# 2023-24 COMPREHENSIVE SURVEY REPORT

## WATER: SPREAD EAGLE CHAIN OF LAKES COUNTY: FLORENCE

## INTRODUCTION AND SURVEY OBJECTIVES

The Wisconsin Department of Natural Resources conducted a comprehensive survey of the Spread Eagle Chain of Lakes, Florence County, to analyze the health of its fishery. A comprehensive survey includes surveys designed to assess 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 changes observed in this fishery since 2011. The Spread Eagle Chain of Lakes is located between Florence, WI and Iron Mountain, MI, with boat access off of North Lake Road.

Acres: 548 Shoreline Miles: 14.8 Maximum Depth (feet): 75
Lake Type: Drainage Public Access: Boat Landing Lake Class: Complex - Cool - Clear
Regulations: ***Walleye***: 18"/ 3-bag ***Bass***: No Min (14-18" protected slot)/ 5-bag ***Panfish***: Seasonal 5/15

## WISCONSIN DNR CONTACT INFO.

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*Table 1. Summary of all surveys conducted during 2023*

**SURVEY INFORMATION**

| Species | Survey Date(s) | Gear Used | Effort | Water Temp. (°F) |
|---|---|---|---|---|
| Walleye, Northern Pike, Yellow Perch | 4/27-5/2/2023 | Fyke Net | 39 Net-Nights | 40-42 |
| Walleye (Recapture) | 5/2/2023 | Boomshocker | 9.83 miles | 40 |
| Muskellunge (Marking), Black Crappie | 5/7-5/18/2023 | Fyke Net | 113 Net-Nights | 50-63 |
| Largemouth and Smallmouth Bass | 6/1 and 6/5/2023 | Boomshocker | 15.36 miles | 71-75 |
| Bluegill, Pumpkinseed, Lepomis Hybrids, Rock Bass | 6/5-6/7/2023 | Fyke Net | 11 Net-Nights | 71-75 |
| Muskellunge (Recapture), Black Crappie | 4/17-4/25/2024 | Fyke Net | 61 Net-Nights | 47-49 |

## 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 to previously marked fish to estimate the number of fish 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 PE.

**Relative stock density (RSD)** is an index used to describe the 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.

*Photo Credit: Carl Sundberg*

- **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.

*Photo Credit: Wisconsin DNR*

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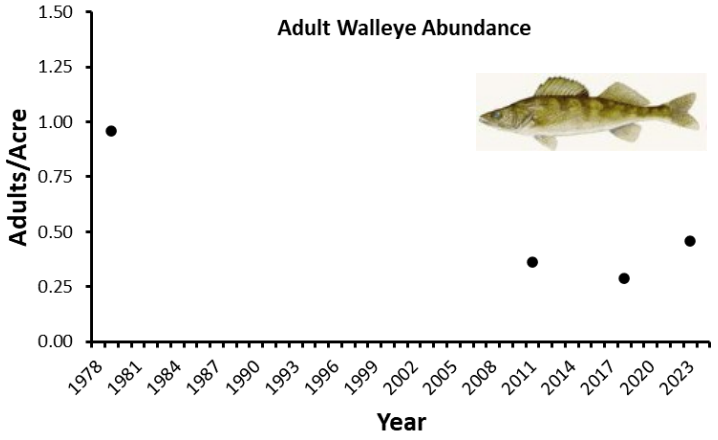
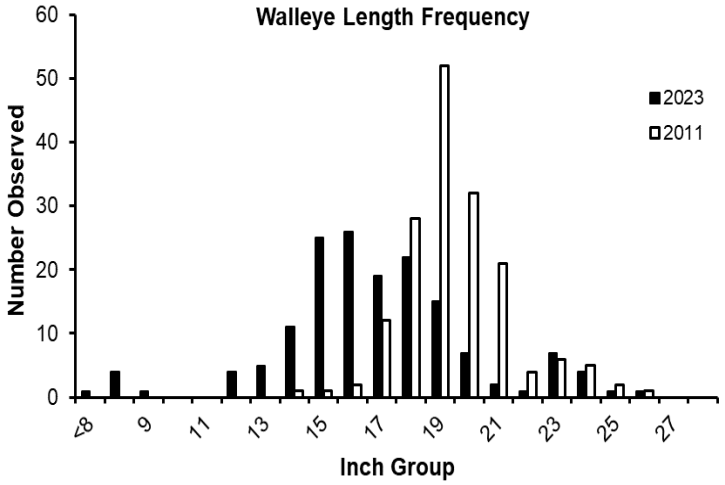
### WALLEYE

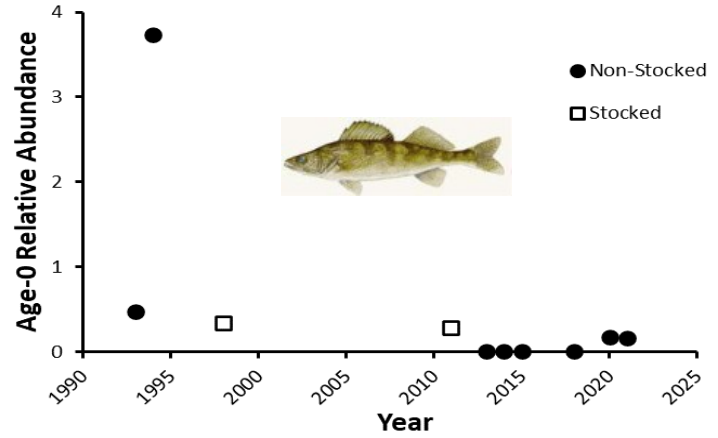
During 2023, a mark-recapture survey was conducted to estimate the abundance of adult walleye in the Spread Eagle Chain of Lakes. Fyke nets were set on 4/26/2023 and were fished until 5/2/2023 capturing a total of 104 adult walleye that were marked with a fin clip. On the night of 5/2/2023, an electrofishing survey was conducted along the majority of the shoreline capturing 74 adult walleye. Of those fish 30 (40.54%) were recaptures from the marking survey. Based on this survey data, we estimate the adult walleye population of the Spread Eagle Chain of Lakes to be approximately 254 walleye (0.46/acre). This is considered to be a low abundance population for the area, with the area average being 1.57 adult walleye/acre. Walleye catch per unit effort during the spring netting was 3.21 fish/net-night, which is slightly below the median for its lake class (3.68 fish/net-night). The adult walleye population of the Spread Eagle Chain of Lakes has increased from 0.36 adults/acre in 2011, and 0.29 adults/acre in 2018, as seen in the figure on the right.

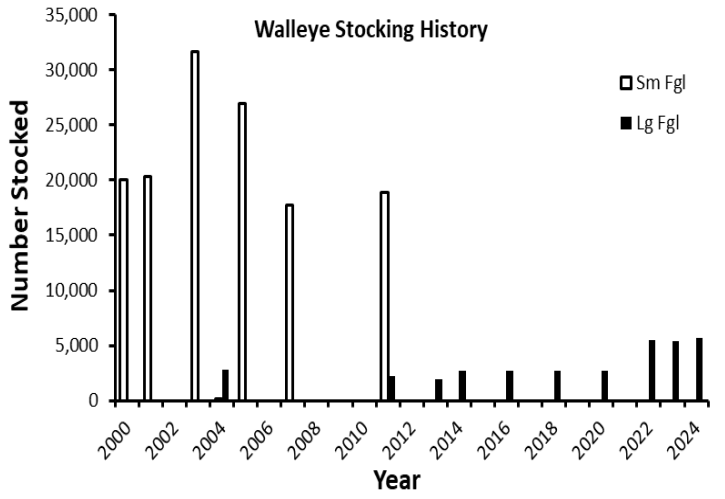



All walleye captured during this survey, a total of 156 fish, were measured to assess the population's size structure. The Spread Eagle Chain of Lakes population boasts an average- to below average-size structure when compared to the area average (table bottom right), with 86.7% of the captured walleye being ≥ 15 inches, and 15.3% being ≥ 20 inches. These values have decreased on the Spread Eagle Chain of Lakes from 99.4% and 42.5% in 2011, as seen in the bottom right, but have increased since 2018 (61.9% and 13.1%, respectively). A length frequency comparing the 2023 and 2011 walleye populations is shown to the left.

Recruitment is assessed using the number of age-0 walleye captured per mile during fall electrofishing surveys. The Spread Eagle Chain of Lakes has exhibited very low age-0 walleye numbers historically, as seen on the right. Typically, a fishery needs at least 1 strong year class (≥ 20 age-0 walleye per mile) every 5 years to maintain a healthy population. The Spread Eagle Chain of Lakes falls well below this mark, having rarely been surveyed above 1 age-0 fish per mile, indicating that this population is reliant on stocking. As the state of the fishery is changing, we will continue to assess recruitment in the coming years.




WDNR has stocked walleye during even numbered years since 2014, and recently the Lake Association has also been stocking, as seen in the figure on the lower left. In 2011, a shift was made from small fingerling walleyes (sm fgl) to large fingerling walleyes (lg fgl). Assessments are still being made as to whether stocking 35 small fingerling or 5 large fingerling walleye/acre creates a better walleye population. The current walleye management plan is to stock with large fingerling walleye biannually at a rate of 5 fish/acre, with the goal of reaching an abundance of 1.1-1.8 adults/acre by 2029.

| WALLEYE SIZE STRUCTURE - SECL, Florence County, 2011-2024 | | | | |
|---|---|---|---|---|
| | 2011 | 2018 | 2023 | Area Avg. |
| RSD15 | 99.40 | 61.68 | 86.67 | 84.51 |
| RSD18 | 90.42 | 25.23 | 40.00 | 58.79 |
| RSD20 | 42.51 | 13.08 | 15.33 | 40.52 |
| RSD24 | 4.79 | 3.74 | 4.00 | 10.54 |
| RSD28 | 0.00 | 0.93 | 0.00 | 0.57 |
| RSD30 | 0.00 | 0.00 | 0.00 | 0.00 |

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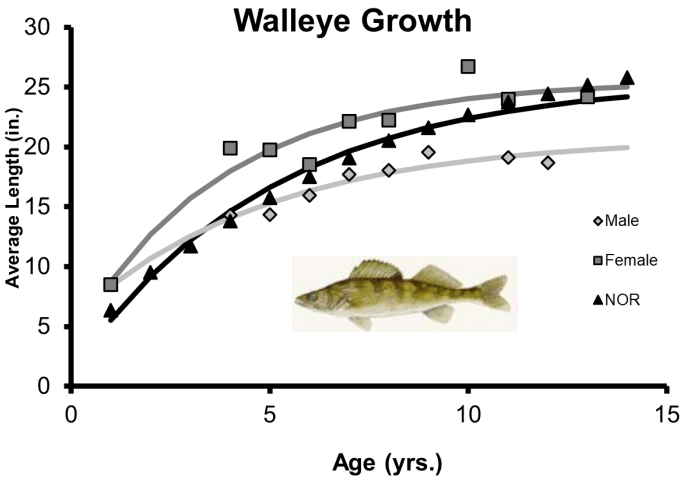
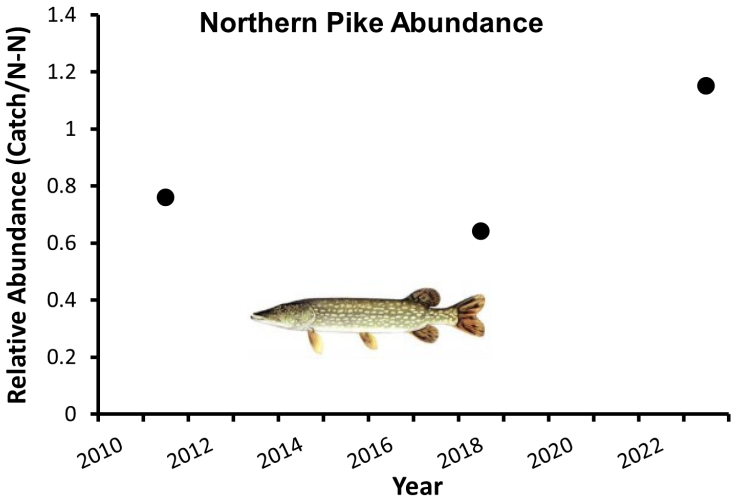
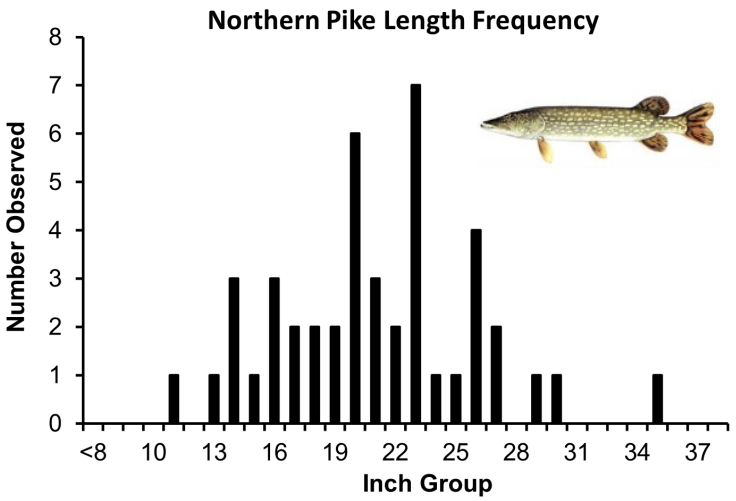
### WALLEYE

Age and growth analysis was conducted for walleye in the Spread Eagle Chain of Lakes in 2023. Female walleye grew faster than the Northern Region of Wisconsin combined sex average (NOR; see figure on right). Male walleye growth slowed below this regional average at age-5, and although this is typical of walleye populations, as female walleye grow larger and faster than male walleye, growth does slow more than expected compared to the average. The oldest fish observed in the 2023 sample were 13 years old. Most fish were age-4, 6, and 8. Walleye growth in the Spread Eagle Chain of Lakes will continue to be monitored in the future.




### NORTHERN PIKE

The northern pike population on the Spread Eagle Chain of Lakes was also assessed in the 2023 spring netting survey, concurrent with walleye netting. Although a population estimate was not included in the 2023 comprehensive survey, relative abundance was recorded and is able to assess the population. A total of 45 fish were captured, with 44 considered to be adults. Relative abundance was 1.15 fish/net-night, which is lower than the area average of 5.23 fish/net-night, but greater than the median relative abundance for the chain's lake type of 0.95 fish/net-night. Northern pike relative abundance in the Spread Eagle Chain of Lakes has increased since they were surveyed in 2011 (0.76 fish/net-night) and 2018 (0.64 fish/net-night), as shown in the figure on the upper left.

Every northern pike captured was measured to assess size structure using Relative Stock Density. Excluding recaptured individuals and fish less than 14 inches, 42 fish were analyzed to assess the size structure. Approximately 54.8% of the northern pike in the Spread Eagle Chain of Lakes were ≥ 21 inches, and 7.1% were ≥ 28 inches. There was an increase in the overall size structure of northern pike in the Spread Eagle Chain of Lakes since 2011, with 30.7% and 12.9% of the sampled fish greater ≥ 21 and 28 inches, respectively, in 2011, as seen in the table in the lower left. The Spread Eagle Chain of Lakes has a relatively average size structure of northern pike when compared to the area averages (46.9% ≥ 21"; 9.7% ≥ 28"). Although sample size was small, northern pike growth was assessed using age at 18" for both male and female northern pike. Growth was relatively average to below average, with analyzed females reaching 18" at age 3 and males at age 4. The Northern Region of Wisconsin averages 18 inches attained at age 3.

| NORTHERN PIKE SIZE STRUCTURE - SECL, Florence County, 2011-2024 | | | | |
|---|---|---|---|---|
| | 2011 | 2018 | 2023 | Area Avg. |
| RSD21 | 30.7 | 25.0 | 54.76 | 46.9 |
| RSD24 | 19.4 | 8.93 | 26.19 | 23.4 |
| RSD28 | 12.9 | 7.14 | 7.14 | 9.7 |
| RSD34 | 0.0 | 0.0 | 2.38 | 1.9 |

Photo Credit: Wisconsin DNR

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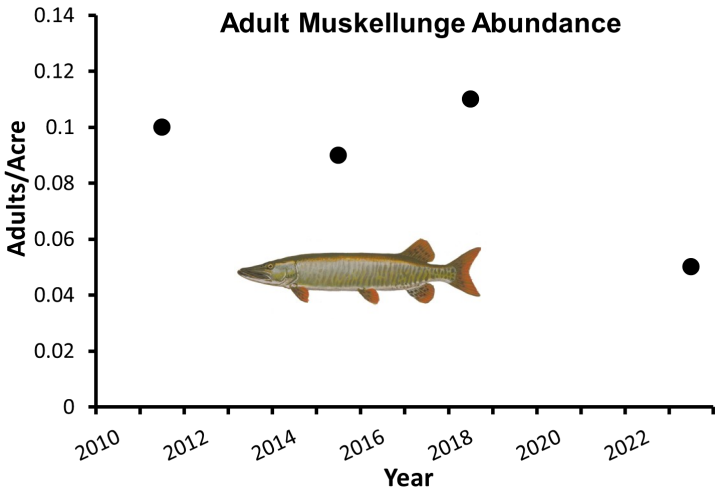
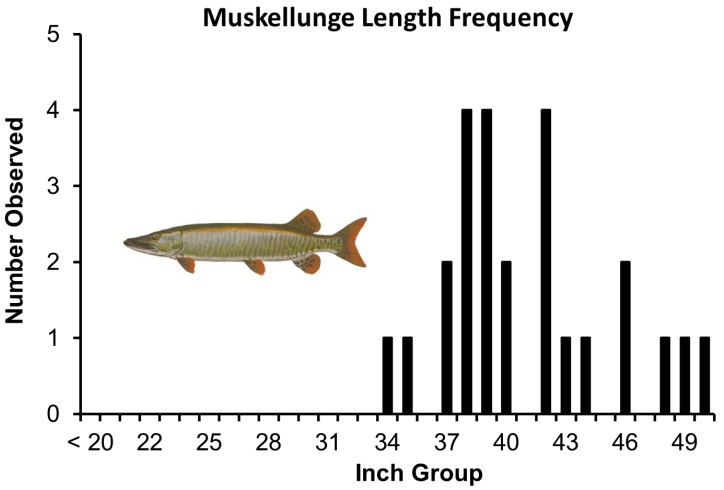
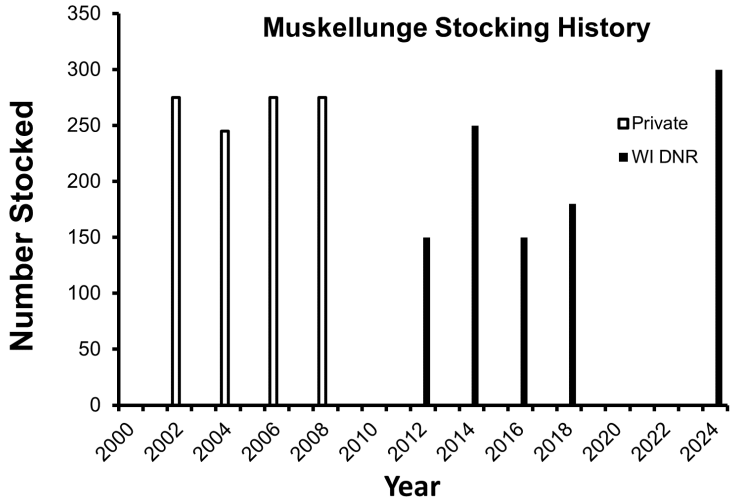
## MUSKELLUNGE

Across 2023 and 2024, a muskellunge mark-recapture survey was conducted to estimate the abundance of muskellunge in the Spread Eagle Chain of Lakes. Fyke nets were set on 5/7/2023 and run through 5/18/2023 to complete the marking survey. Additional fish were captured during walleye surveys and included in this assessment. A total of 23 fish, all ≥ 30 inches and considered adults, were captured in 2023 and marked with unique passive integrated transponder (PIT) tags. Nets were set on 4/17/2024 and fished through 4/25/2024 to complete the recapture survey. Of the 8 fish captured in 2024, 7 were also captured in 2023 (87.5% recapture rate). Based on this data, we estimate the population of adult muskellunge in the Spread Eagle Chain of Lakes to be 26 fish, equating to approximately 0.05 adult muskellunge/acre. This well below the area average (0.18 muskellunge ≥ 30 inches/acre), and is considered to be a very low abundance population. Abundance has decreased from recent surveys, which have shown a relatively stable population of ~0.1 muskellunge ≥ 30 inches/acre (figure on the right). The 2023-2024 Spread Eagle Chain of Lakes estimate is the lowest density across lakes in Florence and Forest counties receiving a muskellunge population estimate since 2011.

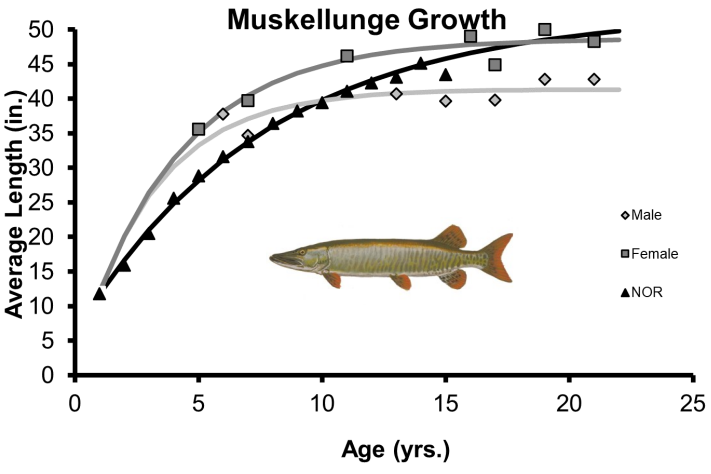
A total of 25 different fish were captured during the 2-year survey, ranging from 34.7 to 50.0 inches in length (see figure on the right). Of this sample, 84% of the fish were ≥ 38 inches, while 20% were ≥ 45 inches. As you would expect with a newly established population, introduced in 2002, size structure has increased with every survey (table on right). The first year class of muskellunge have reached their life expectancy, and size structure will likely stabilize or reduce in the near future. The Spread Eagle Chain of Lakes has a much higher size structure than the area average, of 53.2% ≥ 38 inches and 14.5% ≥ 45 inches, making this a highly desirable trophy fishery.




| MUSKELLUNGE SIZE STRUCTURE - SECL, Florence County, 2011-2024 | | | | | |
|---|---|---|---|---|---|
| | 2011 | 2015 | 2018 | 2023 | Area Avg. |
| RSD38 | 26.53 | 61.11 | 68.42 | 84.0 | 53.18 |
| RSD42 | 8.16 | 13.89 | 21,05 | 44.0 | 29.28 |
| RSD45 | 0.0 | 2.78 | 10.53 | 20.0 | 14.46 |
| RSD48 | 0.0 | 0.0 | 0.0 | 12.0 | 4.39 |




Muskellunge were first introduced to the Spread Eagle Chain of Lakes via private stocking in 2002. Private stocking continued every two years until 2008. After the first muskellunge assessment of the Spread Eagle Chain of Lakes in 2011, stocking efforts were taken over by the Wisconsin DNR. Stocking efforts can be seen in the graph on the upper left. The Spread Eagle Chain of Lakes was stocked every two years starting in 2012, until 2020 when stocking was suspended for two cycles due to pandemic restrictions, hatchery disease outbreak, and reduced funding to stocking operations. Stocking efforts resumed in 2024, with a greater than usual number of large fingerlings stocked to attempt to make up for missed stocking events. The current goal for muskellunge in the Spread Eagle Chain of Lakes is a population of 0.15-0.25 adults/acre.

Muskellunge age and growth were analyzed in 2023. A total of 22 fish were aged. Growth of muskellunge is greater than the Northern Wisconsin Regional average. Muskellunge are sexually dimorphic, with females growing faster than males. This separation appears to begin to occur around age-5. Two individuals surveyed in 2023 were age-21 and are from the original stocking effort of 2002. The low density of muskellunge in the Spread Eagle Chain of Lakes allows for faster growth rates than a more densely populated lake, creating a trophy fishery.

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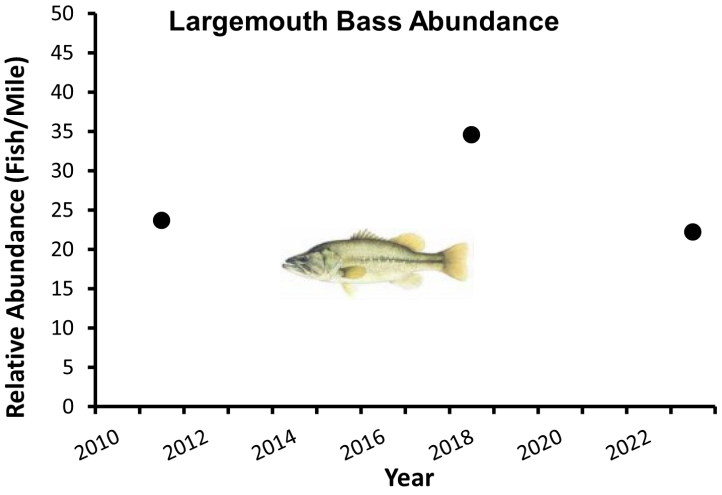
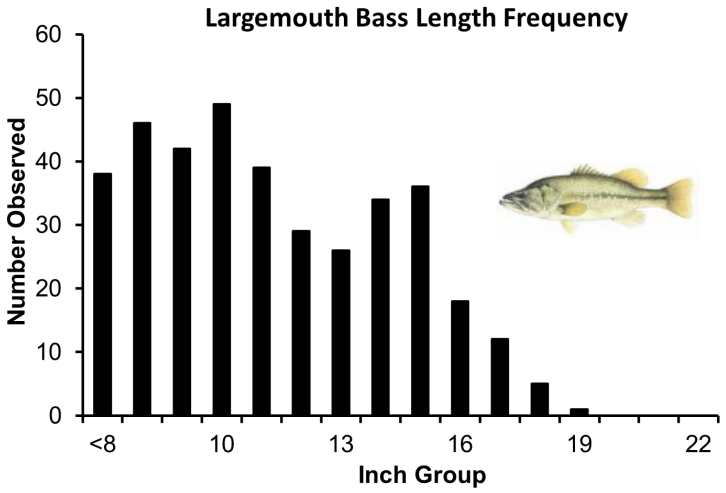



## LARGEMOUTH BASS

The largemouth bass population on the Spread Eagle Chain of Lakes was assessed on 6/1/2023 and 6/5/2023 by electrofishing the majority of the shoreline, including islands. During the two-night survey, a total of 379 largemouth bass were captured, with size ranging from 4.0 to 19.1 inches. The population was assessed using a relative abundance of the number of fish captured per mile electrofished. Total largemouth bass relative abundance was 24.67 fish/mile. Of the 379 fish captured, 341 of them were ≥ 8 inches and considered adults. The relative abundance of adult largemouth bass in the Spread Eagle Chain of Lakes was 22.20/mile. Reduced conductivity of the water due to high temperatures (71-75°F) may have resulted in a decreased relative abundance estimate. As shown in the figure on the left, largemouth bass abundance has decreased from the recent surveys (23.66 adults/mile in 2011; 34.56 adults/mile in 2018). While largemouth bass abundance has been decreasing it is still higher than the area average (17.02 adults/mile) and considered an abundant population. The total largemouth bass relative abundance (24.67 fish/mile) also falls well above the 75th percentile for its lake class (17.80 fish/mile) making it very abundant for its class.

All largemouth bass captured during the 2023 electrofishing survey were measured to assess the size structure of the Spread Eagle Chain of Lakes population, as seen in the figure on the right. Approximately 31.5% were ≥ 14 inches, while 1.8% were ≥ 18 inches. These proportions fall below the area averages of 43.5% and 5.8%, respectively. Although the lake now has a smaller proportion of largemouth bass ≥ 12 inches than previous surveys, it has a greater proportion of fish ≥ 14 and 16 inches, as seen in the table in the lower left. The overall increase in size structure of the largemouth bass population is expected with the decrease in abundance. Despite this, the population sampled in 2023 did have a smaller maximum size sampled than the populations in the previous two surveys. It should be noted, however, that this surveys sample size was smaller than previous bass surveys due to reduced sampling. The protective slot seems to be improving size structure, and is noticeably improving abundance between 14-18 inches. Selective harvest below the protected slot may allow for increased growth and promote larger individuals within the system, as well as eliciting desirable changes for other fish species.




| LARGEMOUTH BASS SIZE STRUCTURE - SECL, Florence County, 2011-2024 | | | | |
|---|---|---|---|---|
| | 2011 | 2018 | 2023 | Area Avg. |
| RSD12 | 55.29 | 53.88 | 47.77 | 69.50 |
| RSD14 | 22.22 | 19.51 | 31.45 | 43.53 |
| RSD16 | 4.69 | 2.88 | 10.68 | 19.80 |
| RSD18 | 1.87 | 0.81 | 1.78 | 5.80 |
| RSD20 | 0.54 | 0.22 | 0.00 | 0.65 |

Age and growth analysis was conducted on largemouth bass in the Spread Eagle Chain of Lakes in 2023. Unlike many other species, largemouth bass do not have different growth rates between male and female fish, so both sexes are grouped when assessing growth. The Spread Eagle Chain of Lakes largemouth bass population displayed growth rates slower than Northern Wisconsin Regional average as seen in the figure on the lower left. The oldest fish observed were age-13.

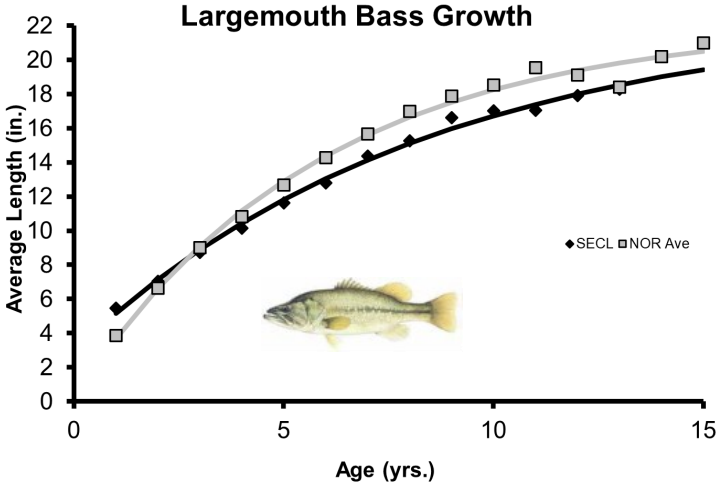




Photo Credit: Wisconsin DNR

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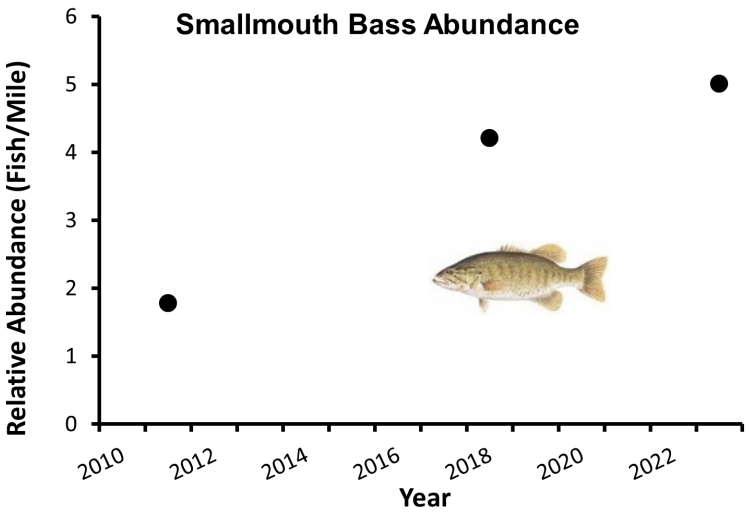
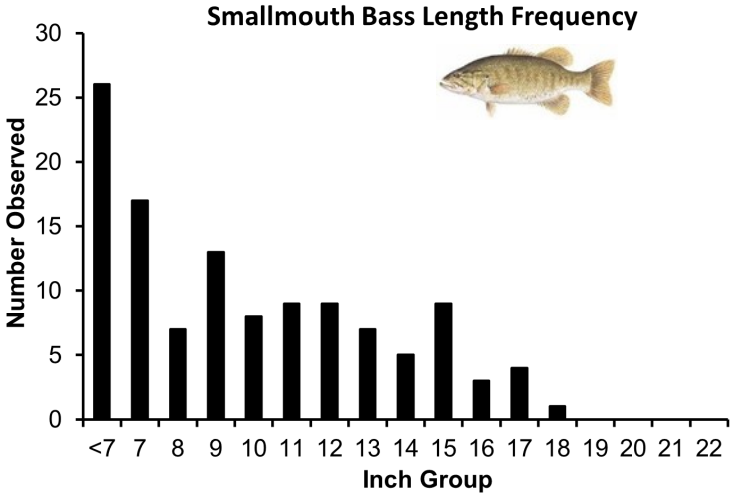
### SMALLMOUTH BASS

Smallmouth bass were sampled concurrently with largemouth bass during the 6/1/2023 and 6/5/2023 electrofishing efforts. A total of 120 smallmouth bass were captured during the survey, ranging from 3.0 to 18.9 inches. The population was assessed using a relative abundance of the number of fish captured per mile electrofished. Total smallmouth bass relative abundance was 7.81 fish/mile, while adult (≥ 7 inches) relative abundance was 5.01/mile. Similarly to largemouth bass, reduced conductivity due to high water temperatures (71-75°F) may have resulted in a low relative abundance. The current adult relative abundance is considerably lower than the area average (10.7/mile), and the Spread Eagle Chain of Lakes adult smallmouth bass population is considered to be of low abundance. Although low, the adult smallmouth bass relative abundance has increased since 2011 (1.78 adults/mile; figure on right).



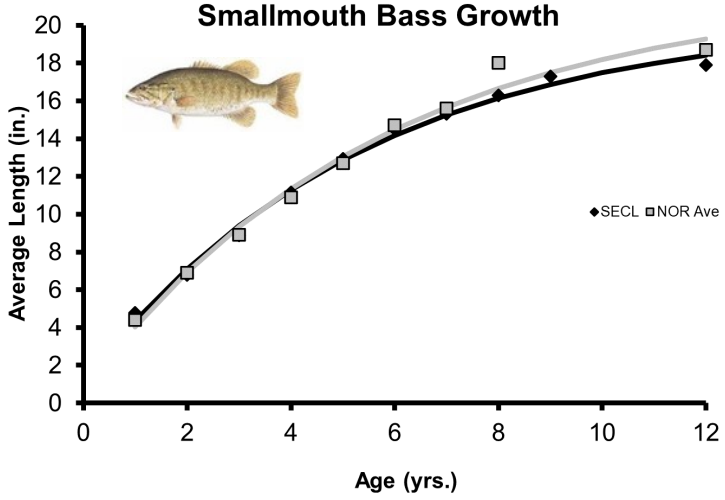




All 118 different smallmouth bass captured during the 2023 electrofishing survey were measured and all fish ≥ 7 inches were used to assess the size structure of the Spread Eagle Chain of Lakes population. Of the analyzed fish 23.9% were ≥ 14 inches, and 5.4% were ≥ 17 inches, as seen in the table below. These values fall well below the area averages of 41.7% and 12.2%, respectively, making this a relatively undesirable population. Size structure has remained stable since 2018, however the population's size structure has decreased since it was sampled in 2011. This decrease of size structure is expected given the increased abundance, as well as the abundance of largemouth bass which are the dominant bass species in the Spread Eagle Chain of Lakes. The interspecific competition from largemouth bass likely reduces both smallmouth bass abundance and size structure.

**SMALLMOUTH BASS SIZE STRUCTURE - SECL, Florence County, 2011-2024**

| | 2011 | 2018 | 2023 | Area Avg. |
|---|---|---|---|---|
| RSD11 | 69.35 | 56.80 | 51.09 | 76.87 |
| RSD14 | 30.65 | 21.30 | 23.91 | 41.68 |
| RSD17 | 6.45 | 5.33 | 5.43 | 12.16 |
| RSD20 | 0.00 | 0.00 | 0.00 | 0.43 |

Age and growth analysis was conducted for smallmouth bass on the Spread Eagle Chain of Lakes in 2023. As is the case with largemouth bass, smallmouth bass do not have sexually dimorphic growth, so both sexes are grouped to assess growth. From the 2023 growth analysis, smallmouth bass showed growth rates very similar to the Northern Wisconsin Regional average, before dropping beneath the average at age-8 and remaining lower through age-12, as seen in the figure to the right. Smallmouth bass appear to have relatively limited longevity in the Spread Eagle Chain of Lakes, with only about 7% of fish aged determined to be age-8, and an estimated 5% of the total population based on size structure analysis, or greater (only 1 fish ≥ age-10). Early mortality of smallmouth bass is not surprising given the current bass harvest regulation designed to increase harvest of and reduce abundance of largemouth bass. The harvest slot should protect and promote larger and older fish, and this is something we will continue to monitor.



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## BACKGROUND INFORMATION - PANFISH

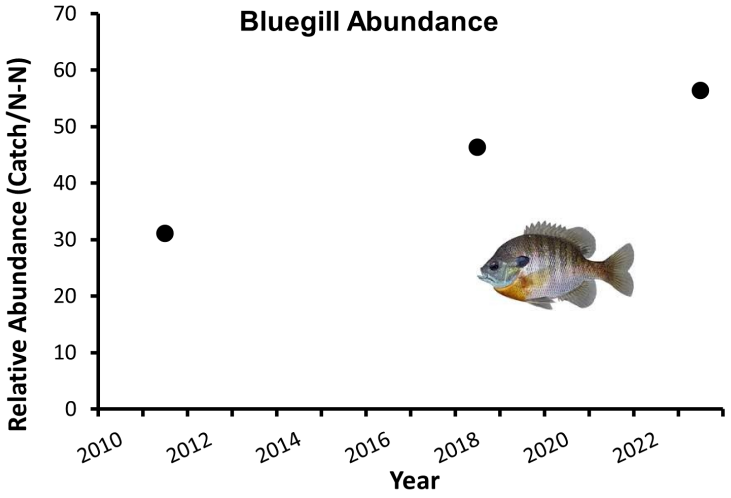
Panfish populations are typically assessed with spring fyke net surveys. Panfish that spawn earlier in the spring (yellow perch and black crappie) get assessed during the first netting survey which targets walleye and northern pike. The panfish species that spawn later in the year (bluegill, pumpkinseed, rock bass) are assessed during a late spring (May or June) netting survey specifically targeting these panfish species. The Spread Eagle Chain of Lakes was chosen at random to receive a seasonal bag limit reduction to 15 fish per day, with no more than 5 of any one species, on panfish during the months of May and June. The bag limit then would return to the statewide 25 fish per day standard during the rest of the year. This regulation went into effect on 4/1/2016. The 2011 survey serves as the pre-change netting assessment which can be used for all species of panfish, while an additional electrofishing survey was conducted in 2015 and should only be used to assess the bluegill population. Post-regulation change, panfish were surveyed again in 2018 and 2023 via nets, and electrofishing surveys for bluegill were completed in 2021 and 2025. Black crappie received additional assessment via netting in 2015, concurrent with muskellunge surveys. The pages that follow will detail changes observed since the regulation change in 2016.

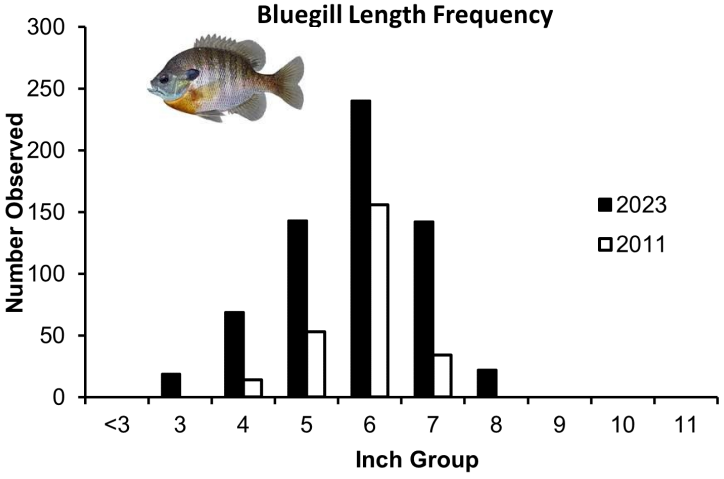
## BLUEGILL

A late spring fyke netting survey was conducted 6/5/2023 – 6/7/2023 to target panfish. During this survey 620 bluegill were captured, with a relative abundance of 56.36 fish/net-night. This is an increase from the 2011 pre-regulation change (31.07 fish/net-night) and the first post-regulation change survey conducted in 2018 (46.33 fish/net-night), as shown in the figure on the right. Bluegill relative abundance falls below the area average (65.57 fish/net-night), but above the area median (39.75 fish/net-night), and the population is considered to be of moderate abundance.

Although not directly comparable to the netting surveys, this trend of increasing bluegill relative abundance in the Spread Eagle Chain of Lakes was also observed in the electrofishing efforts between 2015 (323.11 fish/mile) and 2021 (547.56 fish/mile). Relative abundance then decreased slightly in 2025 (484.00 fish/mile).

Bluegill abundance has increased since the regulation change, which was expected, as bluegill are highly susceptible to harvest during May and June. This regulation change likely reduced yearly harvest and improved spawning success.



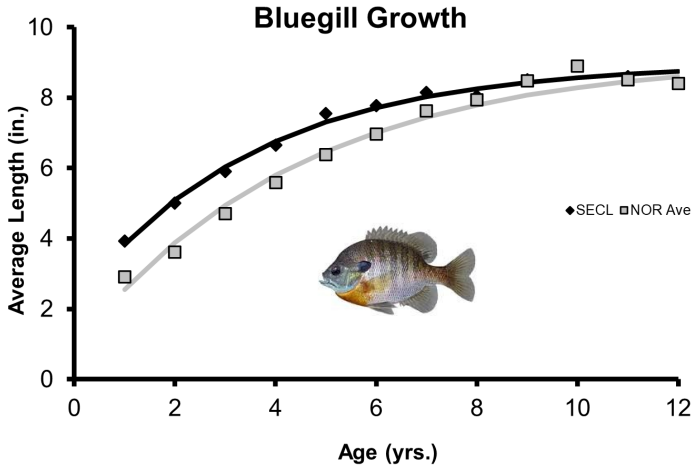




All bluegill captured were measured and those ≥ 3 inches were used to analyze the bluegill size structure in the Spread Eagle Chain of Lakes. Of the fish assessed 63.6% were ≥ 6 inches and 3.5% were ≥ 8 inches in length. This is an increase in size structure from pre-regulation change, as seen in the figure to the left and the table below. Bluegill size structure in the Spread Eagle Chain of Lakes remains below the area average.

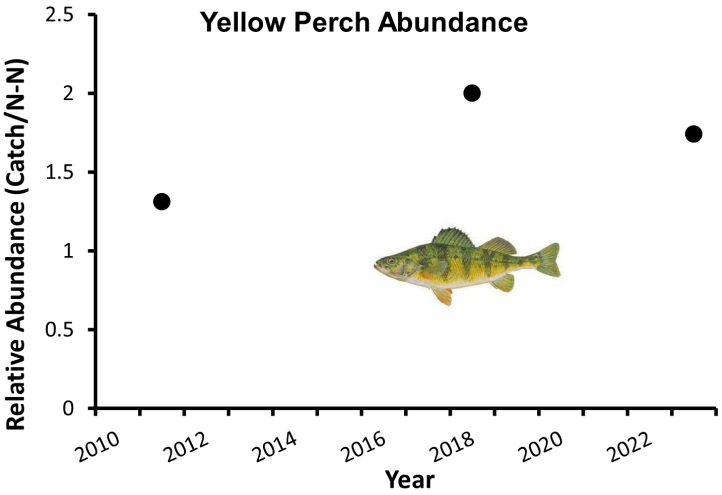
**BLUEGILL SIZE STRUCTURE - SECL, Florence County, 2011-2024**

| | 2011 | 2018 | 2023 | Area Avg. |
|---|---|---|---|---|
| RSD6 | 73.93 | 86.51 | 63.62 | 61.58 |
| RSD7 | 13.23 | 29.68 | 25.83 | 31.11 |
| RSD8 | 0.00 | 0.54 | 3.46 | 9.44 |
| RSD9 | 0.00 | 0.00 | 0.00 | 2.60 |
| RSD10 | 0.00 | 0.00 | 0.00 | 0.30 |

Bluegill age and growth was evaluated in 2023. Bluegill grew much faster than the Northern Region of Wisconsin average, as seen in the figure on the right. Some old fish were observed, with the oldest captured being age-11. These fast growth rates are the reason the Spread Eagle Chain of Lakes was selected for a restrictive regulation, and if we can get fish to live slightly longer we expect this chain to produce larger fish in the future.



# WATER: SPREAD EAGLE CHAIN OF LAKES COUNTY: FLORENCE



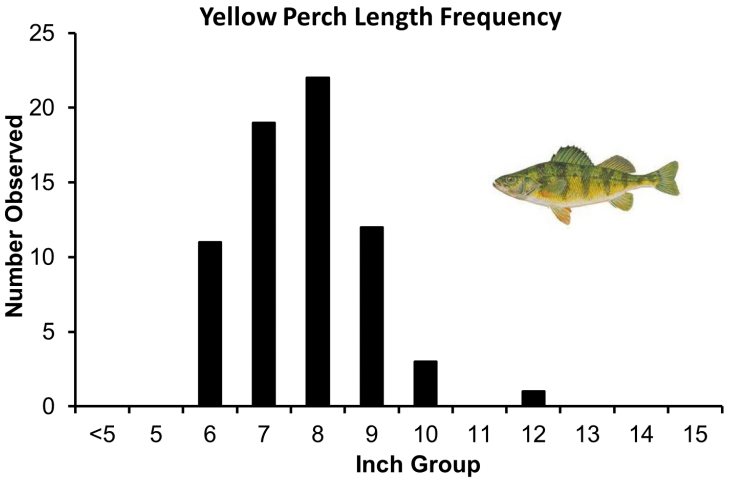

## YELLOW PERCH

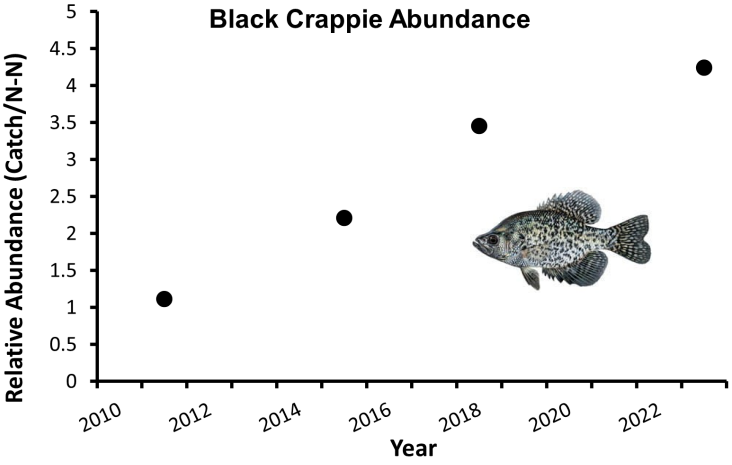
Yellow perch relative abundance was 1.74 fish/net-night in the 4/27-5/2/2023 survey. The relative abundance of yellow perch during the spring survey has decreased from 2.00 fish/net-night in 2018, but is an increase from 1.31 fish/net-night from the 2011 survey. The 2023 relative abundance is above the area median of 0.81 fish/net-night, but well below the median for the lake class of 4.38 fish/net-night. Similarly to bluegill, this is an observed increase since the regulation change.

All 68 fish captured in the spring survey were measured for size structure analysis, which can be seen below. Of the fish sampled, 55.9% were ≥ 8 inches, while 5.9% were ≥ 10 inches. These values have increased from 13.8% and 1.7% in 2011, showing that yellow perch size structure has increased since the regulation change. The 2023 size structure is well above the area mean relative stock densities at these sizes (15.5% and 2.8% at ≥ 8 and 10 inches, respectively). Yellow perch populations can change considerably due to variation in year classes, however, the population in the Spread Eagle Chain of Lakes appears to be slowly improving over time.

## BLACK CRAPPIE

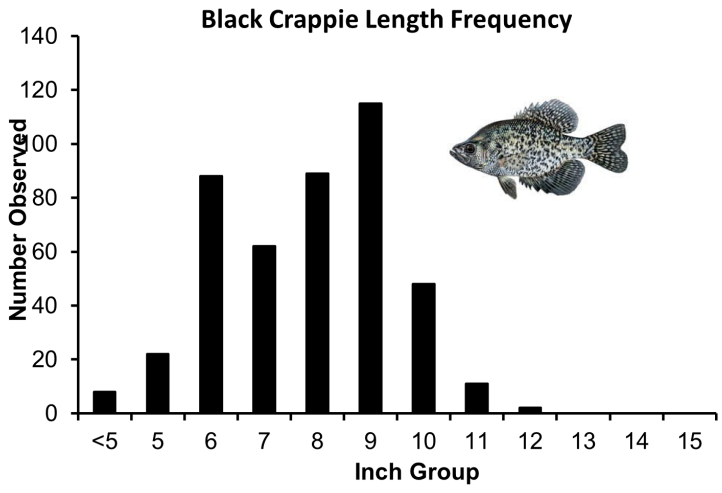
Black crappie are a difficult species to monitor as they are not particularly vulnerable to standardized survey types. Black crappie are also naturally cyclic in their reproduction, and the population can change considerably due to variation in year classes. That being said, black crappie were a secondary target for improvement with the 2016 regulation change. It was hypothesized that the regulation change would benefit black crappie less than bluegill, as it was thought that anglers on the Spread Eagle Chain of Lakes rarely harvested more than 5 black crappie per day due to the lake's relatively low abundance.




Black crappie were sampled most effectively during the muskellunge netting surveys on the Spread Eagle Chain of Lakes, which we can consider to be their "targeted" survey. Muskellunge surveys are a two year process, and we have decided to assess black crappie abundance by taking their average relative abundance for each muskellunge survey conducted on this chain of lakes. During the 2023-2024 survey of the Spread Eagle Chain of Lakes, black crappie relative abundance was 4.24 fish/net-night. As seen in the figure to the upper left, black crappie abundance has been increasing since the 2011-2012 survey. The current black crappie abundance is above the area average of 3.24 fish/net-night at this time of netting.

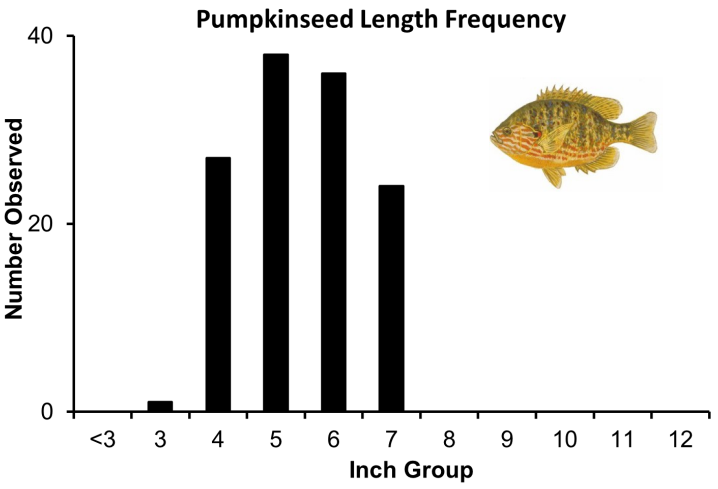
All 445 black crappie captured during the 2023 "targeted" survey were measured for size structure analysis. The length frequency of the sample can be seen on the lower left. After removing all fish less than 5 inches, 60.6% of this sample was ≥ 8 inches and 14% was ≥ 10 inches. The size structure of the black crappie in the Spread Eagle Chain of Lakes has been decreasing since 2011 when 79.5% were ≥ 8 inches and 38.5% were ≥ 10 inches. This is not uncommon for systems with increasing abundance. The Spread Eagle Chain of Lakes currently falls below the area average for size structure. The new regulation (10 panfish bag year round), which will go into effect in 2026, may reduce annual harvest, and additional surveys will be needed in the future to fully assess the impacts of a restrictive panfish regulation on the black crappie population in this chain of lakes.

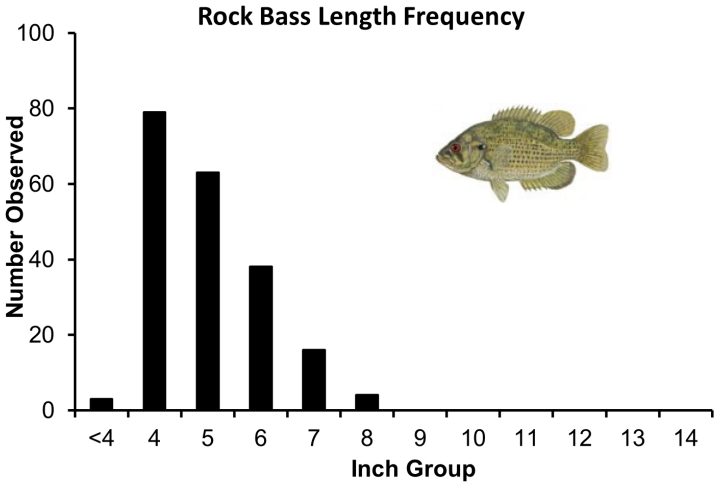


# WATER: SPREAD EAGLE CHAIN OF LAKES COUNTY: FLORENCE

## PUMPKINSEED

During the 2023 comprehensive survey, pumpkinseed were assessed during the same survey as bluegill. A total of 126 pumpkinseed were captured for a relative abundance of 11.0 fish/net-night. Every pumpkinseed was measured to assess the size structure of the population. All fish captured were ≥ 3 inches, with 47.6% being ≥ 6 inches and 19.1% of those captured being ≥ 7 inches. A length frequency distribution of all sampled pumpkinseed can be seen in the figure on the right. Overall size structure has decreased slightly since the previous comprehensive survey in 2018 when 75.0% of the sampled population was ≥ 6 inches and 15.3% was ≥ 7 inches.




## ROCK BASS

The rock bass population in the Spread Eagle Chain of Lakes was also assessed in the 6/5/2023 – 6/7/2023 netting survey. Rock bass relative abundance was 17.27 fish/net-night. All rock bass captured, a total of 203 fish were measured across the survey. After removing all fish less than 4 inches, 10% of the sample was ≥ 7 inches, while only 2% was ≥ 8 inches. The Spread Eagle Chain of Lakes has a relatively abundant population of rock bass with poor size structure. A length frequency distribution of all sampled rock bass can be seen in the figure on the left.

## OTHER SPECIES

During the 2023-2024 survey, 5 other species of fish were captured which were not detailed in this summary. None of these species were caught in high abundance. The table below shows the relative abundance (catch/net-night) of these species across each netting survey. Species included in the table are white sucker (WS), bluegill x pumpkinseed hybrid (BG x PKS), golden shiner (GS), common shiner (CS), and green sunfish/green sunfish hybrids which are grouped together (G Sun Hyb). No new species were observed since the 2018 comprehensive survey.

| RELATIVE ABUNDANCE (Catch/Net-Night) DURING FYKE NET SURVEYS | | | | | |
|---|---|---|---|---|---|
| Species | WS | BG x PKS | GS | CS | G Sun Hyb |
| Spring Netting #1 2023 | 0.10 | 0.03 | 0.03 | 0.00 | 0.00 |
| Spring Netting #2 2023 | 0.00 | 0.03 | 0.58 | 0.01 | 0.00 |
| Spring Netting #3 2023 | 0.00 | 0.00 | 0.09 | 0.00 | 2.82 |
| Spring Netting #2 2024 | 0.02 | 0.08 | 0.02 | 0.00 | 0.00 |

## NOTABLE WALLEYE CAPTURED DURING SPREAD EAGLE CHAIN OF LAKES SURVEYS


Photo Credit: Wisconsin DNR


Photo Credit: Wisconsin DNR

# 2023-24 COMPREHENSIVE SURVEY REPORT

## WATER: SPREAD EAGLE CHAIN OF LAKES COUNTY: FLORENCE

## MANAGEMENT RECOMMENDATIONS

The Spread Eagle Chain of Lakes is a highly developed chain of lakes, and altogether serves as one of the largest lacustrine waterbodies in Florence County. 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.

The Spread Eagle Chain of Lakes walleye population serves as a reason for optimism, especially in the Florence and Forest County area, as most walleye populations have been declining in recent years. Recent management and regulation changes seem to have shifted the population in a positive direction. Walleye abundance has been increasing and may soon provide an adequate angling opportunity. The population seems to be improving in recent years, with more young fish entering the population. The previous goal and plan, put in to action in 2014, was to achieve an adult walleye density of 2.1-3.6/acre by the year 2029 through a restrictive harvest regulation and increased stocking. The harvest restriction of a daily bag of 3 walleye with a minimum length limit of 18 inches was employed, but stocking did not meet the recommendations, with walleye only being stocked at 5/acre every other year. Due to reduced stocking, the current abundance goal by the year 2029 is 1.1-1.8 adult walleye/acre. This goal seems appropriate and more likely to be achieved by 2029, despite the current abundance of 0.46 adult walleye/acre. I would, however, recommend that the stocking rate be increased to 10/acre every other year should large fingerling walleye become more available. The current walleye fishing regulation seems appropriate. The 18-inch minimum length limit protects young walleye and allows for a chance at natural reproduction before reaching a harvestable size, while still allowing for angler harvest.

Muskellunge provide an extremely desirable fishery in the Spread Eagle Chain of Lakes, despite their current low abundance. This is a relatively new muskellunge population created by 4 private stocking events in the 2000s. The current plan for the muskellunge population is to maintain a low density/high size structure population in the Spread Eagle Chain of Lakes. The goal for the population is to have an adult density of 0.15-0.25 adults/acre. The population had held around 0.1 adults/acre between 2011 and 2018, however as fish age out of the population we are seeing a decrease in abundance. The proposed rate of stocking 0.25 large fingerlings/acre every other year was not maintained due to reduced stocking efforts as a result of pandemic restrictions, budgeting cuts, and a hatchery disease outbreak. Stocking was increased in 2024 to 0.55 large fingerlings/acre in effort to accommodate missed stocking events. It may be critical to sample the muskellunge population for juvenile fish survival, as well as to continue enhanced stocking effort before returning to the aforementioned stocking regime. Base stocking efforts may need to be enhanced as well, as the population did not rise above 0.1 adults/acre with previous efforts. For this reason, I recommend increasing the stocking rate from 0.25/acre to 0.5/acre going forward. Current fishing regulations for muskellunge in the Spread Eagle Chain of Lakes are a minimum length limit of 40” with a daily bag limit of 1. The Spread Eagle Chain of Lakes may be a candidate for a more restrictive fishing regulation of a minimum length limit of 50” due to the impressive growth rates and size structure of the population. Muskellunge harvest by anglers is low, but the additional protection may allow for improved survival. This regulation would still allow for harvest of the trophy sized fish that this system is capable of producing.

The Spread Eagle Chain of Lakes has a relatively abundant black bass population with an abundant largemouth bass population, but a low abundance of smallmouth bass. Restricting the population of these species may reduce competitive pressure on the more desirable species within the chain (walleye and muskellunge), while allowing for improved size structure due to decreased intraspecific competition. The current bass population allows for a suitable angling opportunity. The Spread Eagle Chain of Lakes has a relatively liberal harvest regulation to promote harvest of black basses, with no minimum size limit, a protected slot between 14 and 18 inches, and a daily bag of 5, of which one may be over 18 inches. This regulation protects the adult population, and the additional prolonged catch-and-release only season on smallmouth bass should help their less abundant population. These regulations are appropriate given the current management goals for the Spread Eagle Chain of Lakes.

The Spread Eagle Chain of Lakes, via the comprehensive survey from 2011, was found to have poor size structure and average abundance of bluegill while having above average growth. A more restrictive harvest regulation was recommended. The current management goal for the panfish on the Spread Eagle Chain of Lakes is to improve poor size structure of bluegill. The chain was chosen at random to receive a seasonal bag restriction on panfish as a part of a statewide project, and had the panfish bag limit reduced during May and June to a 15 fish daily bag limit, with no more than 5 of any one species, while having the standard statewide 25 panfish/day across all other months. This special regulation went into effect on 4/1/2016. Since then, bluegill abundance and size structure have increased. Bluegill size structure had nearly met goals set for 2028 in 2023. Despite the progress, there is still room for improvement. Other species, like black crappie, have not seen improvements. Black crappie abundance has increased since 2011, however the size structure is becoming worse despite fast growth rates. A more restrictive aggregate daily bag limit of 10 panfish was recommended and proposed for the Spread Eagle Chain of Lakes. The proposed regulation was supported at the 2025 spring hearings and will become the new panfish regulation in 2026. This regulation may benefit not only the bluegill, but the black crappie, yellow perch, and other panfish species as well.

The Spread Eagle Chain of Lakes is currently scheduled for its next comprehensive survey in 2031, although plans are subject to change.

## NOTABLE MUSKELLUNGE CAPTURED IN THE 2023-2024 SPREAD EAGLE CHAIN OF LAKES SURVEY

Photo Credit: Wisconsin DNR

Photo Credit: Wisconsin DNR

Photo Credit: Wisconsin DNR