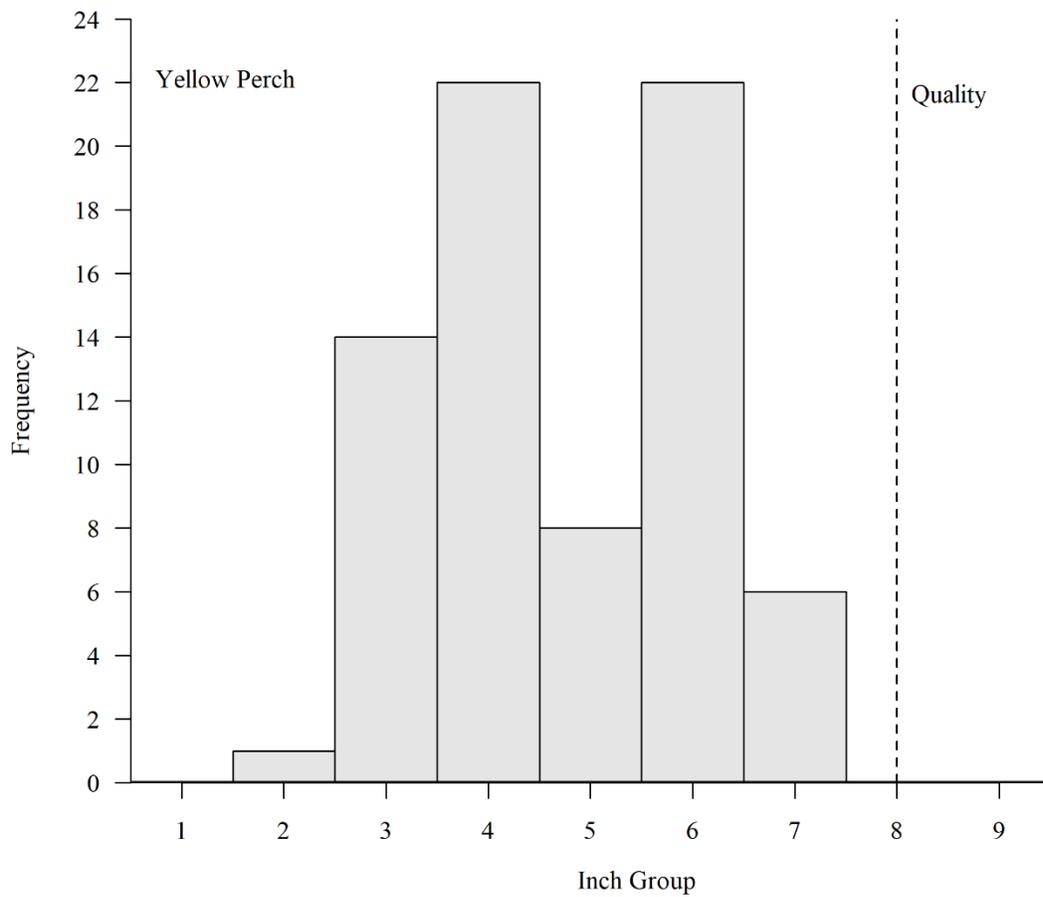


Figure 7. Length-frequency distribution of Yellow Perch collected during the 2025 survey at Big Bass Lake. Vertical dashed line indicates standard quality-size benchmark used to evaluate fish size structure.

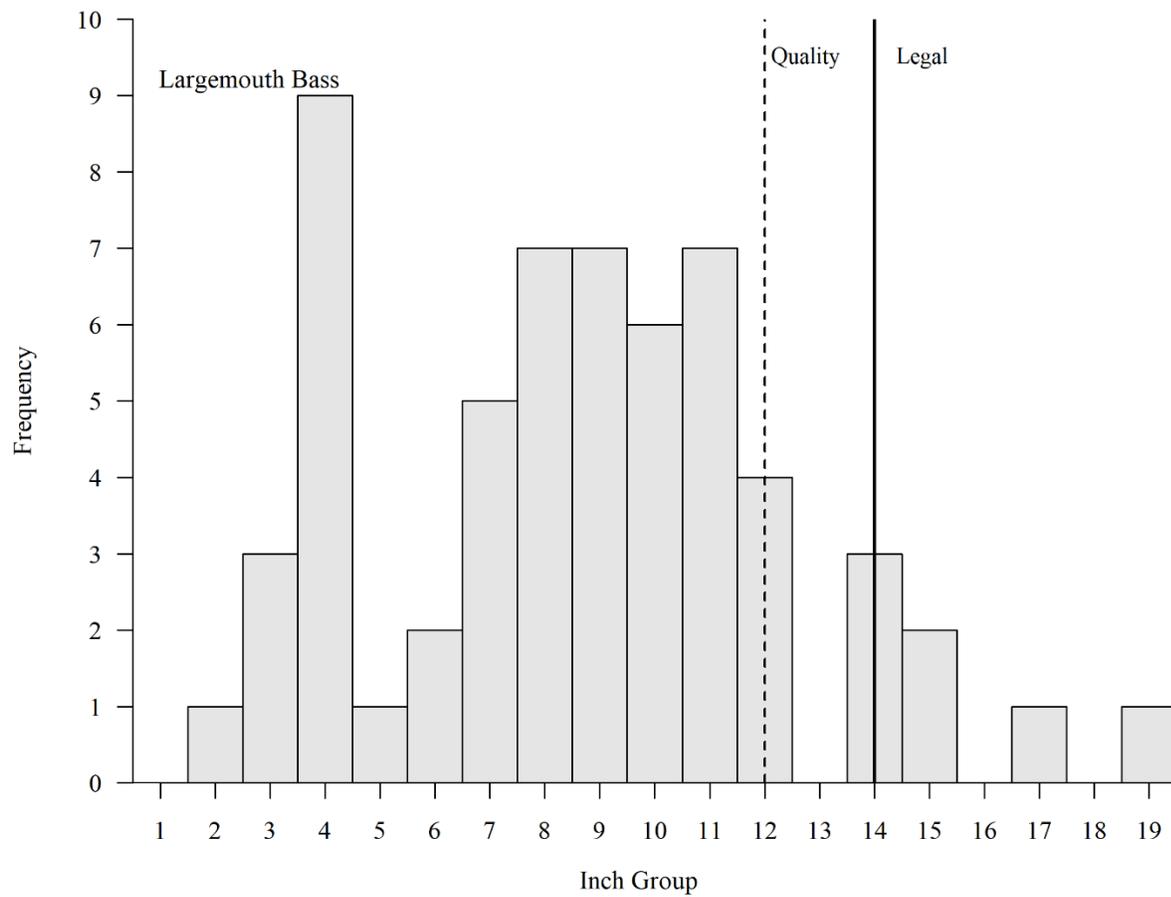


Figure 8. Length-frequency distribution of Largemouth Bass collected during the 2025 survey at Big Bass Lake. Vertical lines indicate standard size benchmarks used to evaluate size structure, including the quality-size (dashed lines) and minimum legal-size limit (solid line).

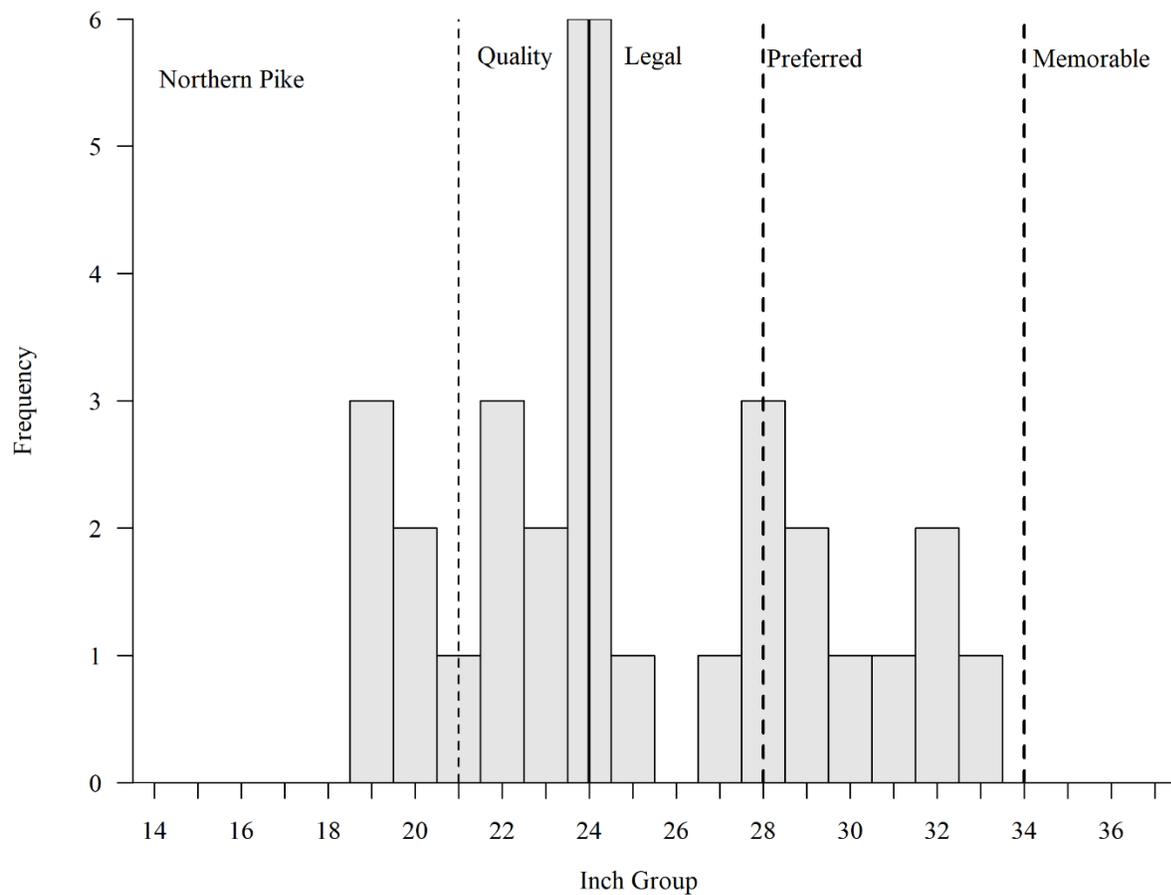


Figure 9. Length-frequency distribution of Northern Pike collected during the 2025 survey at Big Bass Lake. Vertical lines indicate standard size benchmarks used to evaluate size structure, including the minimum legal-size limit (solid line) and quality, preferred, and memorable size thresholds (dashed lines).

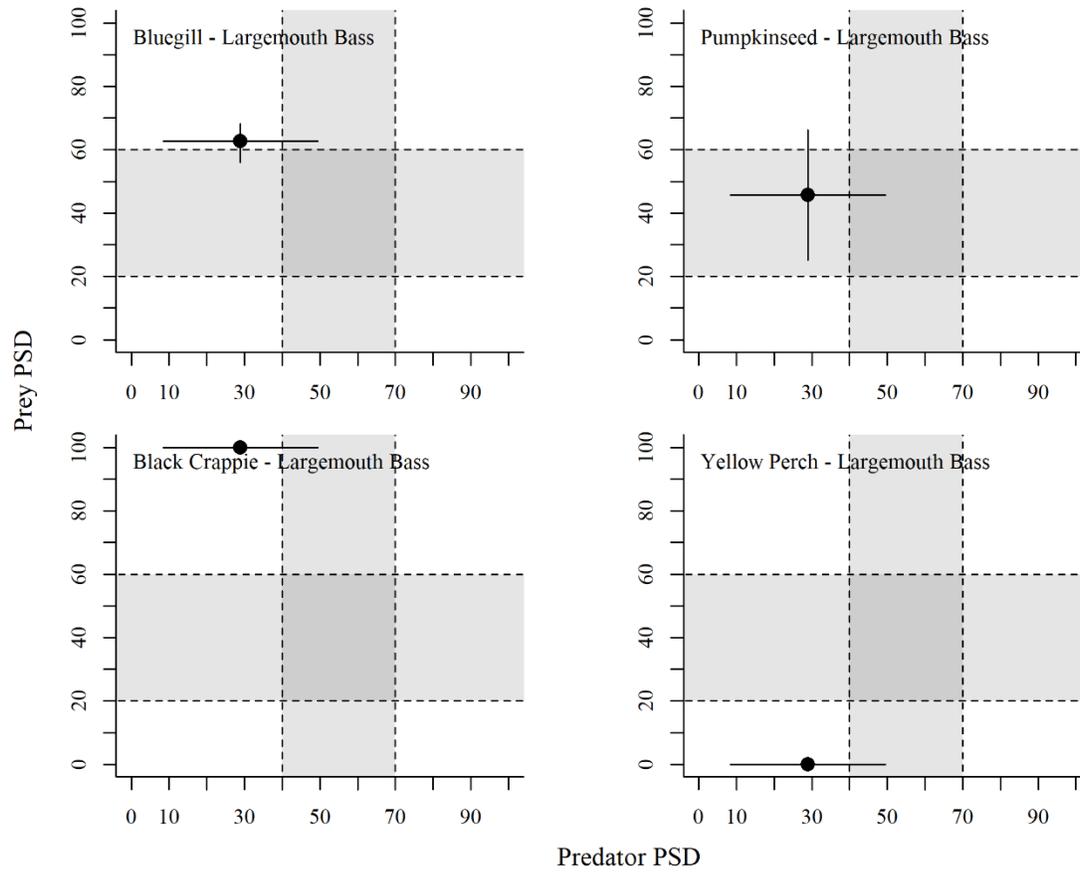


Figure 10. Largemouth bass predator-prey size structure in Big Bass Lake based on fish collected during the 2025 survey. Shaded target ranges represent balanced size structure.

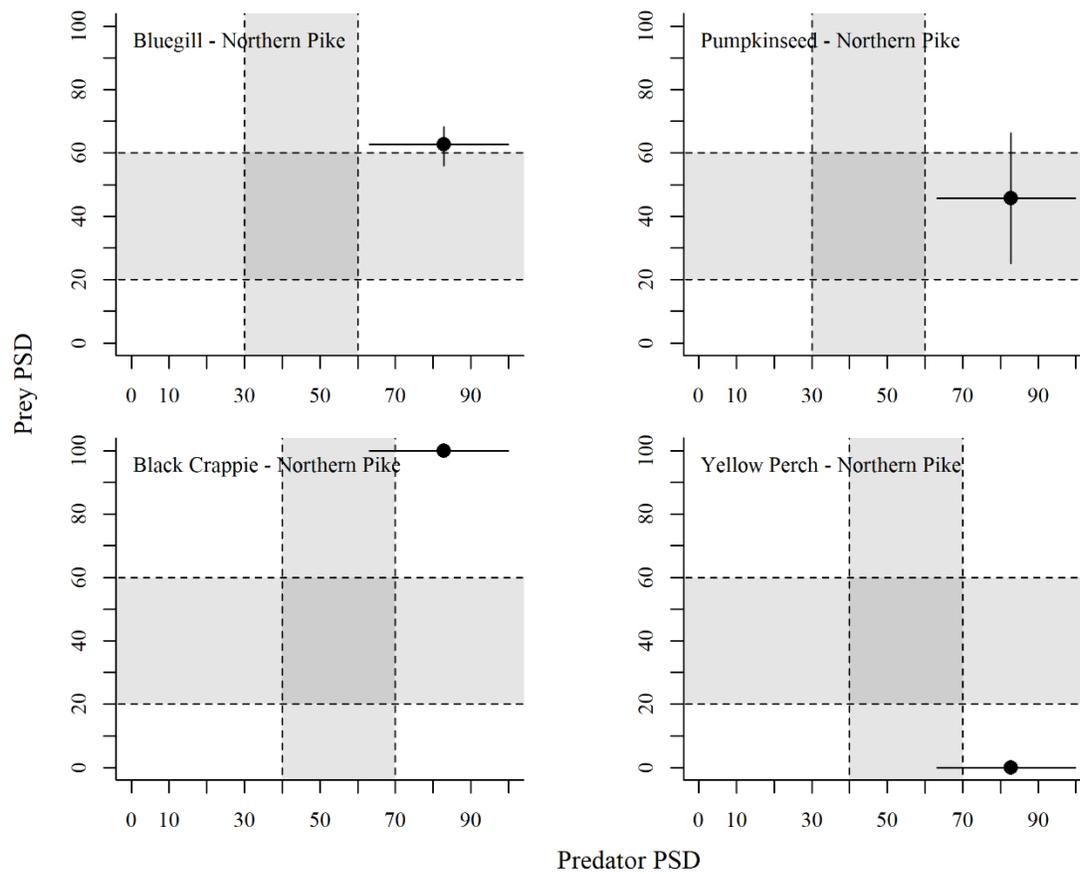


Figure 11. Northern pike predator–prey size structure in Big Bass Lake based on fish collected during the 2025 survey. Shaded target ranges represent balanced size structure.

**Literature Path**

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