2024 COMPREHENSIVE SURVEY REPORT

WATER: FAY LAKE COUNTY: Fflorence

INTRODUCTION AND SURVEY OBJECTIVES

The Wisconsin Department of Natural Resources conducted a comprehensive survey of Fay Lake, Florence County, to analyze the health of its fishery. A comprehensive survey includes surveys designed to assess abundance, size structure, and recruitment of all the major fish populations within the lake; for species specific survey details see the table below. The summary that follows will detail the current fishery, as well as the bullhead removal efforts as part of the walleye rehabilitation project. Fay Lake is located approximately 2 miles northeast of Long Lake with boat access to Fay Lake off of Fay Lake Landing Road. This survey was a collaborative effort with the US Forest Service.

Acres: 282 Shoreline Miles: 4.5 Maximum Depth (feet): 10
Lake Type: Drainage Lake Class: Complex-Cool-Dark Public Access: Boat Landing
Regulations: Statewide Regulations

WISCONSIN DNR CONTACT INFO.

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Summary of all surveys conducted during 2024

SURVEY INFORMATION

Species	Survey Date(s)	Gear Used	Effort	Water Temp. (°F)
Walleye, Northern Pike, Yellow Perch, Black Crappie	3/18-4/5/2024	Fyke Net	21 Net-Nights	38-40
Walleye, Northern Pike, Yellow Perch, Black Crappie	4/5-8/2024	Fyke Net	20 Net-Nights	43
Walleye	4/8/2024	Boomshocker	3.6 miles	44
Bullhead	4/29-5/13/2024	Fyke Net	161 Net-Nights	51-60
Largemouth Bass, Bullhead	6/3/2024	Boomshocker	3.6 miles	67
Bluegill, Pumpkinseed, Lepomis hybrids, Bullhead	6/3-6/2024	Fyke Net	12 Net-Nights	68-69
Bullhead	6/6-14/2024	Fyke Net	56 Net-Nights	64-70

FISH METRIC DESCRIPTIONS

Population estimate (PE) is estimated by marking a portion of the population, then capturing another sample of fish and using the ratio of new fish : previously marked fish to estimate the number of fish that are in the population.

Catch per unit effort (CPUE) is the number of fish per mile (electrofishing) or per net-night (netting), and is used to index abundance when we are unable to get a population estimate.

Relative stock density (RSD) is an index used to describe size structure of fish populations. It is calculated by dividing the number of fish larger than a certain length by the number of stock size fish for a given species. Stock size is a length set for each species, and is used to offset potential large year classes of juvenile fish

Length frequency distribution (LFD) is a graphical representation of the number of fish captured by inch group. Smaller fish (or younger age classes) may not always be represented in the length frequency due to different habitat usage or sampling gear limitations.

SURVEY METHODS

- Surveys are designed to evaluate each species when they are particularly vulnerable to our gear.
- Standard fyke nets and electrofishing gear is used to capture fish.
- Data is collected from the target species of each survey to gather population metrics.
- Fish metrics are compared to previous surveys of this water and the mean/median values for waters in this “area” (Florence and Forest Counties).
- Data collected is used to monitor the fishery, determine if stocking is necessary, evaluate fishing regulations, and determine how to improve the fishery.

GEAR USED DURING THIS SURVEY

- **Fyke Nets** are set in areas where we anticipate fish to congregate. Fish traveling along the shoreline will be met by a “lead” which is similar to a fence. The lead directs the fish toward the trap end of the net, fish travel through a series of funnels and eventually become trapped. Fish are then removed from the net and placed in holding tanks to gather data before being returned to the lake.

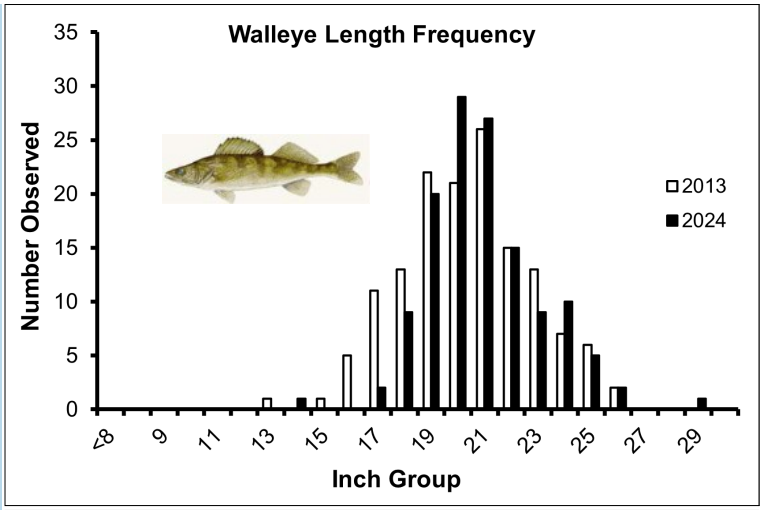
- **Boomshocker** is a specially designed boat that creates an electric current in the water immediately in front of the boat. The boat is driven along the shoreline and shallow areas of the lake, when the boat encounters fish they are momentarily stunned. Once the fish is stunned they can be netted out of the lake and placed in a holding tank. After data is collected the fish are returned to the lake.

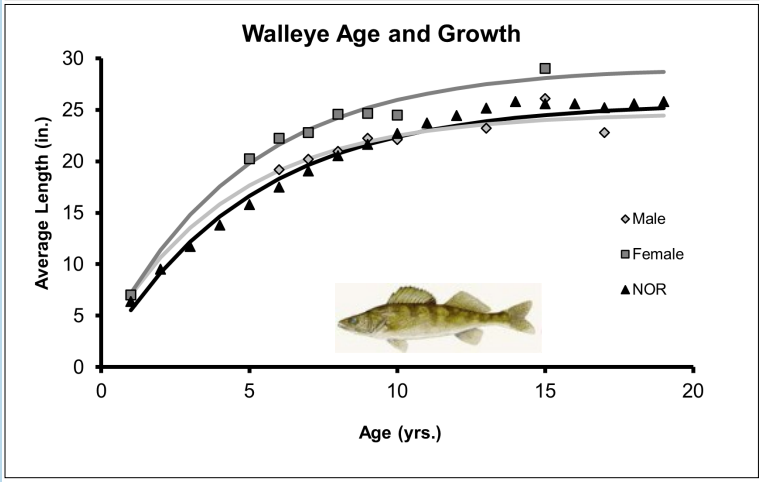
WALLEYE

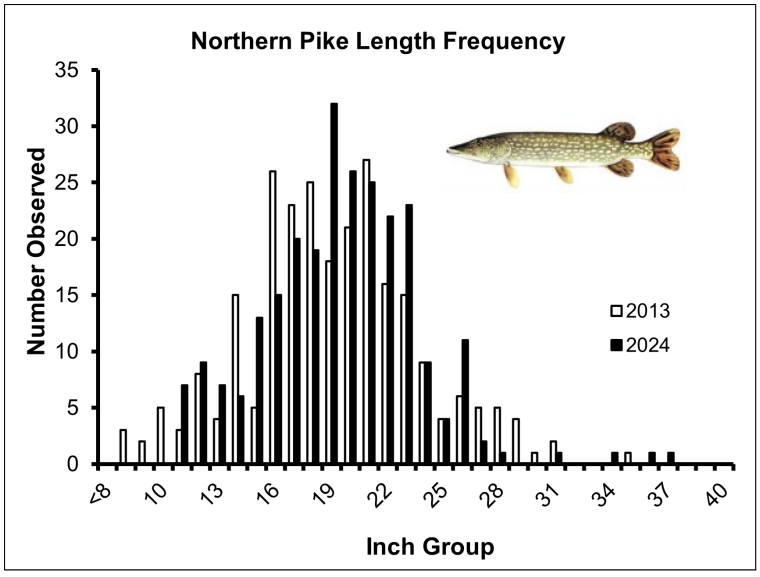
During 2024 a mark-recapture survey was conducted to estimate the abundance of adult walleye in Fay Lake. Nets were initially set on 3/18/2024 and run until 3/21/2024 when cold weather and reforming ice forced nets to be collapsed. Netting efforts were postponed until nets were able to be reset on 4/2 or 4/5/2024 depending on ice conditions at net locations. All nets were reset by 4/5/2024 allowing for standard netting efforts to resume. Nets were fished until 4/8/2024. During early spring netting, a total of 126 walleye (all adults) were caught and marked with an identifiable fin clip. On 4/8/2025, an electrofishing survey was conducted along the majority of the shoreline of Fay Lake. During this survey, 32 adult walleye were caught, with 29 of them (90.1%) having been caught during the fyke netting survey. Given this data, we estimate the adult walleye population of Fay Lake to be 138 fish (0.49 adults/acre). Walleye abundance in Fay Lake has decreased since the previous survey in 2013 (0.75 adults/acre), despite large fingerling walleye being stocked every other year at a rate of 10/acre. Fay Lake has poor walleye abundance and is well below the area average of 1.57 adults/acre. Relative abundance was above the median for the lake class (6.25 fish/net-night; median of 4.27 fish/net-night).

All walleye captured during the mark-recapture survey, a total of 130 different fish, were measured and used for size structure analysis. The walleye size structure of Fay Lake is very high, with 99.2% being ≥ 15 inches, 75.4% ≥ 20 inches, and 13.9% ≥ 24 inches. Size structure has increased slightly since 2013 (99.3%, 62.9%, and 10.5% ≥ 15, 20, and 24 inches, respectively). The increase is likely associated with the decreased adult walleye abundance. This size structure is well above the area average of 84.5% ≥ 15 inches, 40.5% ≥ 20 inches, and 10.5% ≥ 24 inches. Although a favorable size structure for anglers, the lack of shorter fish indicates a continued recruitment issue. A length frequency figure can be seen to the upper right. Although not included in the size structure analysis as it was not caught in the mark-recapture survey, walleye up to 30.5 inches were captured during other netting surveys (see picture on page 5).

Age and growth analysis was conducted for walleye in Fay Lake in 2024. Female walleye grew faster than the Northern Region of Wisconsin combined sex average (NOR; see figure on the right). Males grew similarly to the regional average, though slower at older ages. This is typical of walleye populations, as female walleye grow larger and faster than males. The oldest walleye observed in Fay Lake were age-17. Most walleye were age-6 to age-9. No walleye observed were younger than age-5.







NORTHERN PIKE

A mark-recapture population estimate was also conducted on northern pike concurrent with the walleye survey. During this survey a total of 126 different adult northern pike were captured and marked with an identifiable fin clip between 3/19 and 4/1/2024. Recapture efforts ran from 4/2-9/2024, and during this time 136 adult northern pike were captured, with 14 of them having been captured previously. Based on this data we estimate the adult northern pike population to be 1,367, or 4.85 adults/acre. Northern pike are the dominant gamefish in Fay Lake. Adult northern pike abundance has decreased slightly since 2013 when abundance was 5.27 adults/acre, however, the current population in Fay Lake is still well above the area average of 3.38 adults/acre and is considered abundant. Northern pike were captured at a relative abundance of 3.55 fish/net-night, which is above the 75 percentile for the lake class of 3.38 fish/net-night.

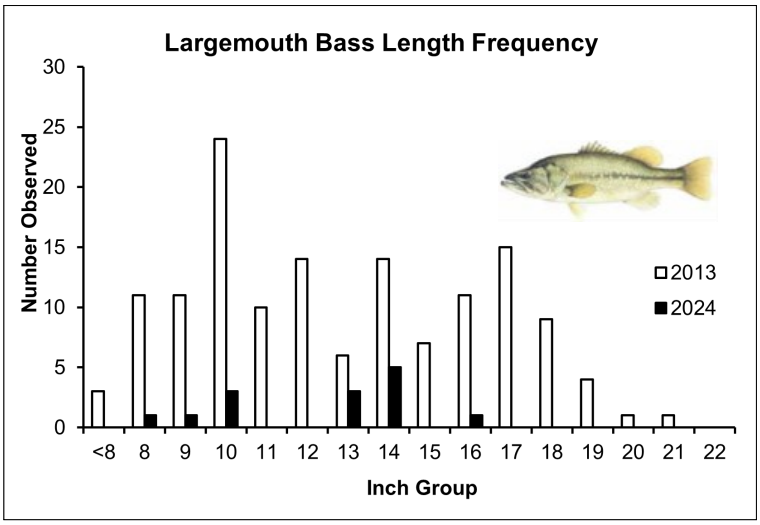
Every northern pike captured during the spring fyke netting efforts was measured to assess size structure. After removing all northern pike shorter than 14 inches, the remaining 232 fish were used for size structure analysis. Of the sample, 43.5% were ≥ 21 inches and 2.2% were ≥ 28 inches. This is relatively similar to the 2013 survey (41.7% ≥ 21 inches and 5.7% ≥ 28 inches. A length frequency figure comparing the surveys can be seen to the left. Fay Lake has a lower size structure than the area average (46.9% ≥ 21 inches and 9.7% ≥ 28 inches) which is expected with its above average northern pike abundance.

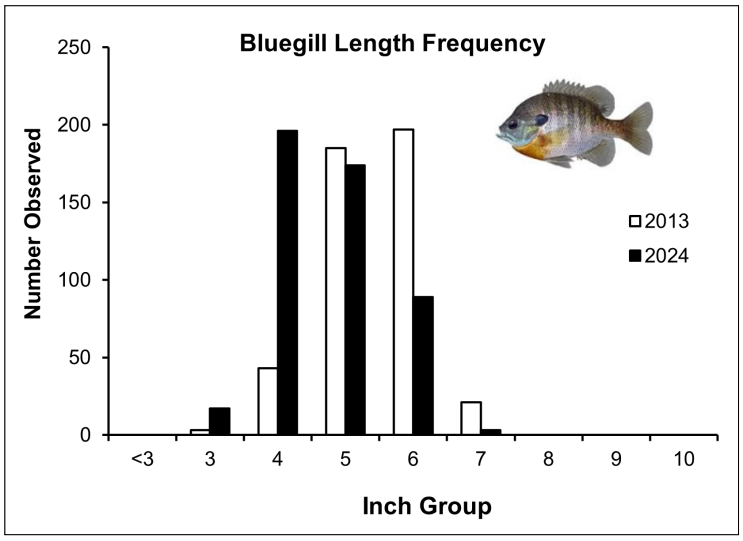
Northern pike growth was assessed in 2013 and we found that northern pike growth was slower than the regional average, especially after age-3. Females grew faster than males after age-3, which is expected in northern pike, but even the females in Fay Lake grew slower than the combined sex regional average. Although the 2024 age and growth analysis was not as detailed as the 2013 analysis, it continued to show slow growth of northern pike.

LARGEMOUTH BASS

On the night of 6/3/2024, an electrofishing survey was conducted along the majority of the shoreline to assess the largemouth bass population of Fay Lake. During this survey a total of 14 largemouth bass were captured (all adults), for a relative abundance of 3.9 adults/mile. Largemouth bass relative abundance has declined in Fay Lake since the 2013 survey when they were captured at a rate of 4.6 adults/mile. This decline is expected with a major winterkill occurring on Fay Lake in 2013-2014, as well as potential minor winterkills before installation of the aeration unit. This is well below the area average largemouth bass relative abundance of 17.0 adults/mile, as well as the lake class median of 5.4 fish/mile.

Not enough largemouth bass were collected to conduct comparative size structure analysis on the population. The largemouth bass captured ranged in size from 8.5 inches to 16.4 inches. Only 1 fish was ≥ 15 inches while the majority were in the 13.0-14.9 inch range. The largemouth bass in Fay Lake had much greater size structure in 2013, shown in the length frequency figure to the right, when 44.9% of the bass surveyed were ≥ 14 inches and 10.9% were ≥ 18 inches.





BLUEGILL

The bluegill population in Fay Lake was assessed during the 6/3-6/2024 fyke netting survey. During this survey we captured 1639 bluegill for a relative abundance of 136.6/net-night. Bluegill abundance has increased in Fay Lake since 2013, as the previous survey's bluegill relative abundance was 94.9 fish/net-night. Fay Lake is considered to have an abundant bluegill population as the area average is 65.6 fish/net-night.

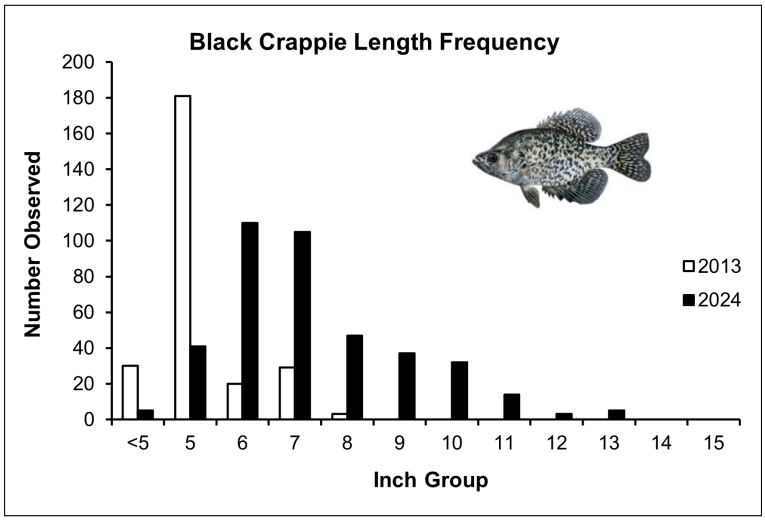
A random subsample of 479 bluegill captured during the 2024 panfish fyke netting survey were measured for size structure analysis of the Fay Lake bluegill population. Of the fish measured, 19.2% were ≥ 6 inches while 0.6% were ≥ 7 inches. No bluegill measured were ≥ 8 inches. The bluegill size structure in Fay Lake has decreased since the previous survey in 2013 when 48.6% of the bluegill measured were ≥ 6 inches and 4.7% were ≥ 7 inches. Similarly, however, none measured in 2013 were ≥ 8 inches. This decrease in size structure is expected with the increased bluegill abundance. The bluegill length frequency can be seen to the left. The bluegill size structure in Fay Lake is very low for the area, with an average of 61.6% ≥ 6 inches, 31.1% ≥ 7 inches, and 9.4% ≥ 8 inches.

Bluegill age and growth was evaluated in 2024. Bluegill grew faster than the Northern Region of Wisconsin average until age-4, when growth then slowed below the average. No fish were aged older than 5. This growth rate in early years is surprising given the abundance of this population.

BLACK CRAPPIE

Black crappie abundance was assessed during the early spring fyke netting efforts from 4/5-8/2024. A total of 57 black crappie were caught during this survey for a relative abundance of 2.85 fish/net-night. This is a significant decrease from the 2013 survey when black crappie were caught at a rate of 339.8 fish/net-night during the early spring fyke netting. Black crappie relative abundance is low compared to the area average for this survey (5.84 fish/net-night). The highest black crappie relative abundance during 2024 was observed during the late spring panfish netting survey, when black crappie were caught at a rate of 8.5 fish/net-night. It's uncommon for black crappie relative abundance to increase during the late spring survey, so it's possible that our relative abundance estimate may not accurately depict the population, although it's apparent that the population has declined significantly since 2013. Fish behavior near ice-out may have also been affected by the strange spring warming pattern which may have influenced our survey accuracy. Black crappie populations are very cyclic in nature and it's not uncommon to see changes in abundance.

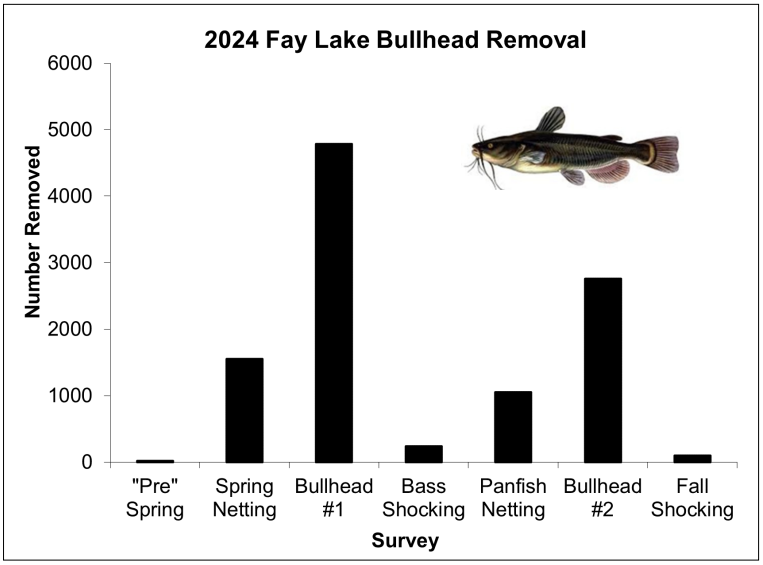
All black crappie captured during the 4/5-8/2024 spring netting, as well as all black crappie captured during the netting from 4/29-5/8/2024 targeting bullhead, were measured to assess size structure. In total, 399 black crappie were measured. After removing all fish less than 5 inches, 35.0% of the sample was ≥ 8 inches, while 13.7% was ≥ 10 inches. Size structure has increased significantly from 2013, when only 1.3% of the black crappie were ≥ 8 inches, and no black crappie were ≥ 10 inches. Current size structure is lower than the area average of 62.4% ≥ 8 inches and 19.9% ≥ 10 inches. It's likely that the black crappie population in 2013 was dominated by one year class. The increase in size structure is expected with the decrease in abundance. A length frequency of the measured black crappie can be seen to the right.

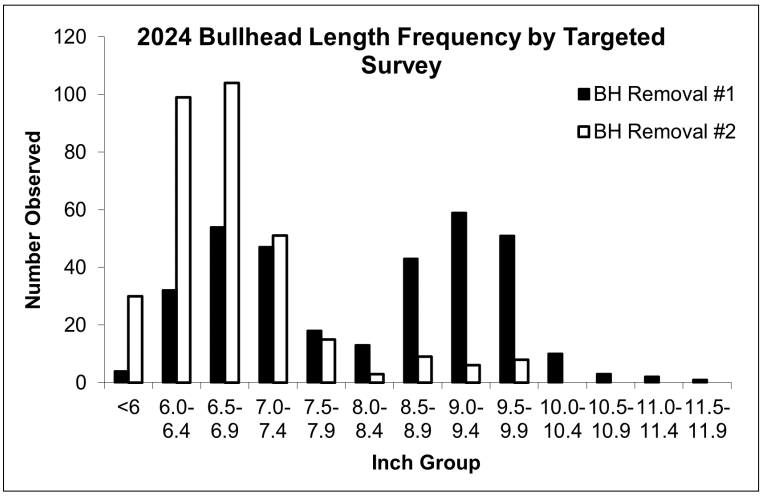


BULLHEAD

Prior to the 2024 comprehensive survey, Fay Lake was known to have an overabundance of bullhead (33 fish/net-night in 2013). Fay Lake contains all three bullhead species (black, yellow, and brown), with yellow bullhead being the most abundant species. Unless specified by species, "bullhead" refers to the combination of the three species. Bullhead are native to Fay Lake, and due to the lakes shallow nature, productivity, and history of winterkill, it's a system that can promote bullhead populations. Since the lake is currently managed as a walleye lake and has poor survival of stocked walleye, especially in recent years, the lake was a candidate for bullhead removal efforts. Bullhead have been found to limit walleye natural recruitment and can lead to declines in other fish species through both predation and competition for resources. Through an agreement with the Fay Lake Association, the WDNR agreed to reduce the bullhead population and in return the Fay Lake Association would operate and maintain an aeration unit to minimize winterkill. To accomplish this, all bullheads captured during standard surveys were removed, and additional netting surveys were conducted for increased effort towards bullhead removal.

During the 2024 comprehensive survey, a total of 10,490 bullhead were removed, weighing an estimated 2,509.6 pounds. This equates to approximately 37.2 bullhead removed per acre. A more detailed summary of bullhead removed can be seen in the figure to the upper right. Bullhead abundance in Fay Lake increased from 33.0 fish/net-night in 2013 to 77.5 fish/net-night in 2024 during early spring walleye netting. Random samples were measured across all netting periods to assess the size structure of the bullhead population in Fay Lake. A total of 773 bullhead were measured. After removing all bullhead < 6 inches for analysis, 21.0% of the remaining sample was ≥ 9 inches. No bullhead measured were ≥ 12 inches. A length frequency graph comparing bullhead sizes between the two 2024 targeted netting surveys can be seen on the right. This is a relatively low size structure of bullhead, which is common with over-abundant populations. Size structure has declined since 2013, when 62.9% were ≥ 9 inches and 3.8% were ≥ 12 inches. The size structure comparison between the 2013 and 2024 surveys can be seen below.





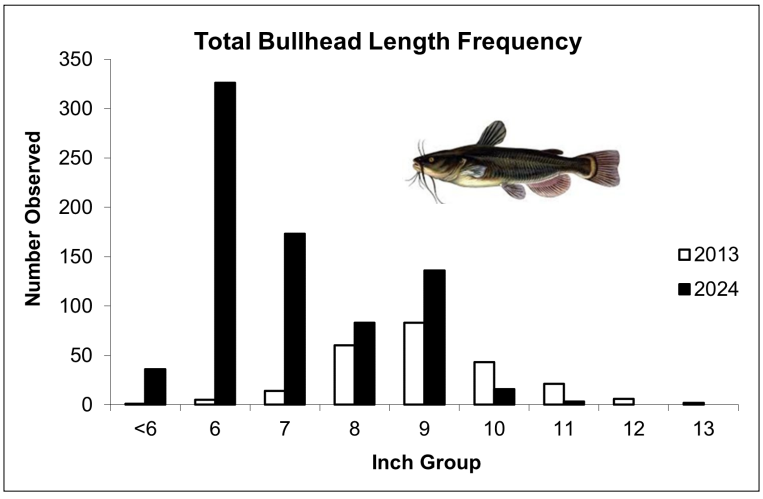
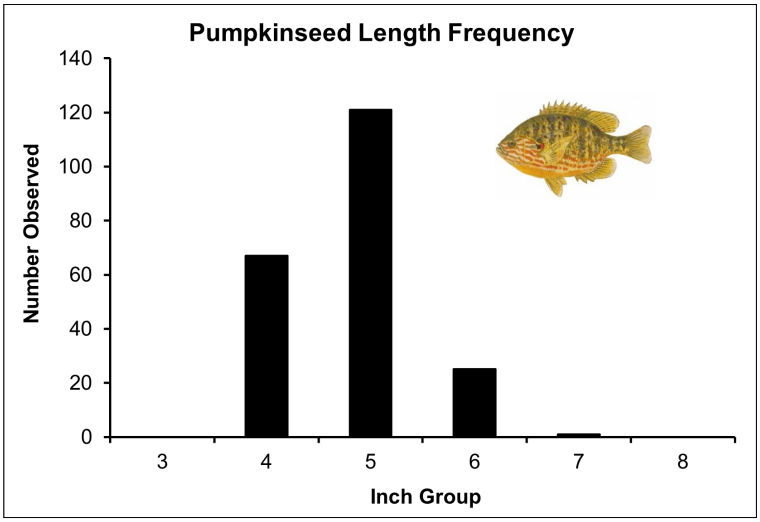


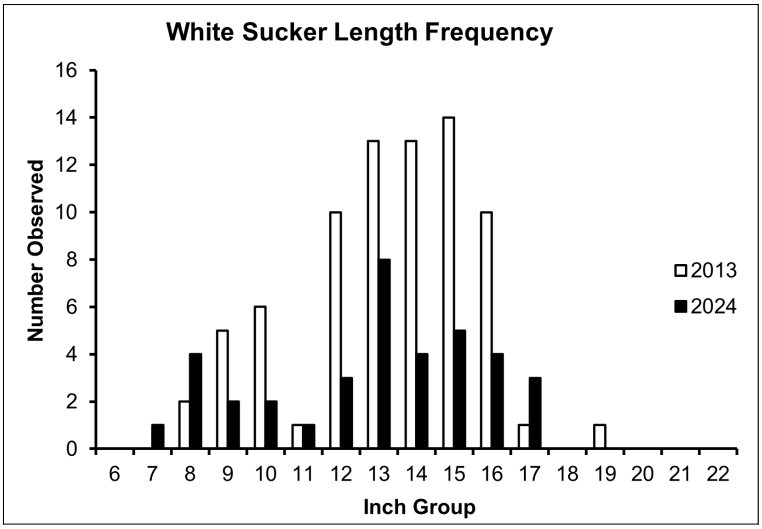

Photo Credit: Wisconsin DNR

Fay Lake bullhead abundance was greatly reduced by the bullhead removal project. Despite this, bullhead are capable of compensatory recruitment and can have large year classes should resources allow. The winter aeration system is a pivotal component of the bullhead removal as to not allow for a winterkill situation in which bullhead are afforded an abundance of resources due to their resilience and ability to persist with low dissolved oxygen. We thank the Fay Lake Lake Association for their continued efforts to keeping bullhead numbers down. We encourage harvest of bullheads in Fay Lake, and the WDNR will be continuing bullhead removal efforts in the near future, with plans for additional netting effort in 2026.

PUMPKINSEED

The pumpkinseed population was assessed during the same fyke netting survey as bluegill . A total of 792 pumpkinseed were captured during that survey for a relative abundance of 66.0 fish/net-night. A subsample of 214 pumpkinseed were measured for size structure analysis of the population. Of these, 12.1% were ≥ 6 inches, but only 1 fish (0.5%) was ≥ 7 inches. Like the other panfish species in Fay Lake, the pumpkinseed population has low size structure. The length frequency of the pumpkinseed can be seen to the right.





WHITE SUCKER

The Fay Lake white sucker population was assessed during the spring walleye fyke netting survey. Once the ice was completely off and netting resumed on April 5th, white sucker relative abundance was measured at 1.7 fish/net-night. This is a decrease from the 2013 survey (13.1 fish/net-night) but still slightly above the area average of 1.03 fish/net-night during this time. All 37 white sucker captured were measured and used for size structure analysis. 81.1% were ≥ 10 inches while 18.9% were ≥ 16 inches. This is a decrease in size structure from 2013 (90.8% and 15.8% ≥ 10 and 16 inches, respectively; see figure on left).

OTHER SPECIES

During the 2024 comprehensive survey of Fay Lake, 4 species of fish were captured which were not detailed in this summary. None of these species were caught in high abundance. The table below gives the relative abundance (catch/net-night) for each of these species across the different surveys. Species included in the table are muskellunge (MU), yellow perch (YP), bluegill x pumpkinseed hybrids (BxP), and golden shiner (GSH). Surveys which would exclude non-target species were not included in this table.

RELATIVE ABUNDANCE OF OTHER SPECIES (FISH/NET-NIGHT)

Survey	MU	YP	BxP	GSH
"Pre" Spring Netting (3/18—4/5/2024)	0	0.05	0	0
Spring Netting #1 (4/5—8/2024)	0	0	0	0
Bullhead Removal #1 (4/29—5/13/2024)	0.01	0.08	0.08	0
Spring Netting #3 (6/3—6/2024)	0	0.08	0.42	0.08

Note: The muskellunge captured during Bullhead Netting was a 43.4 inch male which was captured twice. This muskellunge was also captured in 2013 measuring 42.9 inches. This muskellunge was estimated to be 14 years old in 2013 which makes this fish 25 years old when captured in 2024.

SURVEY NOTES AND MANAGEMENT RECOMMENDATIONS

Fay Lake is a shallow, moderately developed, 282 acre lake in western Florence County, about 2 miles northeast of Long Lake. The lake has good angler access from the public boat launch on Fay Lake Landing Road. This comprehensive survey details all major fish species within the system and should provide an adequate picture to the shape and status of the fishery in its current state. This survey was a collaborative effort between the Wisconsin DNR and the US Forest Service.

Fay Lake is currently managed for walleyes. Despite regular stocking efforts, the walleye population has been on the decline in recent years. Adult walleye abundance has fallen under 0.5 fish/acre. Although abundance is low, the size structure of the fish is still desirable to anglers. Fay Lake is currently undergoing a biomanipulation and lake rehabilitation effort via bullhead removal and installation of an aeration system. Through these efforts the WDNR hopes to improve survival of stocked fish in the system. Fay Lake currently has no special regulations on walleye. The standard regulation currently protects more than 60% of the population and still allows for potential harvest opportunities of stocked fish. Given the current management goals for Fay Lake, this regulation is appropriate.

Fay Lake is currently getting stocked every two years at a rate of 10 large fingerling walleye/acre. Although current survival is low, it is too early in the rehabilitation process to determine the success of the efforts towards improving survival of stocked fish. Fay Lake should continue to be stocked at this rate until the next comprehensive survey. At this point, the walleye population should be reassessed to determine whether stocking success has improved and whether stocking should continue.

Fay Lake experienced a major winterkill during the 2013-2014 winter following the previous comprehensive survey, which greatly impacted the fish community. The largemouth bass population has drastically declined, however the population may be recovering in recent years. The panfish population is mostly comprised of small and abundant bluegill, although the black crappie population may provide an adequate angling opportunity. Anglers should note however that black crappie are naturally cyclic in their reproduction, and significant harvest during “boom” years may lead to extended stretches of low abundance. Northern pike and bullhead species are much more tolerant of low oxygen conditions during events like winterkills. Despite this, northern pike abundance has declined slightly since the previous survey. Northern pike abundance is still above average, and size structure is still below average. Bullhead got extremely abundant following the winterkill. Since the 2013-2014 winterkill, the WDNR has removed a great number of bullhead from Fay Lake in hopes that the reduced competition and predation by bullhead may enhance the fishery by allowing for better survival and growth of other species in the lake. The winter aeration system is a pivotal part in helping to keep the bullhead numbers down, and we thank the Fay Lake Association for their support and efforts towards this cause.

Fay Lake has no special regulations. All current regulations are appropriate.

Fay Lake is on an 11 year sampling rotation, and is currently scheduled for its next comprehensive survey in 2035.

The Wisconsin DNR conducted additional bullhead removal efforts in Fall 2025 and Spring 2026 which are not detailed in this summary. For information on these efforts, please contact the area fisheries biologists.

NOTABLE FISH CAPTURED IN THE 2024 COMPREHENSIVE SURVEY


Photo Credit: Wisconsin DNR


Photo Credit: Wisconsin DNR