The Chippewa Flowage Fishery in 2022

Water Level Management and Progress Toward Fisheries Objectives

Photo by Max Wolter

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Table of Contents

Executive Summary

The Chippewa Flowage is a popular waterbody for angling and other types of recreation. Fisheries management in the Chippewa Flowage encompasses a number of complex issues, including a shared tribal-angling fishery, invasive and introduced species management and water level management and decision-making.

Fortunately, “The Chip” has a strong coalition of resource advocates and dedicated agency staff. The Chippewa Flowage Partner Group brings these organizations and agencies together quarterly to discuss management issues and make recommendations on water level management to benefit the fishery and other resources.

This report brings together several decades of fish and water level management in a compilation of analyses. The timing of this report coincides with the release of results from a large fisheries survey effort in 2022, which included an adult walleye population estimate and angler creel survey.

Here, we also compare recent fisheries composition and quality with the goals and objectives established in the Chippewa Flowage Fishery Management Plan. We detail where fish management has, and has not, been successful in achieving stated goals and objectives in the plan and make recommendations on the future of fishery management planning for this waterbody.

INTRODUCTION

The Chippewa Flowage (known officially as “Lake Chippewa”) is located in the center of Sawyer County, Wisconsin. The 15,300-acre reservoir impounds the East Fork and West Fork of the Chippewa River. It is important to acknowledge that the creation of this dam and resulting flowage is marked with tragedy, having resulted in the loss of community and opportunities for the native people that were inhabiting the area (you can read more about this history in the Chippewa Flowage Joint Agency Management Plan). Yet today “The Flowage” is a place of life, supporting tribal subsistence hunting and fishing, a popular angling fishery and a vibrant tourism community.

There are many who care about The Flowage, and many with specific responsibilities for its current and future health. A large portion of the shoreline and acreage falls within the reservation boundaries of the Lac Courte Oreilles Tribe, who, along with other bands of Lake Superior Ojibwe retain rights to harvest fish and game both on and off-reservation. The Lac Courte Oreilles People and their natural resources professionals within the Lac Courte Oreilles Conservation Department (LCOCD) are key players in all aspects of natural resource management on the Chippewa Flowage.

Xcel Energy, formerly the Northern States Power Company, operates the dam (known as the "Winter Dam") that regulates the water level of the Chippewa Flowage, along with many of the hydropower facilities downstream along the Chippewa River. The Lac Courte Oreilles Tribe has authority over power production at the Winter Dam. Xcel Energy has been willing to engage with resource professionals and other stakeholders on water level management issues, and their collaborative approach has led to many of the positive resource outcomes discussed in this report.

US Forest Service controls a stretch of shoreline and a considerable amount of acreage surrounding the Chippewa Flowage as a part of the Chequamegon-Nicolet National Forest.

Private individuals and groups are also deeply connected to The Flowage and invested in resource management. The Chippewa Flowage Property Owners Association (lake association) consists of private property owners in the vicinity of the lake. The Lake Chippewa Flowage Resort Owners Association consists of business interests, including resort owners, fishing guides, restauranters and bait shops. There are other shoreline owners that do not belong to either of the previously mentioned groups but have an active interest in management of the lake.

The Wisconsin Department of Natural Resources (DNR) has several unique responsibilities when it comes to the Chippewa Flowage. The majority of the shoreline and immediate surrounding acreage are in state ownership and management. Included within this state land are 11 popular campsites, a majority of which are on islands, that are available to the public for free on a first-come-first-served basis. There are an additional 7 campsites managed by the LCO Conservation Department. The DNR has specific management authority for setting angling regulations in cooperation with their official citizen advisory body the Wisconsin Conservation Congress. Fish stocking responsibilities, when they are needed, are shared between DNR, LCOCD and private groups operating under permits from DNR (more on page 6). Surveying fish populations has been the responsibility of DNR and the Great Lakes Indian Fish and Wildlife Commission (GLIFWC), which works on natural resource issues on behalf of tribes within Wisconsin's Ceded Territory.

Fisheries management in the Chippewa Flowage is complex and includes an intersection of many different people and agencies. The Chippewa Flowage Fisheries Management Plan was created in 2007 with the goal of coordinating management efforts and setting clear goals and objectives for the fishery (Pratt and Neuswanger 2007).

This report summarizes the fisheries survey efforts in 2022, when considerable work was done to estimate total walleye abundance and gather data on angling catch and harvest. An additional goal of this report is to describe where we have been successful, and where we have come up short in achieving the objectives of the

CFFMP over the last 15 years, including discussion and analyses on what tools have been useful in getting us there. This report serves as an important status update as we consider whether the CFFMP needs to be updated in the future.

MANAGEMENT PLAN SUMMARY

The 2007 Chippewa Flowage Fisheries Management Plan was created in the culmination of a process that began in 2005. Local DNR Fisheries professionals sought input from local stakeholders to craft the plan. Shoreline owners, anglers, fishing guides, resort owners and representatives from the Lac Courte Oreilles Tribe provided input to the plan. These stakeholders were asked to rank their interest in different species of fish in the Chippewa Flowage and provide preferences for how they would like to see them managed.

The resulting plan set a goal for each species that stakeholders expressed interest in. Furthermore, specific and measurable objectives were created for both size and abundance of each species (Table 1).

Table 1. *Objectives for abundance and size of important fish species as detailed in the 2007 Chippewa Flowage Fisheries Management Plan. All objectives are for adult fish and exclude immature fish. Species are shown in the order they were ranked by anglers.*

SPECIES	ABUNDANCE OBJECTIVE	SIZE OBJECTIVE
Walleye	4-8 adults per acre	20-40% over 15 inches
Muskellunge	0.3-0.4 adults per acre	30-40% over 42 inches and 3-5% over 50 inches
Black crappie	10-20 per net night in spring surveys	20-40% over 10 inches
Bluegill	25-50 per mile in late spring electrofishing surveys	5-15% over 8 inches
Yellow perch	None specified	10-20% over 10 inches
Smallmouth bass	15-25 per mile in late spring electrofishing surveys	5-15% over 17 inches
Largemouth Bass	5-10 per mile in late spring electrofishing surveys	5-15% over 18 inches
Northern Pike	<1 per acre	15-25% over 28 inches

The plan also discussed important topics, such as managing the introduced northern pike population, water level manipulation, angling regulation strategies and interactions between species, among others.

In this report comparisons are made between observed fisheries metrics and objectives from the CFFMP. When available, metrics from the most recent 2022 survey will be used, but data from older surveys is used for some species that were not targeted in 2022. We will also make similar comparisons between fisheries metrics in the Chippewa Flowage and other similar lakes. The Chippewa Flowage is classified as a “Complex-cool-dark” lake in a system developed by Rypel et al. 2019. “Complex” refers to the number of gamefish present in the fishery. “Cool” indicates that the waterbody is cooler than average for the state and “dark” refers to the clarity of the water. Comparisons among lakes within a similar class can be more meaningful and insightful when evaluating fish management actions.

SURVEYS

Our ability to assess whether the fishery is meeting the objectives outlined in the CFFMP (Table 1) relies on recent and accurate fisheries survey data. The Chippewa Flowage fishery is surveyed in a manner and frequency that is somewhat unique in comparison to other lakes in northern Wisconsin because of its size and importance (more in Appendix 1). There are also differing amounts of data available depending on the species and in some instances difficulties with making comparisons to historic data because of changing protocols over time. Here we will describe survey methodology over the last 15 years and those data will be central to these analyses. Comparisons to earlier data will be made in sections of this report, when possible.

“Population estimates” are a statistically derived estimate of the total number of a species in the waterbody (which can be converted to a per-acre abundance estimate). Population estimates are very intensive, making them both expensive and a logistically challenging survey type for a waterbody the size of the Chippewa Flowage. As such, walleye population estimates have been conducted about once every 10 years.

No population estimates have been conducted for other gamefish or panfish species (attempts have been made for muskellunge, but they were not rigorous enough to be official). Rather, we use less intensive survey methods to describe “relative abundance” of these species, most commonly expressed as number captured per unit of effort (e.g. number per mile of shoreline electrofished or number per net night). Relative abundance measures are significantly less expensive and are easier to generate than a population estimate, yet still allow comparisons of abundance among waterbodies or across different points in time. Surveys that allow us to generate relative abundance measures for northern pike, muskellunge, largemouth bass, smallmouth bass, bluegill, black crappie and yellow perch are conducted often on the Chippewa Flowage, including annual estimates for some species (Appendix 1).

Relative abundance is often calculated for walleye in years when a population estimate is not conducted.

Two different gear types are used to target fish species on the Chippewa Flowage. Fyke netting is used to capture walleye, muskellunge, northern pike, black crappie and yellow perch. Netting timing varies depending on the species being targeted. Early spring fyke netting (32-50°F water temperature) targets walleye, yellow perch and northern pike, while late spring fyke netting (50-60°F water temperature) is more effective for black crappie and muskellunge. Between 8-14 fyke nets are typically set for 2-5 nights when conducting relative abundance surveys. Close to 100 nets have been deployed when calculating population estimates for walleye on the Chippewa Flowage. Efforts are made to maintain consistency in net locations to make inter-annual comparisons of data more meaningful, but some alterations are typically needed to accommodate water level changes or other logistical factors.

Boat electrofishing is used to survey largemouth bass, smallmouth bass and bluegill in late spring (60-70°F water temperature) and generate relative abundance measurements. Electrofishing is also used as a complimentary gear in walleye population estimates. Fall electrofishing surveys (40-60°F water temperature) are conducted annually on the Chippewa Flowage by DNR and GLIFWC to generate relative abundance estimates of juvenile walleye and muskellunge. Electrofishing stations for both spring and fall are revisited consistently for data comparison purposes.

A decision was made in the early days of this current monitoring scheme to conduct spring surveys of the east and the west sides of the Chippewa Flowage in separate, alternating years (east side in even years, west side in odd years). This was believed to be necessary to capture some of the unique fisheries characteristics of this waterbody and the diversity of habitat therein. This approach has generally served our data needs but does create some instances where more detailed interpretation of data is necessary. For example, observed annual fluctuations in catch rate for some species (see pages 38-39 for examples) are actually the result of the east/west sampling regime and not true annual variation. Some survey types capture both east and west sides simultaneously, including walleye population estimates and fall electrofishing.

In both DNR or GLIFWC surveys, fish are identified to species and target fish are measured and counted (non-target fish are often counted but not measured or may not even be counted in some instances). Additionally, fish may be “marked” with a fin clip or radio ID tag (PIT tag) for later identification (more on page 27-28). Fish are typically released alive, although a small number (typically <100 each) of bass, panfish and pike are occasionally sacrificed for age and growth rate analyses. Aging structures for walleye and yellow perch (dorsal spines) are collected non-lethally.

Creel surveys are also conducted by DNR periodically on the Chippewa Flowage, generally in the same year when walleye population estimates are conducted. Creel surveys consist of angler counts to estimate total fishing effort and interviews to determine what anglers target, catch and harvest. Creel data are presented throughout this report. Unfortunately, past creel surveys of the Chippewa Flowage have not included the ice fishing season, creating a gap in our understanding of that component of the fishery. The Chippewa Flowage has never been creeled in Winter because walleye angling is closed.

STOCKING

Stocking fish has been a frequent and recurring management action in the Chippewa Flowage, with contributions of stocked fish from DNR, the LCO Tribe and private partners (see Appendix 2). However, stocking is not necessary to sustain adequate abundance of most species. Bluegill, black crappie, yellow perch, northern pike, largemouth bass and smallmouth bass, along with all other non-game species, are all entirely self-sustaining. There is some evidence that northern pike were stocked near the Winter Dam in the early 1970s, which followed another stocking in the upper reaches of the East Fork of the Chippewa River in Bear Lake.

Walleye have a long stocking history in the Chippewa Flowage, including some smaller stocking events as recently as 2022. Walleye stocking in the Chippewa Flowage historically focused on planting large numbers of fry. Over time, the strategy changed to planting fewer small fingerlings (1-3 inches in length) and then continuing that trend to stock even fewer large fingerlings (6-8 inches in length). Walleye stocking throughout much of the Chippewa Flowage's history should be considered supplemental, as natural reproduction was also generally strong (Figure 1). During most of the 20th century, walleye stocking was likely done more out of popularity than necessity.

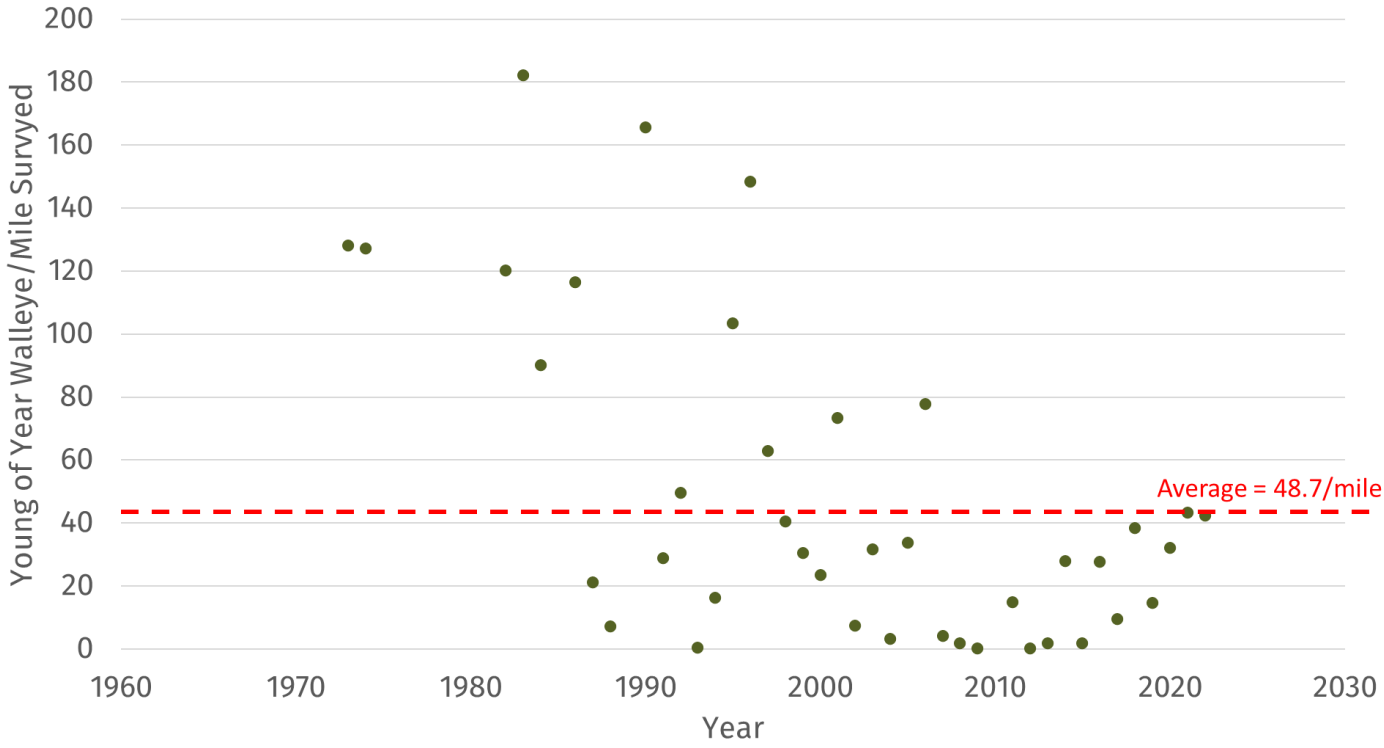

Figure 1. *Walleye year class strength in the Chippewa Flowage since 1970 based on relative abundance of young of year walleye captured in fall electrofishing surveys.*

However, walleye reproduction faltered in the late 2000s and early 2010s (Figure 1), establishing a point in time where stocking became more important to maintain a fishable population and aid in rehabilitation efforts. Fortunately, natural reproduction returned to a moderate level in 2014 and has been adequate to sustain the population since that time. Some stocking has continued since 2014, but it can once again be considered supplemental. The vast majority of the walleye in the Chippewa Flowage today are from natural reproduction based on fall recruitment surveys.

Muskellunge stocking is currently important for managing that population. Muskellunge reproduction continues to exist in the Chippewa Flowage but appears to be at a level that is too low to maintain a fishery that would meet the abundance objective established in the CFFMP. Muskellunge stocking was done frequently in the past, with fingerlings that were typically in the 9 to 11-inch size range. More recently, muskellunge stocking strategy has shifted to an every-third-year frequency with an emphasis on maximizing the size of stocked fingerlings. The improved size of fingerlings (around 20-30% longer and at times over 50% heavier than in the past) is a credit to the Hayward Lakes Chapter of Muskies Inc and DNR hatchery staff who have worked together to modify hatchery practices. Studies have shown larger muskellunge fingerlings to have better survival (Hanson et al. 1986), and this may be

particularly important in a lake that now has a relatively abundant, non-native competitor in northern pike (Inskip 1986).

Genetic appropriateness of stocked fish can contribute to their success in the receiving waterbody (Jennings et al. 2010). Stocked fish in the Chippewa Flowage should utilize native genetics to the greatest possible extent. These practices are currently in place for walleye and muskellunge stocked by DNR and LCO Conservation Department. These same guidelines would also be followed should private stocking be needed in the future.

ANGLING REGULATIONS

Angling regulations are an important tool to manage harvest and shape fish populations. The most common forms of angling regulations utilized on the Chippewa Flowage, and elsewhere in Wisconsin, are size limits, bag limits and open/closed seasons.

Angling regulations at a statewide scale in Wisconsin have generally shifted to be more conservative for panfish, walleye and muskellunge over the last several decades (Table 2). There are many instances where an angling regulation for the Chippewa Flowage was changed because the statewide or regional rule was changed (e.g. panfish bag limit reduced from 50 to 25 in 1998).

Walleye regulations on the Chippewa Flowage have oscillated between being very liberal (no minimum length limit) and moderately liberal (low or moderately low minimum length limit). Bag limits have also changed over time, largely in relation to the shared fishery model used in Wisconsin's Ceded Territory. The bag limit changed annually in response to tribal harvest between the late 1980s and 2015. After 2015, the bag limit was set at 3 and no longer varies annually.

Panfish and muskellunge limits have gradually become more conservative, but for different reasons and with different modes of regulation. Panfish bag limits have been reduced to lower exploitation, with the goal of improving panfish size and spreading out quality fishing opportunities, an approach that has generally been successful in Wisconsin and elsewhere (Jacobson 2005, Rypel 2015). Muskellunge length limits have been increasing, which may prevent some amount of exploitation. However, a large percentage of muskellunge anglers have shifted towards voluntary catch-and-release over time (Margenau and Petchenik 2004). As a result, higher length limits for muskellunge may be more symbolic of trophy fishing opportunities than they are functional management tools.

Northern pike regulations in northern Wisconsin have stayed relatively liberal. Bass have alternated between no length restrictions and a moderate minimum length limit. These regulations appear to be appropriate given the moderate, at best,

interest in harvesting these species and their abundance in the Chippewa Flowage. There is little risk of bass or northern pike being overexploited in the same manner that walleye could be.

Table 2. *History of fishing regulations for the Chippewa Flowage for popular species since 1980. The abbreviation "min. LL" is used for "minimum length limit" in some spaces.*

** - The "sliding bag limit" was a system used to adjust angling bag limits based on the amount of tribal spring harvest that occurred each year. That system was replaced with a fixed 3-daily bag limit and more length-based restrictions for anglers in 2015. ** - The daily bag limit for panfish on the Chippewa Flowage was reduced to 10 in 2022.*

<table>
<tr><th colspan="9">History of Fishing Regulations for the Chippewa Flowage, Sawyer County</th></tr>
<tr><th>Species</th><th>1980</th><th>1985</th><th>1990</th><th>1995</th><th>2000</th><th>2005</th><th>2010</th><th>2015</th></tr>
<tr><td>Walleye</td><td>13" min. LL, 5 daily bag limit</td><td colspan="3">No minimum length limit, sliding bag limit (0-3)*</td><td colspan="3">15" minimum length limit, sliding bag limit (0-3)*</td><td>No minimum length limit, sliding bag limit (0-3)*</td><td>15" min. LL, no harvest 20-24" and only 1 over 24", 3 daily bag limit</td></tr>
<tr><td>Northern Pike</td><td colspan="8">No minumum length limit, 5 daily bag limit</td></tr>
<tr><td>Smallmouth Bass</td><td colspan="2">No minimum length limit, 5 daily bag limit</td><td colspan="2">12" minimum length limit, 5 daily bag limit</td><td colspan="4">14" minimum length limit, 5 daily bag limit</td></tr>
<tr><td>Largemouth Bass</td><td colspan="2">No minimum length limit, 5 daily bag limit</td><td colspan="3">12" minimum length limit, 5 daily bag limit</td><td colspan="2">14" minimum length limit, 5 daily bag limit</td><td>No minimum length limit, 5 daily bag limit</td></tr>
<tr><td>Panfish</td><td colspan="4">No size resctrictions, 50 daily bag limit</td><td colspan="4">No size resctrictions, 25 daily bag limit</td><td>**</td></tr>
<tr><td>Muskellunge</td><td>30" min. LL, 1 daily bag limit</td><td colspan="3">32" minimum length limit, 1 daily bag limit</td><td colspan="3">34" minimum length limit, 1 daily bag limit</td><td>50" minimum length limit, 1 daily bag limit</td></tr>
</table>

Today the Chippewa Flowage has a number of "non-standard" regulations, or a regulation that differs from the statewide or regional default regulation while still not being fully unique to the waterbody (i.e., the regulation is used elsewhere). Table 3 summarizes angling regulations for important species on the Chippewa Flowage in 2023, with notes on each.

Table 3. *Angling regulations for major fish species of interest in the Chippewa Flowage in 2023. Notes are provided on the history and use of each regulation.*

SPECIES	SIZE LIMITS	DAILY BAG LIMIT	NOTES
Walleye	15" minimum length limit, no harvest between 20-24", and	3	In place since 2015. This is the standard regulation for northern Wisconsin.

	only one may be harvested over 24”		Harvest of walleye is also closed after Nov. 30, a season structure that is unique to this waterbody.
Panfish (black crappie, bluegill, yellow perch, “sunfishes”)	None	10 (combined)	This is a reduced bag limit (statewide bag limit is 25) that has been in place since 2022.
Muskellunge	50” minimum length limit	1	This is the “trophy” regulation for inland waters.
Smallmouth bass	14” minimum length limit	5 (combined with Largemouth Bass)	The size limit was retained for smallmouth bass while being eliminated for largemouth bass, partly as a result of preferences in the CFFMP.
Largemouth bass	None	5 (combined with Smallmouth Bass)	The minimum length limit was removed in 2011 to encourage more harvest of smaller largemouth bass.
Northern pike	None	5	There is an active proposal to increase the bag limit to allow more harvest of this introduced species.

Ice fishing seasons have been a source of debate for many decades on the Chippewa Flowage. The current season structure for walleye effectively prevents ice fishing for them in most years and is unique to the Chippewa Flowage. Ice fishing for other species has been closed in the past, with ice fishing opportunities being reestablished for panfish species first in the 1990s and ice fishing for northern pike and bass only being allowed since 2011 (ice fishing for muskellunge is not allowed).

ANGLING EXPERIENCE AND ANGLER BEHAVIOR

The Chippewa Flowage is a well-known and popular “destination” fishery that supports a healthy resort community, fishing guides and considerable tourism revenue. Creel surveys allow us to quantify angler effort on the waterbody, including how such effort has changed over time (Table 4). It may come as a surprise to some stakeholders that angler effort has decreased through time, an observation that runs counter to popular opinion about the waterbody becoming more crowded. It is

possible that as the amount of angling effort has decreased through time, other sources of water-based recreation have replaced fishing, leading to the same amount (or even more) boat traffic. Estimates of angler effort do not include ice fishing, which has likely become more popular over time as seasons have been reopened for more species, however we have no data available to test that hypothesis.

Table 4. *Angler effort estimates on the Chippewa Flowage through time. Estimates only include the open-water fishing season.*

YEAR	ESTIMATED TOTAL ANGLER EFFORT (HOURS)	HOURS OF ANGLING EFFORT PER ACRE OF WATER
1990	667,098	43.6
1999	489,926	32.0
2011	476,137	31.1
2022	364,795	23.8

Angler behavior in the Chippewa Flowage has shifted over time, in response to both biological and social changes. In the two creel surveys from the 1990s, over 60% of total angler effort was directed at walleye and muskellunge (Figure 2). By 2011, anglers targeted panfish at a higher rate than in the past, and panfish effort exceeded gamefish effort. These patterns may reflect diversifying interest from anglers but may also reflect how species abundance had changed in the fishery. Interest in largemouth bass and smallmouth bass has increased over time, while the percentage of effort put towards northern pike remained relatively constant. Effort towards “other” species (rock bass, catfish, suckers, bullheads, common carp) has been consistently very low, indicating that our focus on the species included in the CFFMP accurately captures angler interest.

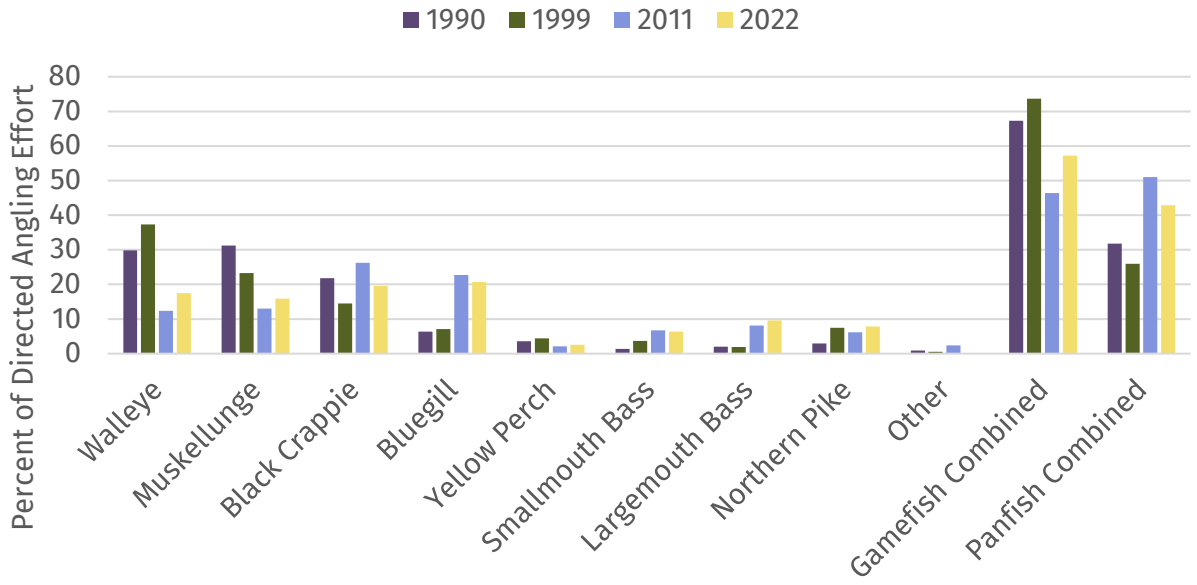

Figure 2. *Angler effort directed at different species in the Chippewa Flowage at four points in time, based on creel surveys.*

Anglers' decisions about which fish to harvest are the result of a complex mix of individual preferences, angling regulations and biology. For example, some anglers are strictly catch-and-release, no matter what they catch. Some anglers may harvest only certain species or may be very selective about the sizes of fish they will harvest. Of course, angling regulations are also an important part of the harvest picture and are typically designed to force anglers to release some number or size of fish that they would have otherwise kept.

Further examination of creel data from the Chippewa Flowage reveals all these factors in play at different points in time (Figure 3). Percentage of caught walleye that were harvested was relatively consistent in the 1990 and 1999 creel, before nearly doubling in the 2011 creel which was conducted after the minimum length limit had been eliminated. The percent of walleye that were harvested was lower in the 2022 creel survey with the current length restrictions in place.

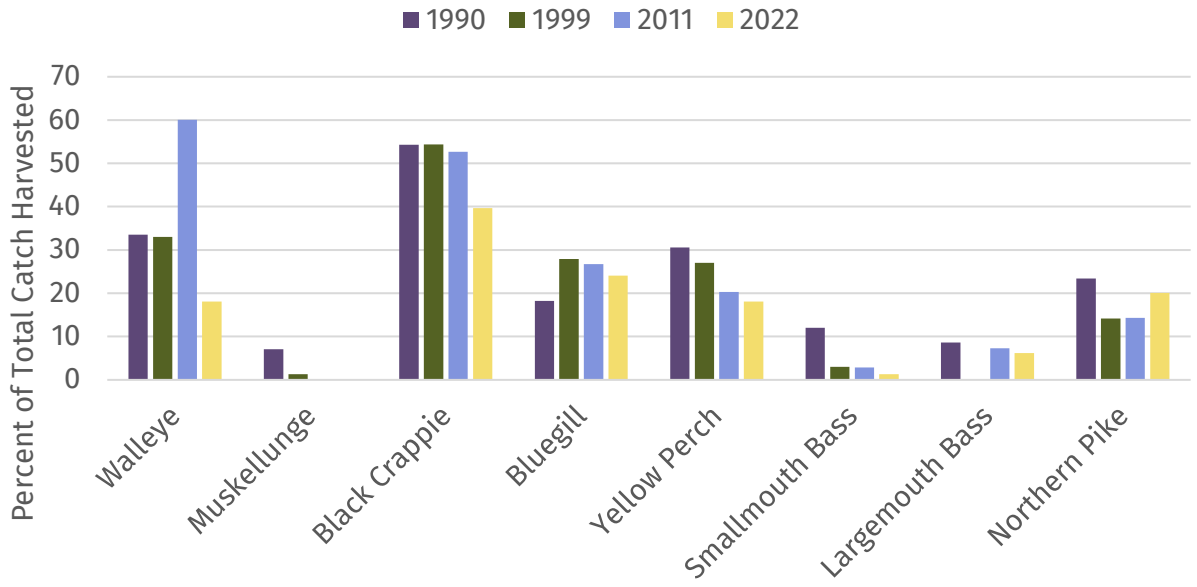

Figure 3. *Percent of estimated total catch that was harvested, by species, in the Chippewa Flowage based on creel data in four separate years.*

Harvest of muskellunge has exhibited an interesting but not unexpected pattern. In 1990, over 7% of all muskellunge caught were harvested. That number dropped in 1999 and then went to zero in 2011 and 2022. Two factors are responsible for the reduction in muskellunge harvest. First, minimum length limits have steadily increased on the Chippewa Flowage (Table 2), making it more difficult to catch a legal-sized muskellunge. Second, anglers have been voluntarily adopting catch-and-release ethic for muskellunge in Wisconsin, with many choosing to release even legal-sized muskellunge (Margenau and Petchenik 2004). Smallmouth bass harvest in the Chippewa Flowage follows a similar pattern, yet a small amount of harvest of smallmouth bass occurred in 2022.

Panfish are a popularly harvested species in the Chippewa Flowage (Table 5) and have never been managed with any type of length restrictions. Still, anglers release about half of the black crappie they catch and around three quarters of bluegill and yellow perch (Figure 3). The differing harvest rates most likely result from the sizes of panfish available to be caught, with anglers catching greater percentages of bluegill and yellow perch that are not large enough to create interest in keeping them. Whereas black crappie that are caught by anglers are more consistently of a desirable size. Notably, the percent of panfish harvested in 2022 was lower than 2011 and 1999 for all three species of panfish. The bag limit for panfish was reduced from 25 to 10 in 2022, which may have contributed to more panfish being released that might have otherwise been kept.

Table 5. *Harvest (total and per acre) of species of fish in the Chippewa Flowage based on 2022 creel data. Harvest statistics only include the open water period.*

Species	Total harvest	Harvest per acre
Walleye	8,697 (5,766 angling, 2,931 spring tribal)	0.6
Muskellunge	1 (spring tribal)	<0.1
Black crappie	58,142	3.8
Bluegill	87,669	5.7
Yellow perch	5,368	0.4
Smallmouth bass	177	<0.1
Largemouth bass	1,736	0.1
Northern pike	6,893	0.5

Harvest of both largemouth bass and northern pike have been promoted at different points in the history of the Chippewa Flowage. A campaign to encourage harvest of smaller largemouth bass was in effect around the time of the 2011 creel survey and the minimum length limit for that species was eliminated around that same time. Still, over 90% of Largemouth bass caught by anglers were released in 2011 and that pattern held true in 2022 as well. Northern pike harvest has been encouraged for many decades since they became a part of the fishery out of concern that they may supplant muskellunge, the more popular and native Esocid species. Over 20% of northern pike caught by anglers were harvested in 1990, before harvest rates dipped in 1999 and 2011. A renewed and active campaign called the “Pike Improvement Project” was started in 2019 to incentivize more harvest of northern pike. The 2022 creel provides some evidence that program has been working, as pike harvest rates rose above 20% again. Still, a large majority of northern pike caught in the Chippewa Flowage are released despite liberal regulations and active promotion of pike harvest. A factor that contributes to the high release rate for pike is that a majority are caught “incidentally” by anglers targeting other species. Anglers specifically targeting pike are rare (Figure 2), but they likely have a higher interest in harvesting them. It has been an ongoing challenge to convince anglers to harvest pike caught incidentally.

WATER LEVEL MANAGEMENT

The water level on the Chippewa Flowage is always fluctuating as a result of the waterbody’s role as a storage reservoir for downstream hydropower production. This is especially true in winter months. In fact, some form of a winter drawdown has been performed each year since the flowage’s creation, with the smallest being 2.5 feet in magnitude, and the average being around 8 feet in magnitude (Figure 4).

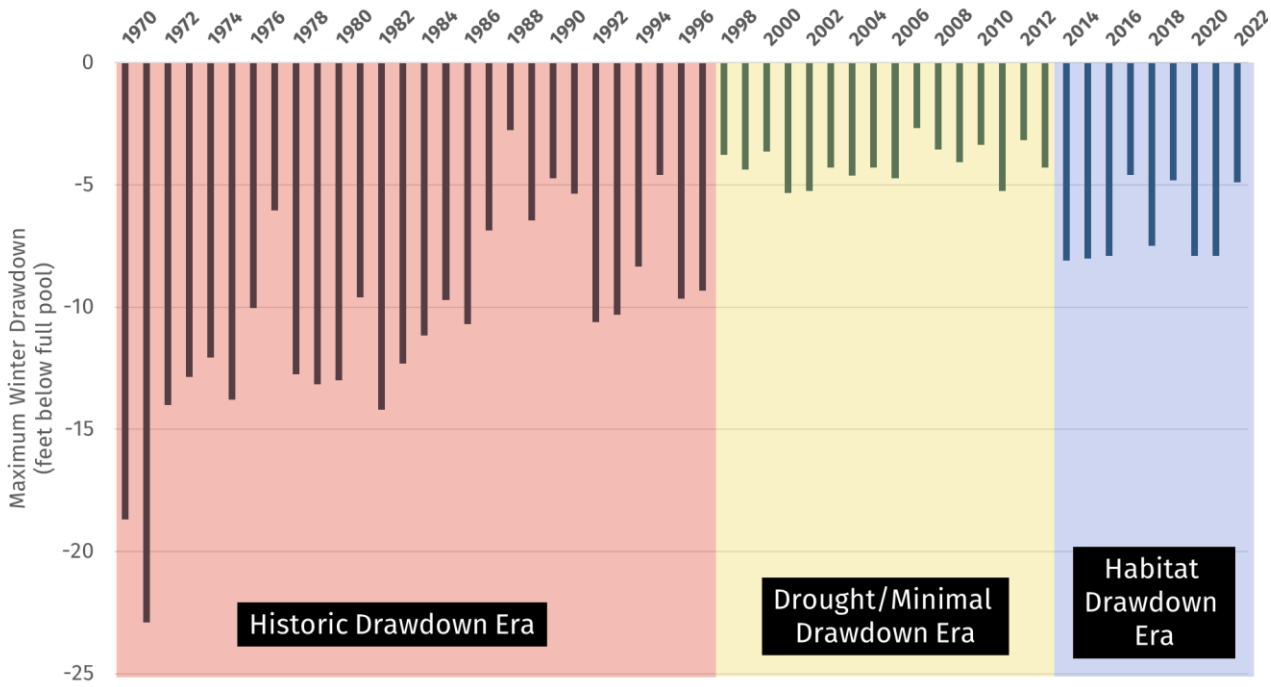

Figure 4. *Maximum depth (feet) of winter drawdown in the Chippewa Flowage since 1970. Three different "eras" of water level management are denoted with colors. Data provided by Xcel Energy.*

The span of time from 1970-present can be divided into three distinct "eras" of water level management. The names and cutoffs for these eras were generated as a part of this analysis and are not official terminology used by Xcel Energy or others. The "Historic Drawdown Era" (from dam creation up to 1998) included the deepest fall/winter drawdowns performed on the Chippewa Flowage. These drawdowns were typically performed during mid-winter, after ice was established on the lake. Deeper winter drawdowns favored riverine species like walleye, muskellunge and black crappie over more lake-dwelling species like largemouth bass and bluegill. Fish kills were also documented during some deeper winter drawdowns. As a result, deep winter drawdowns likely played a major role in structuring the fish community during this era.

The "Drought/Minimal Drawdown Era" (1998-2013) included a period of time when inflows to the reservoir were lower than what had historically been observed. This resulted in winter drawdowns of a smaller magnitude. Walleye recruitment was showing signs of weakening during this era, with some of the first consecutive years with poor walleye reproduction (2007-2013, Figure 5). Drops in water level in the summer were common as well during this era, which resulted from water releases during dry periods for downstream power generation. Summer drops in water level are generally smaller but can be impactful recreationally since they occur during a busier season when people are utilizing docks and boat landings. This era resulted in

the creation of the “Chippewa Flowage Partners Group” (CFPG), a collection of stakeholder and agency representatives (DNR, LCOCD, USFS) that meet quarterly to provide input to Xcel Energy on water level management and other topics.

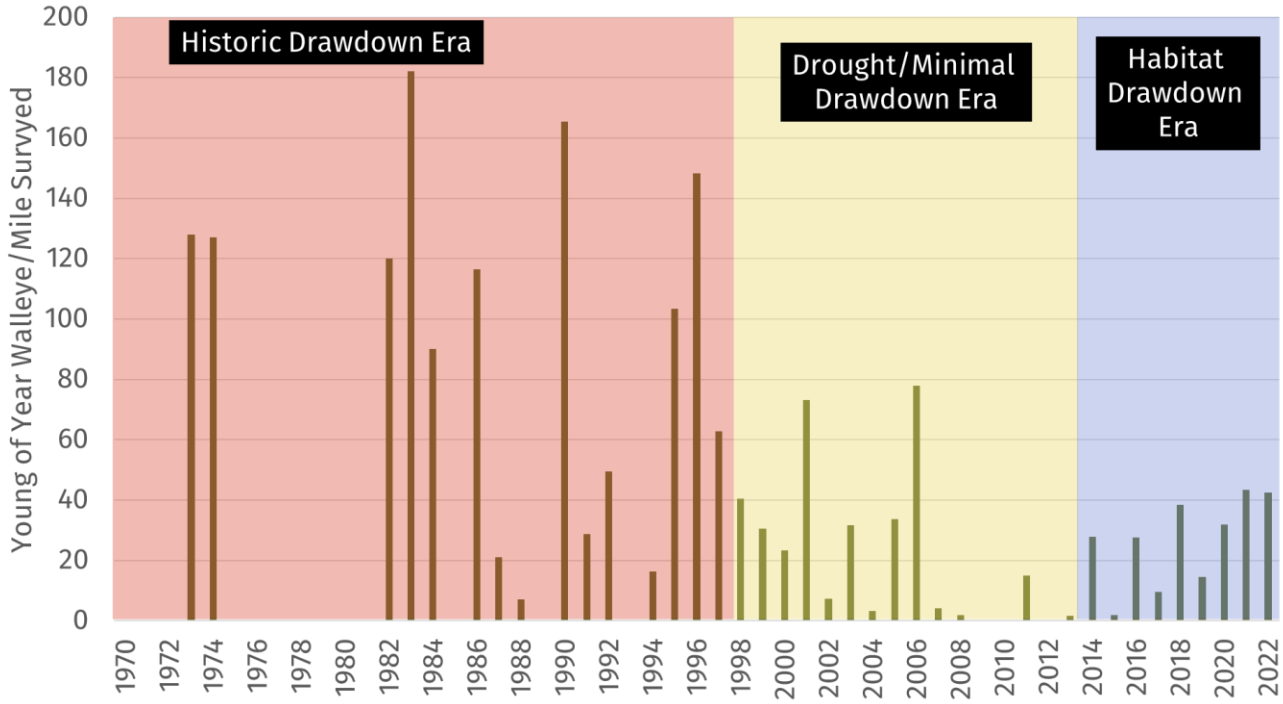

Figure 5. *Walleye year class strength in the Chippewa Flowage since 1970 based on relative abundance of young of year walleye captured in fall electrofishing surveys with different water level management “eras” highlighted in color. No survey data were available from 1970-1972 and 1975-1981, 1985 and 1989.*

The “Habitat Drawdown Era” (2013-present) was the direct result of the work of the CFPG. Analyses of fisheries and water level data found that walleye recruitment was stronger on the Chippewa Flowage following a deeper winter drawdown (Figure 5) and weaker during the Drought/Minimal Winter Drawdown Era (Figure 4). At this same time, invasive Eurasian milfoil became a major concern. The habitat drawdown was conceived and implemented in winter 2013-2014 as a means to address both of these issues. Habitat drawdowns on the Chippewa Flowage start earlier than a typical winter drawdown, with ~5 feet of water level reduction by mid-October. This timing allows nearshore areas to desiccate and freeze, which was theorized to be beneficial for both walleye spawning and Eurasian milfoil control. An additional 3 feet of water level reduction was done throughout the winter months, for a total winter drawdown magnitude of around 8 feet. Dropping the water level deeper than 8 feet could elevate the risk of fish kills. It was expected that a habitat drawdown would be needed approximately 2 out of every 3 years to achieve the combined fish and plant management goals, and from 2014 to present that has been the general frequency (6 years with a habitat drawdown, 3 years without). In years where a habitat drawdown

is not recommended or possible, Xcel Energy has followed their normal operating procedures, with most water level reductions happening in winter months after ice cover.

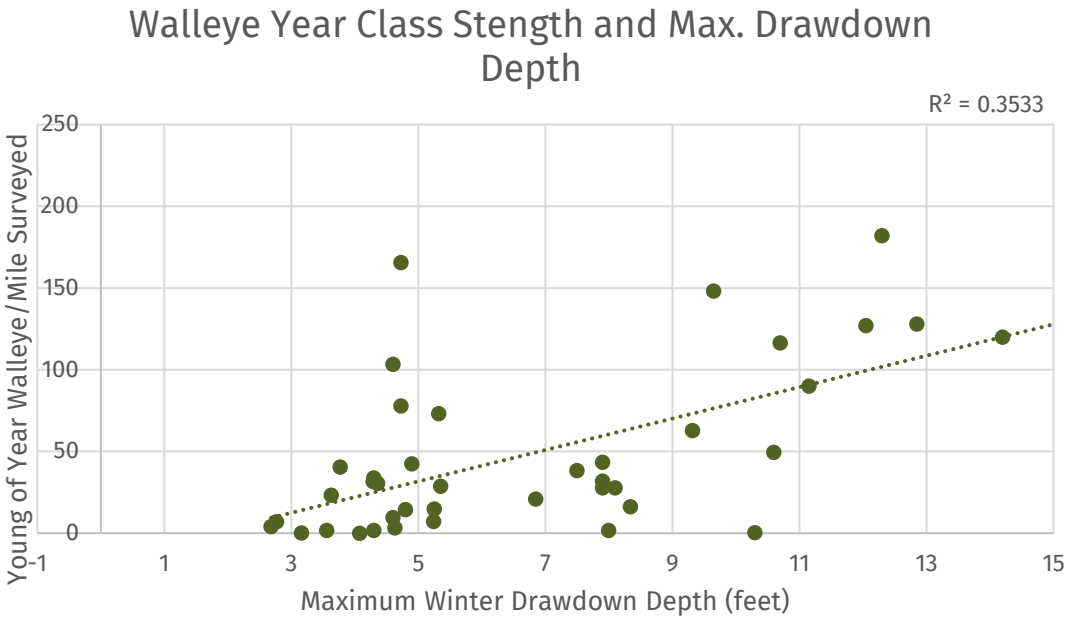

Figure 5. *Regression analysis of walleye year class strength (young-of-year per mile surveyed) and maximum winter drawdown depth. Data are from 1970-2022. This relationship was statistically significant (P<0.05).*

Habitat drawdowns appear to have been a successful prescription for restoring walleye recruitment on the Chippewa Flowage. Since 2013, years with a habitat drawdown have had nearly twice the relative abundance of walleye young-of-year in fall surveys (Figure 7). Interestingly, walleye recruitment in both habitat drawdown and non-habitat drawdown years has been trending upward, likely indicating a return to walleye dominance in the fishery and a better “margin for error” for walleye reproductive success. Reductions in Eurasian milfoil following drawdowns have also been observed by specialists with the LCOCD and researchers at Northland College, though the results achieved from any individual drawdown seem to be short-lived (report in prep).

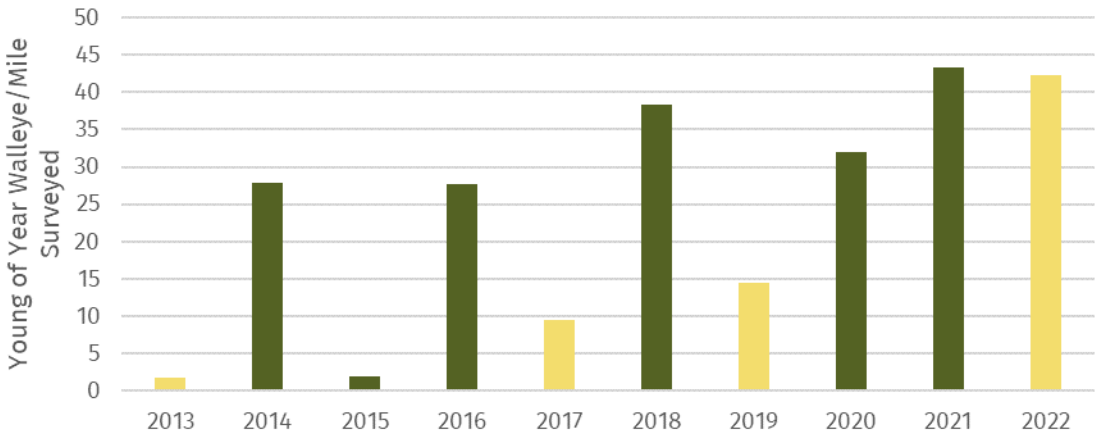

Figure 7. *Relative abundance of young-of-year walleye in the Chippewa Flowage following a habitat drawdown (green bars) and years without a habitat drawdown (yellow bars).*

The benefits of drawdowns for muskellunge are less clear and conclusions are limited by available data. There is less indication that muskellunge benefit from deeper winter drawdowns in the same way that walleye do in the Chippewa Flowage (Figure 8). However, in the Habitat Drawdown Era, more muskellunge recruitment has been observed following a habitat drawdown (in fact, no natural born muskellunge have been observed following a year without a habitat drawdown since 2013, Figure 9). Young of year muskellunge catch rates following habitat drawdowns are still not very high in comparison to other naturally reproducing muskellunge lakes and what may have been present in the Chippewa Flowage historically (i.e., pre-northern pike).

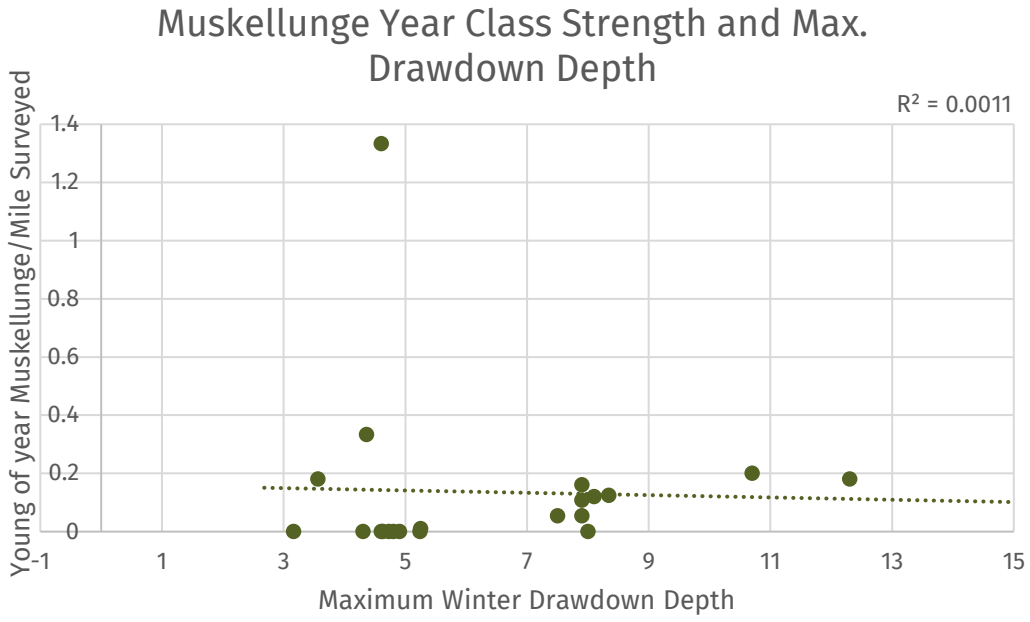

Figure 8. *Regression analysis of muskellunge year class strength (young-of-year per mile surveyed) and maximum winter drawdown depth. Data are from 1970-2022. This relationship was not statistically significant (P>0.05).*

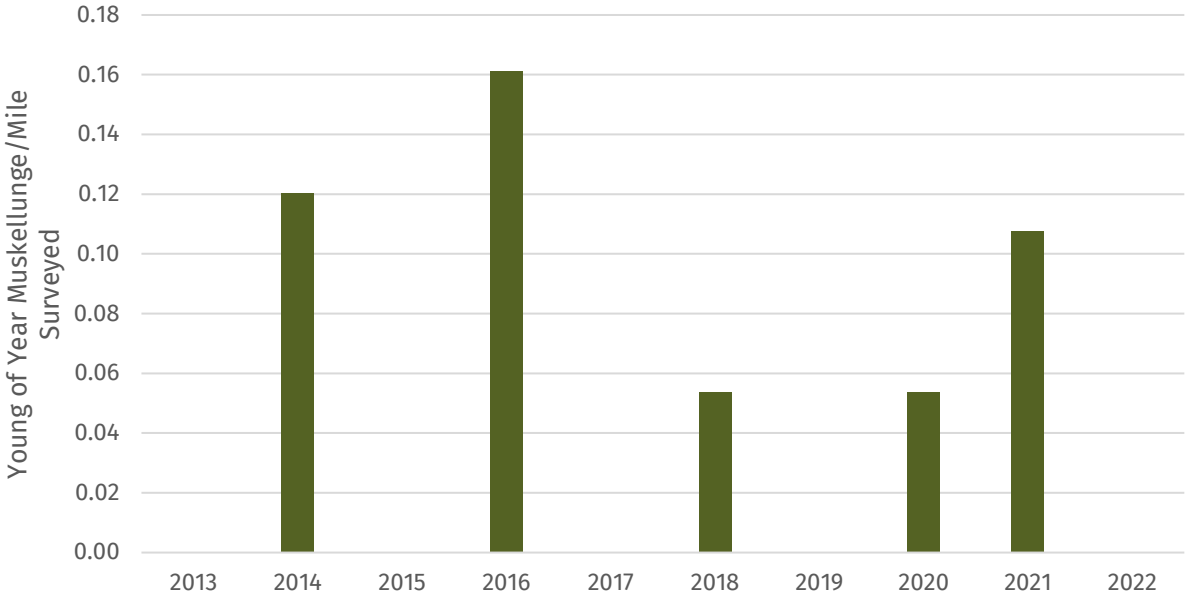

Figure 9. *Relative abundance of young-of-year muskellunge in the Chippewa Flowage. Green bars indicate years following a habitat drawdown. No habitat drawdown was performed before the 2013, 2017, 2019 and 2022 spawning seasons and no young-of-year muskellunge were observed in those year.*

Impacts of habitat drawdowns on other species are also somewhat difficult to interpret with available data (data from before the Habitat Drawdown Era is limited to 2009-2013). Abundance of largemouth bass (Figure 10) and bluegill (Figure 11) have been reduced since habitat drawdowns started. However, habitat drawdowns started at a time when largemouth bass and bluegill abundance were very high. It is possible that abundance of these species would have come down from those peaks regardless of water level management decisions. Walleye also increased in abundance after habitat drawdowns began, creating more potential competitive interactions and predation on bass and bluegill, a possible secondary impact of the habitat drawdowns.

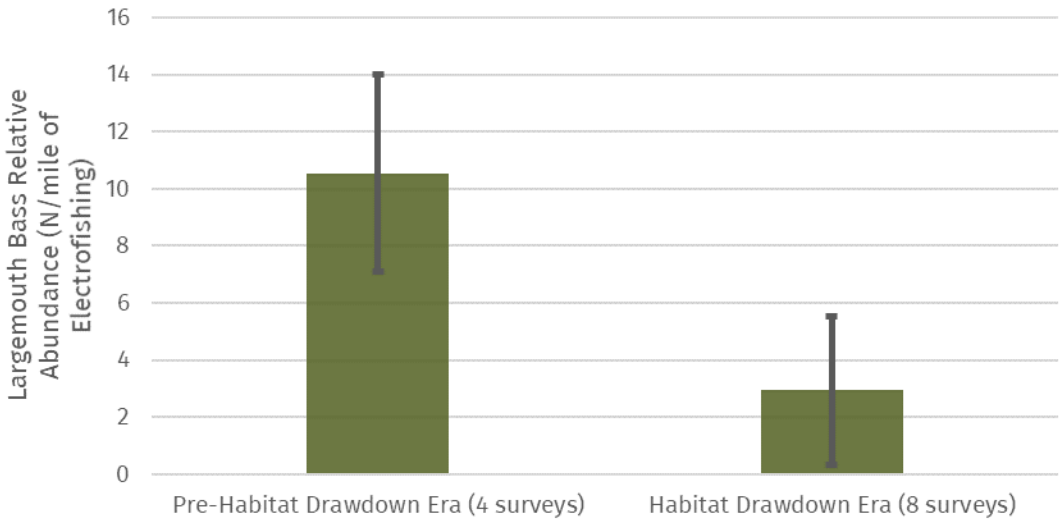

Figure 10. *Average relative abundance of largemouth bass in the Chippewa Flowage before and during the "Habitat Drawdown Era" (2014-present). Data are from late spring boat electrofishing (N/mile). Error bars represent standard deviation.*

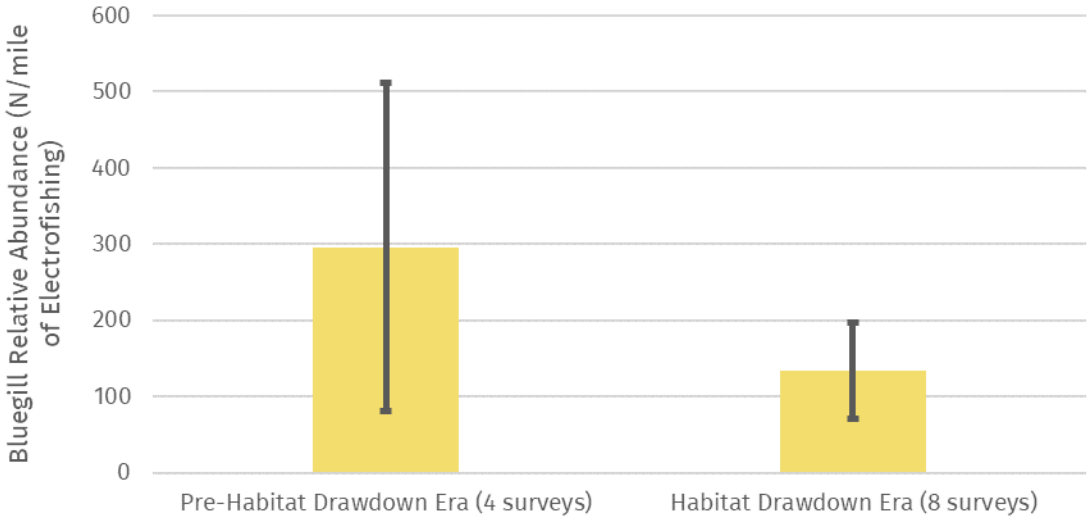

Figure 11. *Average relative abundance of bluegill in the Chippewa Flowage before and during the "Habitat Drawdown Era" (2014-present). Data are from late spring boat electrofishing (N/mile). Error bars represent standard deviation.*

There do not appear to be impacts from habitat drawdowns on abundance of northern pike, black crappie or smallmouth bass (Table 6). Relative abundance for these species was also more variable and there were slightly fewer surveys to draw from.

Table 6. *Average relative abundance of smallmouth bass, black crappie and northern pike in the Chippewa Flowage before and during the "Habitat Drawdown Era" (2014-present). Data for smallmouth bass are from late-spring boat electrofishing (N/mile) and data for black crappie and northern pike are from fyke netting (N/net night).*

SPECIES	PRE-HABITAT DRAWDOWN ERA RELATIVE ABUNDANCE (STANDARD DEVIATION)	HABITAT DRAWDOWN ERA RELATIVE ABUNDANCE (STANDARD DEVIATION)
Smallmouth Bass	11.4/mile (12.5)	10.6/mile (9.8)
Black Crappie	21.1 per net night (6.6)	19.0 per net night (7.9)
Northern Pike	7.0/net-night (4.4)	9.8/net-night (7.8)

The CFPG developed a "habitat drawdown recommendation" guide (Appendix 3) to aid in making water level recommendations. The guide incorporates fisheries data, such as those presented here, along with plant survey data and observations and experiences from stakeholders. The guide provides an empirical basis for a habitat drawdown recommendation and is intended to generate a recommendation to perform a habitat drawdown in some, but not all, years. With the guide, a recommendation for a habitat drawdown is largely reliant on recent resource data.

STATUS OF IMPORTANT SPECIES

WALLEYE

Walleye were ranked as the top species of interest for anglers in the CFFMP and receive a considerable amount of survey effort. The history of walleye recruitment and the relationship between walleye and water level management are discussed in more detail on pages 14-18. The abundance of walleye increased since natural reproduction returned in 2014 and a more restrictive regulation was put in place (2015). The abundance of walleye in the Chippewa Flowage in 2022 was estimated to be 72,837 adults or 4.8 adults/acre (Figure 13). This meets the abundance objective for walleye in the CFFMP and represents an increase over both the 1999 and 2011 estimates.

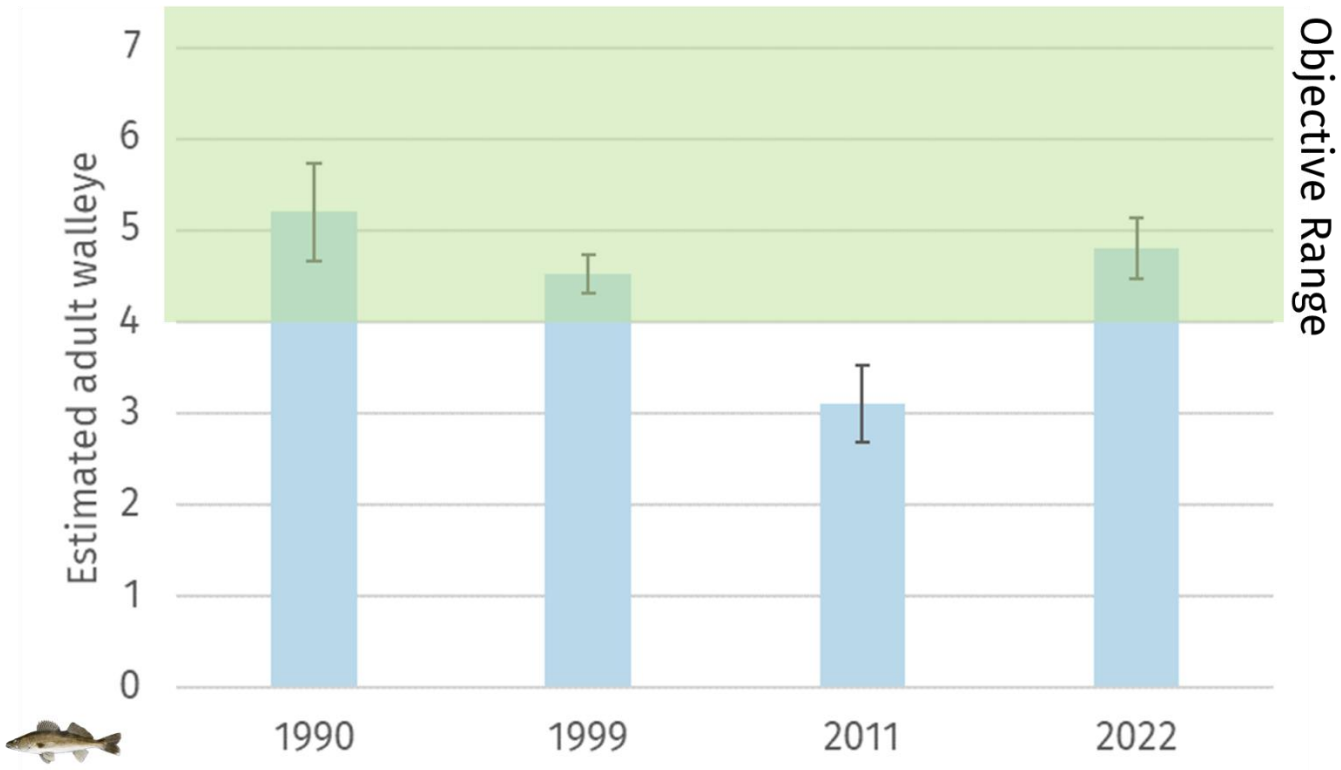

Figure 13. *Estimated abundance of adult walleye (per acre) in the Chippewa Flowage at four points in time. Green shaded area represents the objective range for abundance (4-8 per acre) in the Chippewa Flowage Fisheries Management Plan (2007).*

Size of walleye has also been in line with the established objective in the CFFMP. In 2022, 31% of walleye in the Chippewa Flowage were over 15 inches (Figure 14). Over time, the size of walleye in the Chippewa Flowage has met the size objective in the CFFMP in 5 of 11 survey years and exceeded the objective range in 6 of 11 survey years (Figure 15).

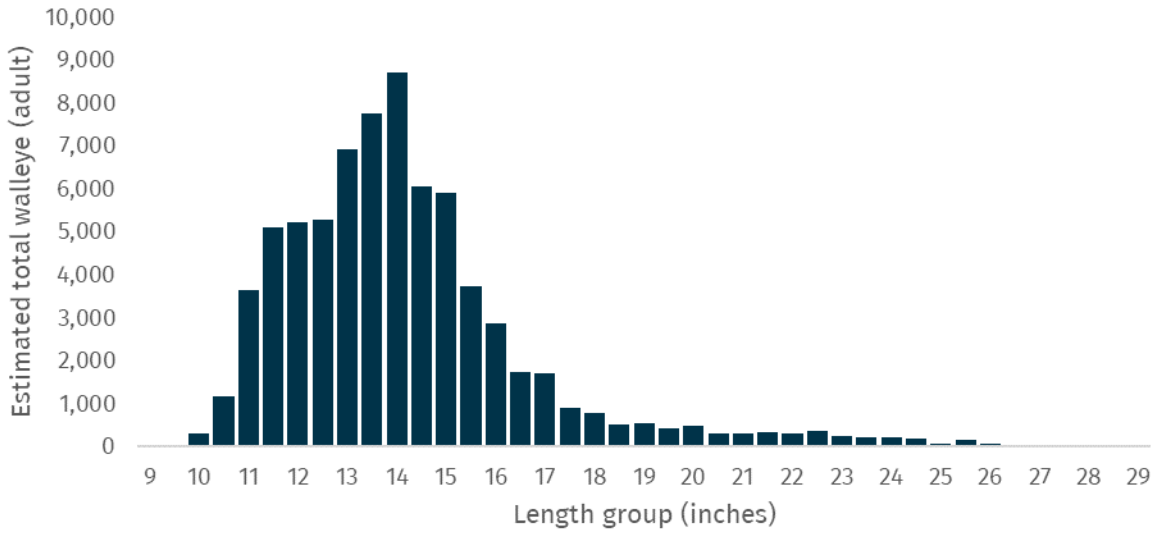

Figure 14. *Length frequency of adult walleye estimated to be in the Chippewa Flowage in 2022, based on a whole-lake mark-recapture survey.*

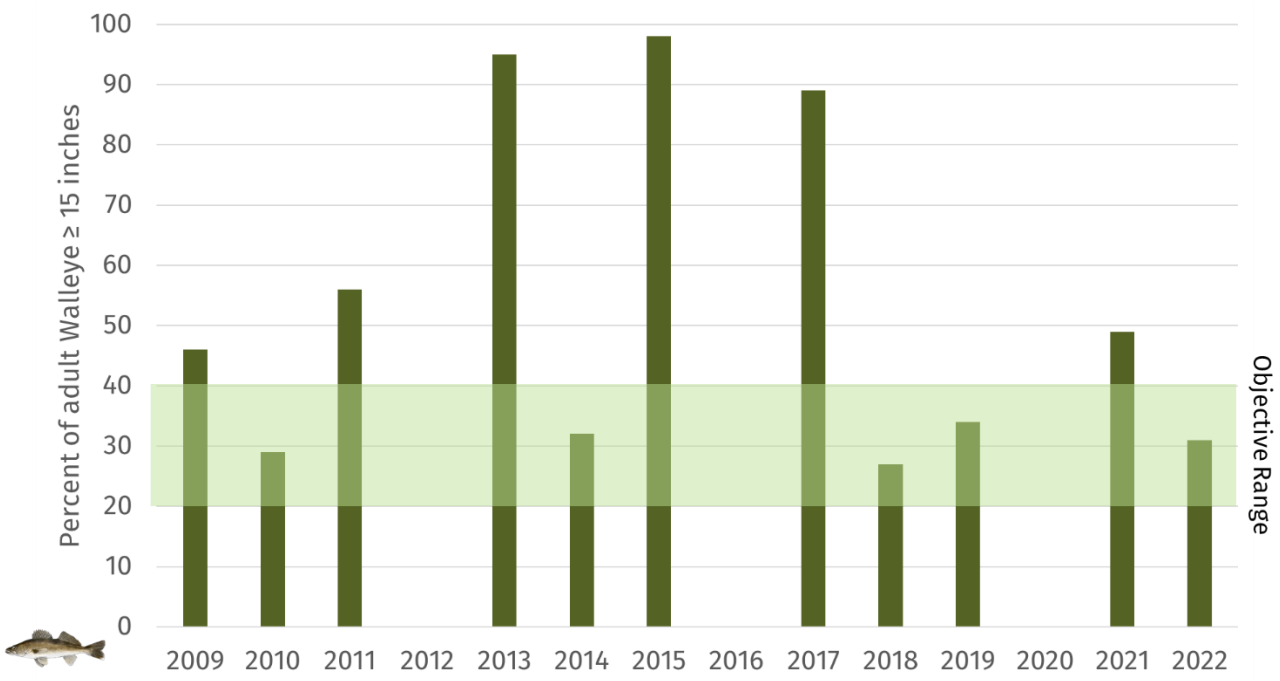

Figure 15. *Size structure of walleye (PSD-15, or percentage of walleye over 15 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (20-40% over 15 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from spring netting surveys.*

Growth of walleye in the Chippewa Flowage is linked to population density. Walleye grow faster during periods of low density (early 2010s) and slower during periods of high density (early 1990s). Walleye growth (length at age) in 2022 generally tracked

with the regional average. Growth of males was predictably slower than that of females (Figure 16). Both males and females reach 15 inches of length (legal size) in about 5 years. It takes a female walleye about 8 years to reach 20 inches, while most males will never achieve that mark.

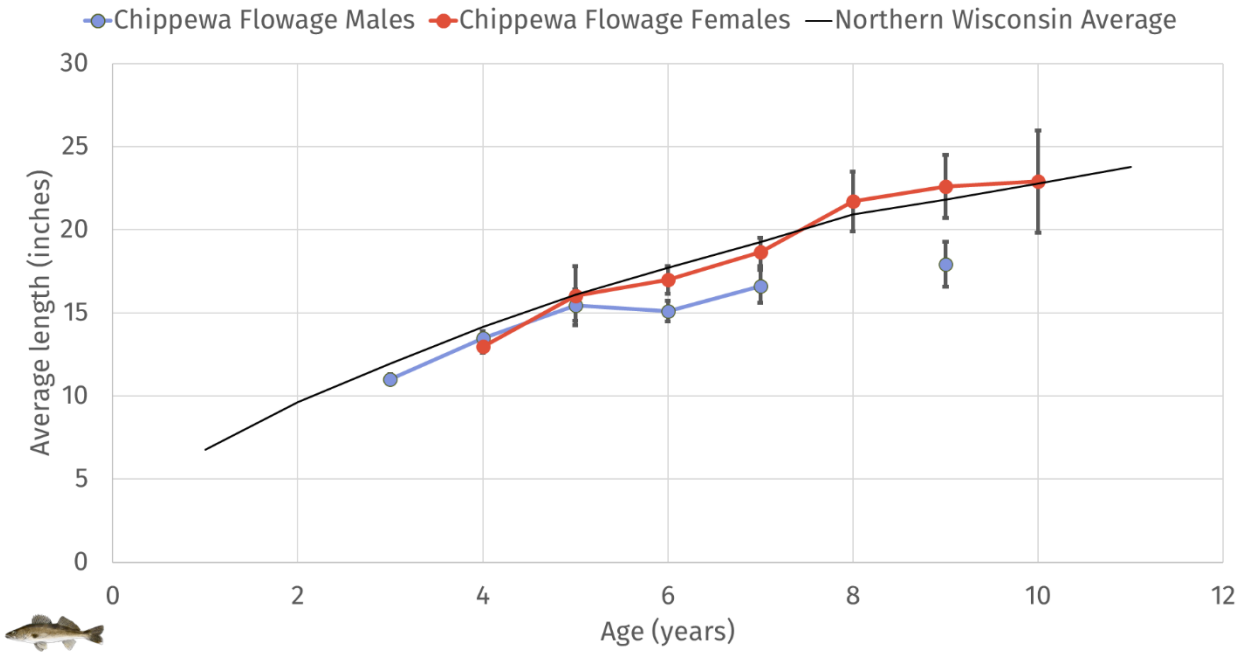

Figure 16. *Walleye mean length at age (with 95% confidence intervals), by sex, in the Chippewa Flowage with the Northern Wisconsin average shown for comparison. Ages were estimated using sectioned dorsal spines. Data were from 2022.*

"Exploitation" is the percent of the total population that is harvested in a given year. In 2022, estimated walleye exploitation from angling was 4.7% and tribal spring harvest was 3.2%, for a total of 7.9%. Estimated exploitation rates in 2011 were 5.6% for angling and 3.9% for tribal harvest for a total of 9.6%.

MUSKELLUNGE

Muskellunge (or "Musky") have a venerable position in the Chippewa Flowage fishery and are deeply connected to the history of the waterbody. Anglers today value muskellunge as a trophy species with a primary emphasis on catch and release. Some muskellunge are harvested annually both on and off-reservation by tribal harvesters.

Assessing muskellunge abundance in the Chippewa Flowage has been very challenging. Population estimates have rarely been attempted and resulting numbers have been statistically unreliable. Even relative abundance measures have high variability, likely related to survey timing and amount of effort expended.

Angler catch rate in creel surveys may be one of our best measures of muskellunge angling experience on the Chippewa Flowage through time. Angler catch rates were highest (i.e., lowest number of hours needed to catch a muskellunge) in 1990 before falling in the 1999 and 2011 creels (Table 7). Angler catch rate increased slightly between the 2011 and 2022 creel surveys. Overall, anglers should expect to put in at least 40 hours of angling effort for every muskellunge caught in the Chippewa Flowage, since that rate has been relatively consistent for over 30 years.

Table 7. *Total estimated catch and catch rate of muskellunge in the Chippewa Flowage based on angler creel data from four points in time.*

YEAR	ESTIMATED TOTAL MUSKELLUNGE CAUGHT	MUSKELLUNGE CATCH RATE (Hours per fish caught)
2022	1,787	56.5
2011	1,706	69.0
1999	2,912	65.8
1990	6,938	43.9

Assessing muskellunge size is more straightforward, provided that a suitable number are captured by survey efforts. Muskellunge size in the Chippewa Flowage has most often been lower than the objective PSD-42 range in the CFFMP (7 of 8 survey years) and was exceeded in one survey year (Figure 17). The objective for PSD-42 has never been met. Similarly, the objective for PSD-50 has never been met, though some 50-inch muskellunge have been captured. Muskellunge top-end size is of major interest for anglers, particularly in a lake managed for trophy fish.

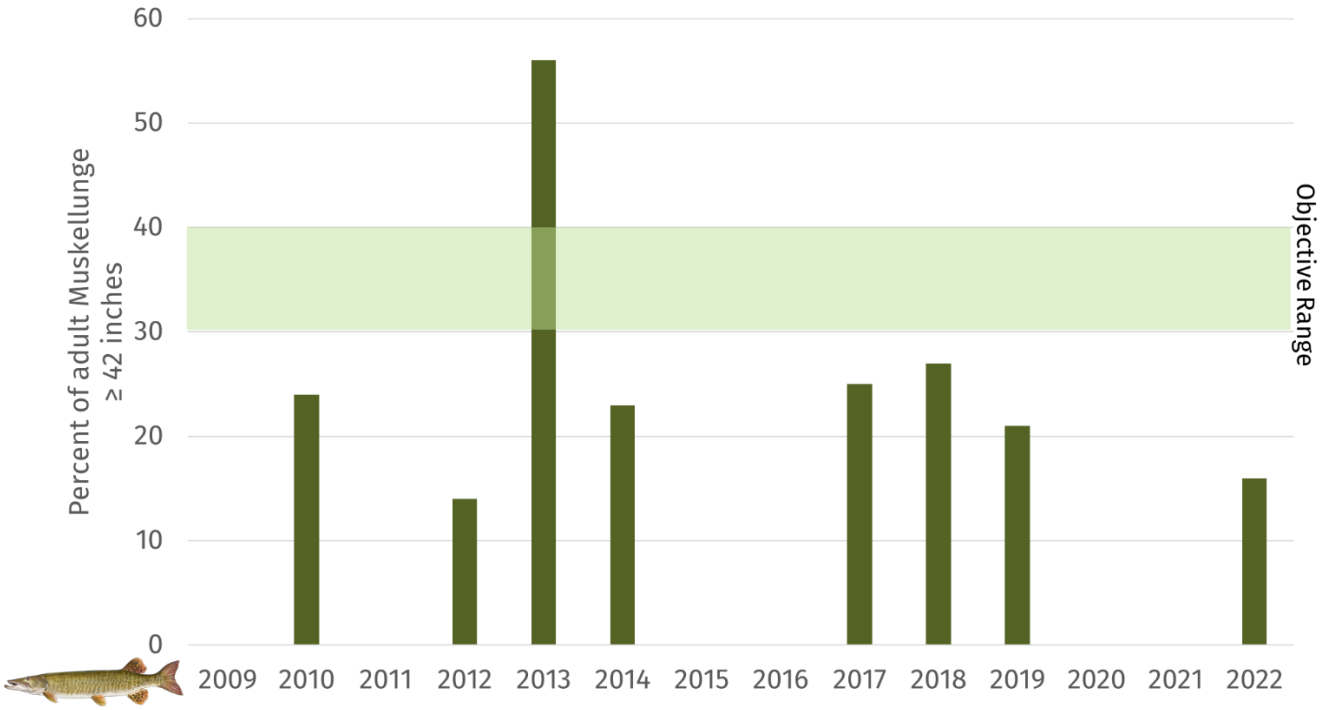

Figure 17. *Size structure of muskellunge (PSD-42, or percentage of muskellunge over 42 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (30-40% over 42 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from spring netting surveys, no data are available for 2009, 2011, 2015-2016 and 2020-2021.*

Size of muskellunge in a waterbody is a function of growth and mortality rates. Growth of Chippewa Flowage muskellunge appears to be adequate for fish to reach sizes that would be of interest to anglers. Known age PIT-tagged muskellunge stocked into the Chippewa Flowage in 2013, 2016 and 2019, and captured in subsequent years show growth that is faster than regional averages (Figure 18). Muskellunge in the upper-30 and low-40-inch range are common (Figure 19), but larger fish are rarer. This has been an issue since many anglers value top-end size above all other population characteristics.

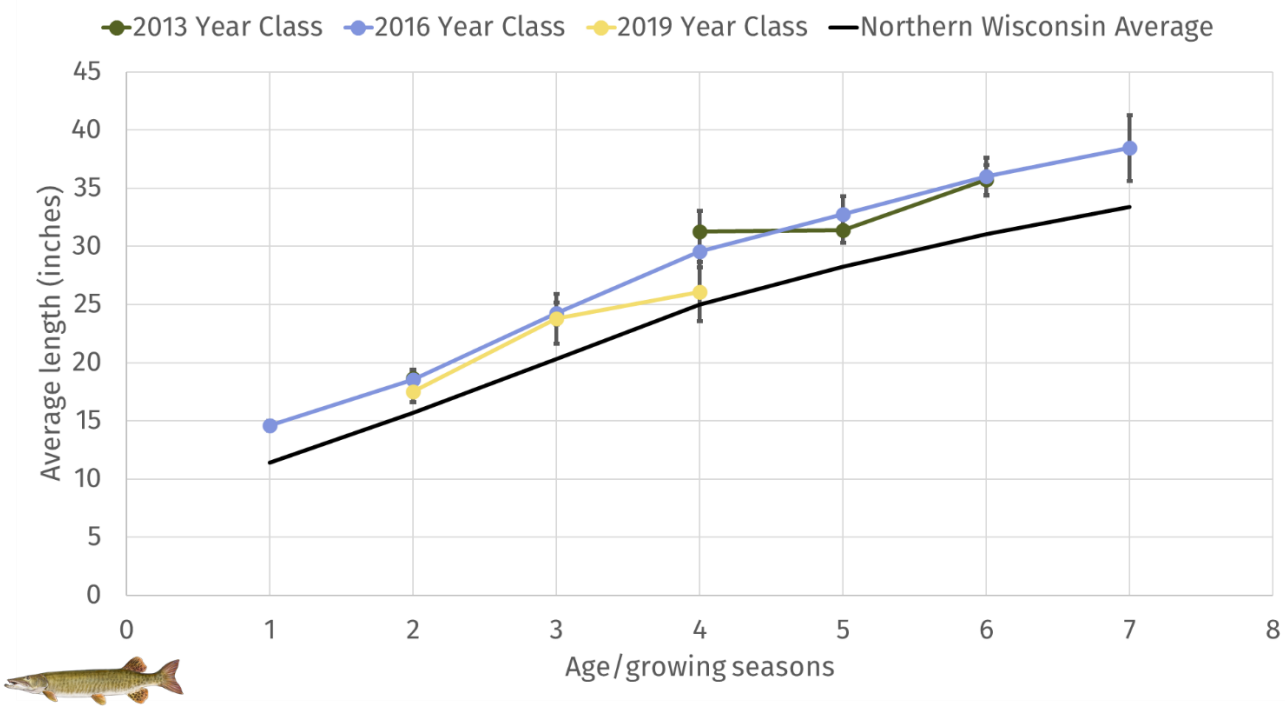

Figure 18. *Muskellunge mean length at age (with 95% confidence intervals) in the Chippewa Flowage based on known-age PIT tag recaptures from three separate year classes. Data only include stocked muskellunge. The average for Northern Wisconsin is also shown.*

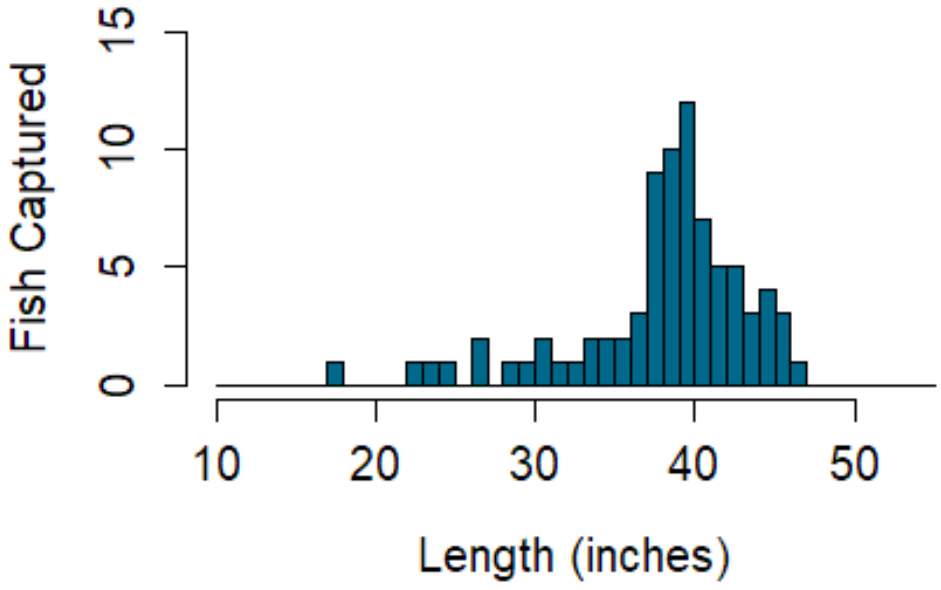

Figure 19. *Length frequency of muskellunge captured during broodstock netting survey of the Chippewa Flowage in 2019 by the DNR Governor Thompson Hatchery Team.*

Mortality and longevity of muskellunge in the Chippewa Flowage is mostly unknown, but may be a contributing factor to observed size structure. Additional insights into muskellunge mortality may be obtained from PIT tag data, but other direct analyses may be necessary as well.

BLACK CRAPPIE

While they may not have the same prestige as walleye or muskellunge, black crappie are arguably the most popular species among Chippewa Flowage anglers based on a combination of stated preferences in the CFFMP and measured directed effort in past creel surveys. Black crappie are managed for harvest and moderate abundance, while trying to maintain a certain degree of quality size structure (Table 1).

Black crappie abundance in the Chippewa Flowage has been somewhat variable over time, with survey timing likely contributing to that variation, since crappie are more often a secondary target in surveys directed at walleye or muskellunge. The population has met the target abundance in about a third of surveys conducted since the creation of the CFFMP (3 of 10 surveys, Figure 20). Abundance has only been below the target range in one year and has exceeded the target range in six years. The range of observed relative abundance measurements for black crappie in the Chippewa Flowage roughly lines up with the 75th-90th percentiles for the complex-cool-dark lake class.

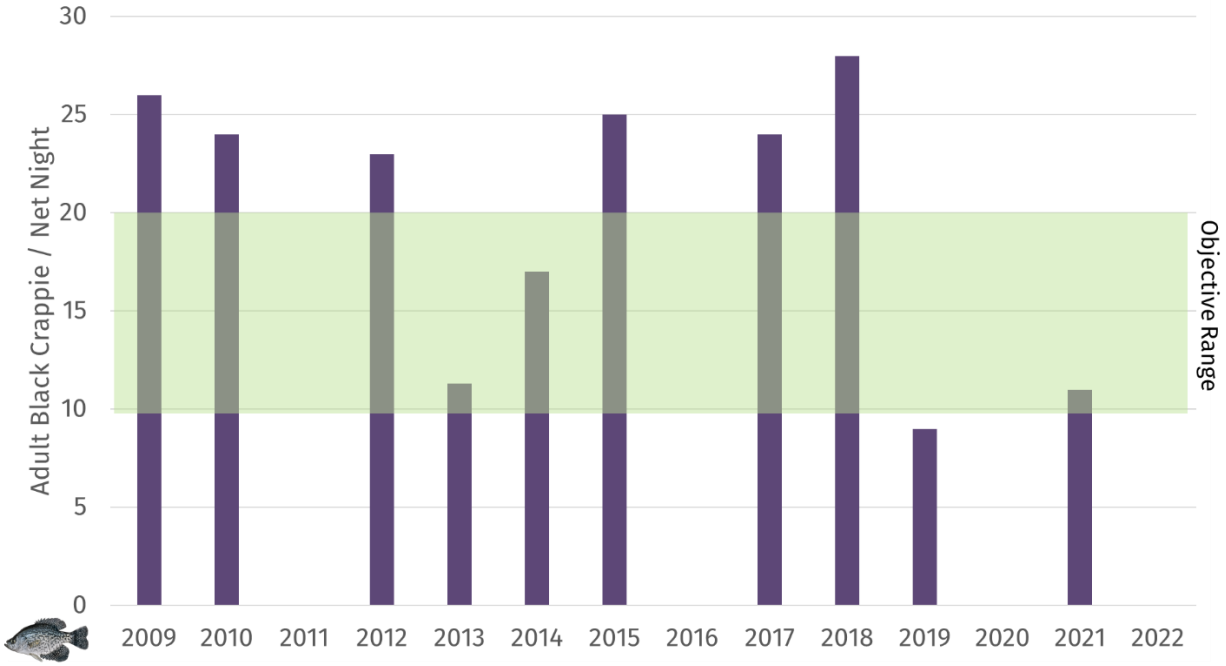

Figure 20. *Black crappie relative abundance (catch/net night) in the Chippewa Flowage from 2009-2022. Data are from spring netting surveys. No survey data were available in 2011, 2016, 2020 and 2022. Green shaded area represents the objective range for relative abundance (10-20 per net night) in the Chippewa Flowage Fisheries Management Plan (2007).*

The population has met the size structure target in about half of surveys conducted since the creation of the CFFMP (4 of 10 surveys, Figure 21). Size structure has typically been around the low end of the objective range in years the target is met. Size has been more commonly below the objective range (5 of 10 years) and has only once been determined to be above the target range. The reduced panfish bag limit that was implemented in 2022 is expected to reduce exploitation of all panfish by ~18% and lead to small improvements in average size of panfish species, which may lead to more consistent achievement of this size objective in the future.

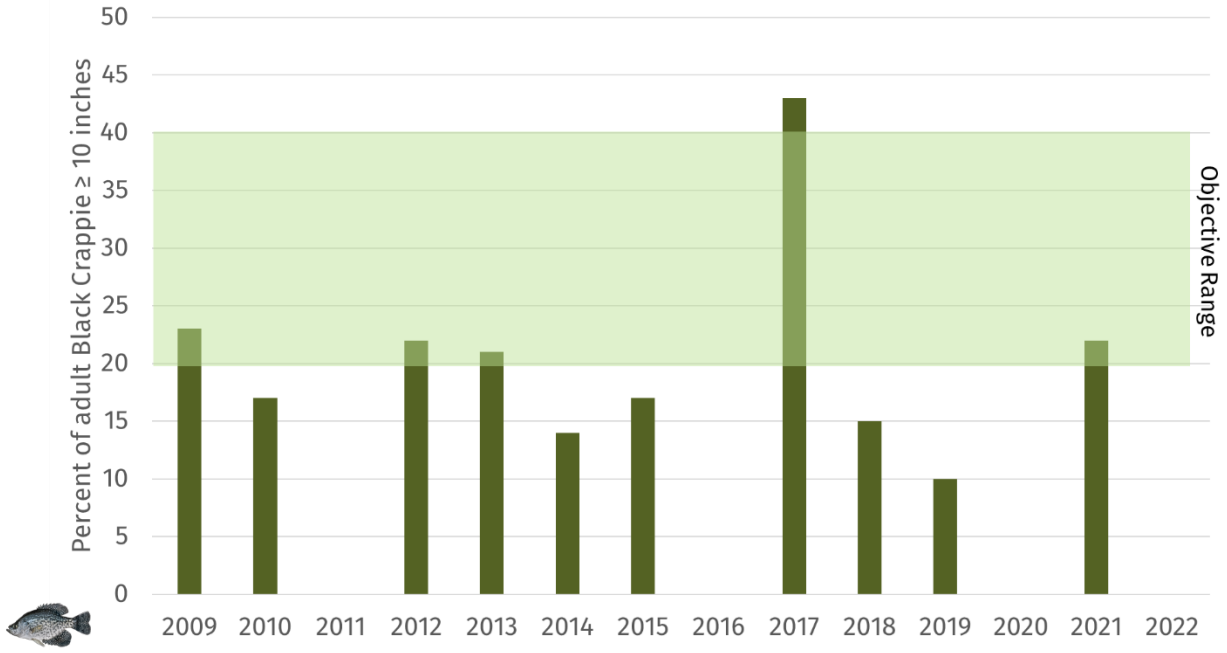

Figure 21. *Size structure of black crappie (PSD-10, or percentage of black crappie over 10 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (20-40% over 10 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from spring netting surveys, no data are available for 2011, 2016, 2020 and 2022.*

Growth of black crappie in the Chippewa Flowage closely follows the regional average (Figure 22). Chippewa Flowage black crappie reach 10 inches in around 6-7 years, on average, and a sizable proportion make it to this size, even under the previously more liberal angling regulation (Figure 20). However, growth appears to slow after age 7, and annual mortality in 2017 was calculated to be 62.6% for adult black crappie. This combination of factors makes it difficult for black crappie to reach preferred length (12 inches), a size that rarely appears in Chippewa Flowage fisheries surveys (Figure 23).

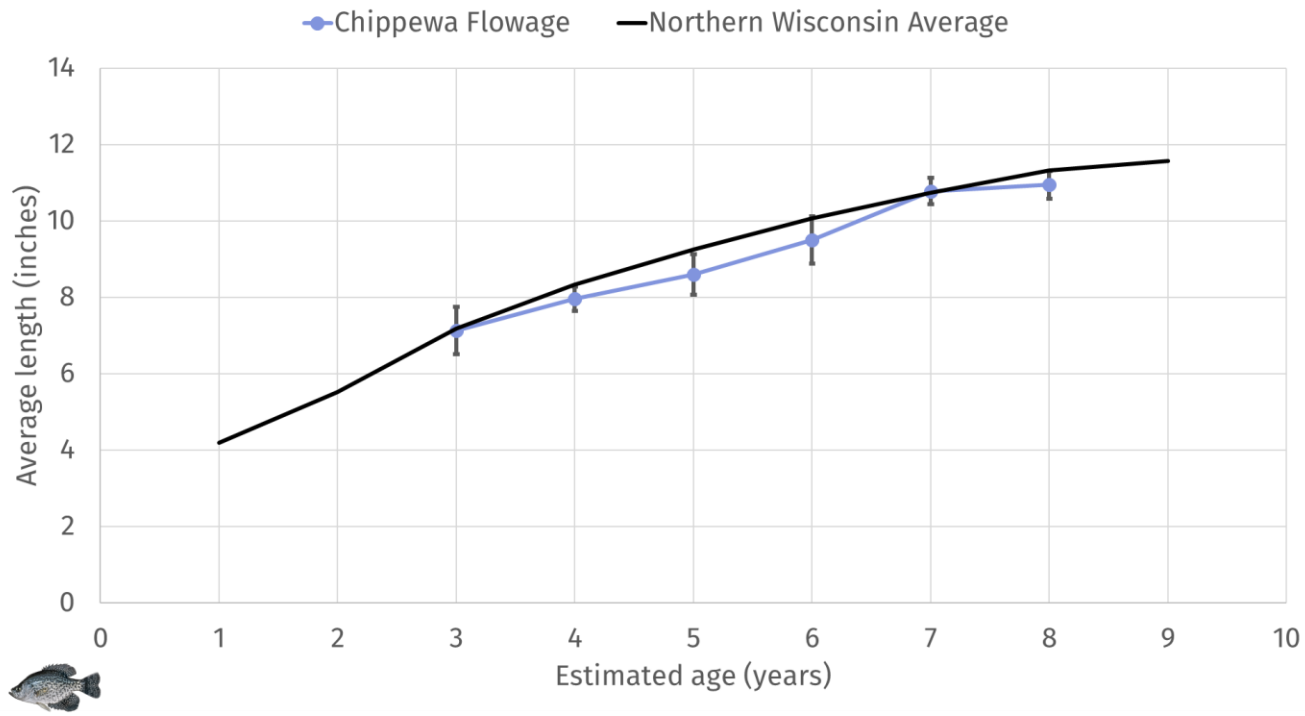

Figure 22. *Black crappie mean length at age (with 95% confidence intervals) in the Chippewa Flowage based on samples collected in 2017 (west side) along with the Northern Wisconsin average for comparison. Ages were estimated using sectioned otoliths.*

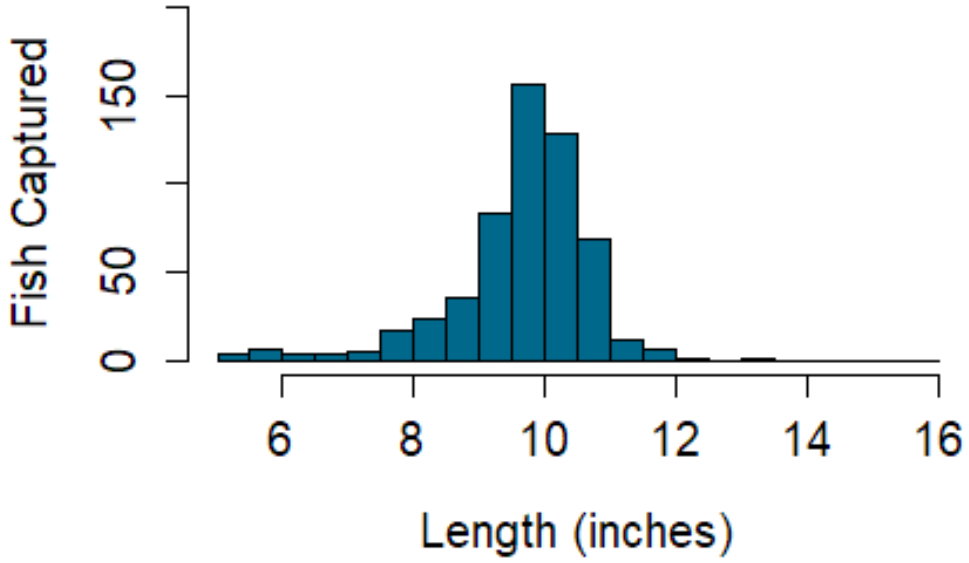

Figure 23. *Length frequency of black crappie captured in a 2017 spring fyke netting survey of the Chippewa Flowage.*

BLUEGILL

Bluegill were one of the most targeted species in the 2022, accounting for over 100,000 hours of angling effort. Bluegill are an accessible species for anglers of all skill levels, and are valued for harvest as well as consistent angling action.

The general perception is that bluegill abundance has increased considerably since the 1990s when the species was likely limited by deeper winter drawdowns (Figure 4). The impact of the more recent "habitat drawdowns" on bluegill abundance is discussed on page 20-21, but even within the habitat drawdown era, bluegill abundance was consistently higher than the objectives of the CFFMP. Bluegill relative abundance exceeded the target range in all 12 surveys conducted since 2009 (Figure 24). However, the observed abundance is actually very normal for lakes of this class, with surveys typically generating a catch rate that falls in the 50th-90th percentile. The objective in the CFFMP is closer to the 25th percentile for this lake class. This objective may need to be reworked, considering that it has never been met and anglers may not be pleased with a bluegill population that would be less than half as abundant as what has been observed over the last 15 years.

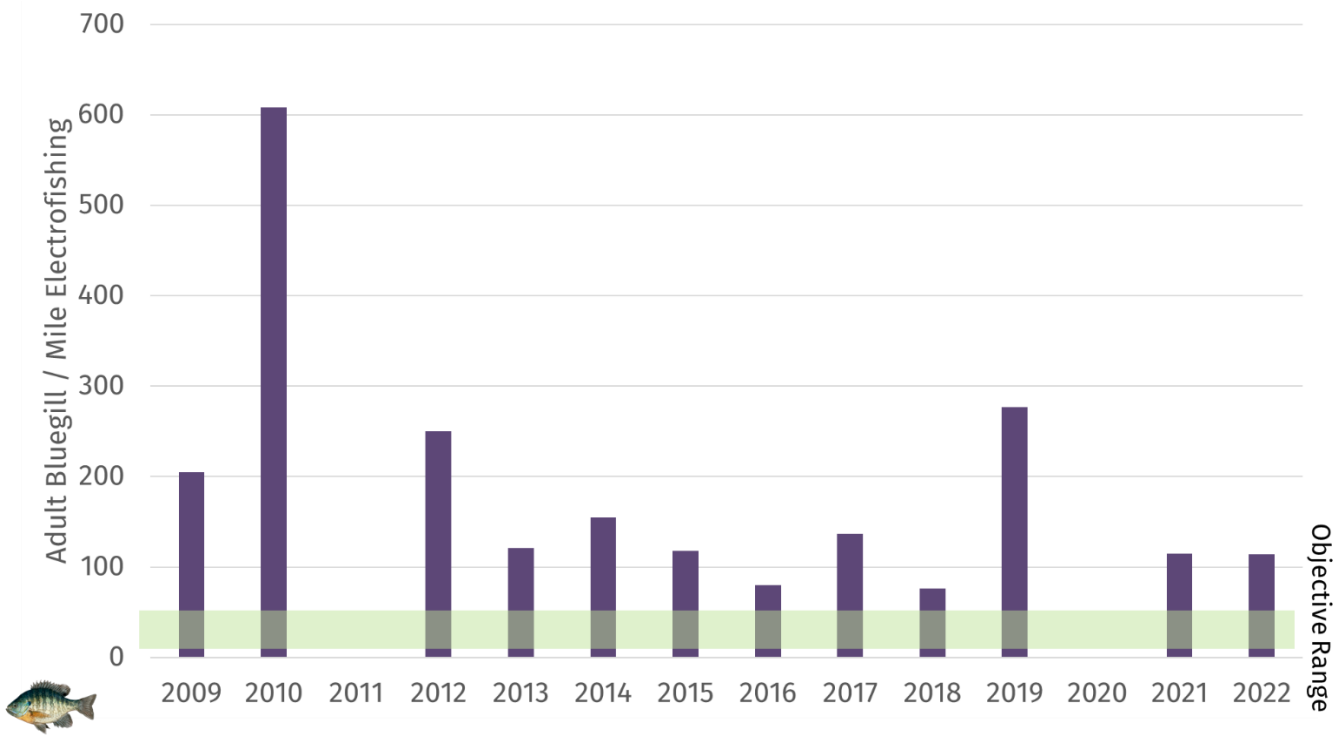

Figure 24. *Bluegill relative abundance in the Chippewa Flowage from 2009-2022 late spring electrofishing surveys. No survey data were available in 2011 and 2022. Green shaded area represents the objective range for relative abundance (25-50 per mile electrofished) in the Chippewa Flowage Fisheries Management Plan (2007).*

While it is possible bluegill abundance could at some point be too low to be desirable to anglers, there are also issues associated with abundance being too high. The high abundance observed from 2009-2012 (Figure 24) corresponded with some of the lowest size structure observed in the population (Figure 25). Keeping bluegill abundance from becoming excessive will be an important management action for achieving size-based objectives. Maintaining the abundance of predators, such as walleye, and periodic use of habitat drawdowns will likely help keep bluegill abundance in check.

Observed bluegill size has typically been below the objective range in the CFFMP (9 of 12 survey years), has been above the objective range once and has only been in the objective range twice (Figure 25). However, there is some slight indication that size has improved since 2015 and the reduced panfish bag limit implemented in 2022 may further these improvements over time and lead to more consistent achievement of the objective. An abundant predator population (walleye) will also help manage bluegill abundance and deliver better size.

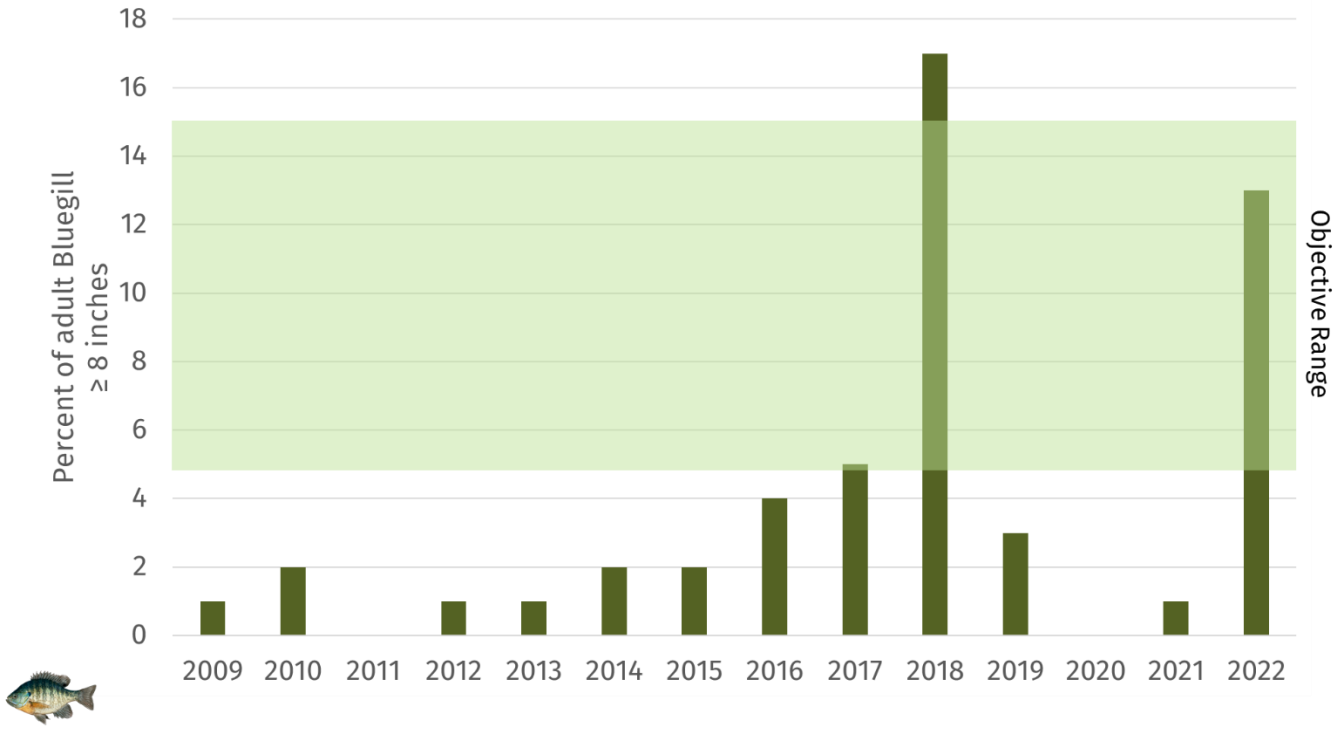

Figure 25. *Size structure of bluegill (PSD-8, or percentage of bluegill over 8 inches) in the Chippewa Flowage late spring electrofishing surveys between 2009-2022. Green shaded area represents the objective range for size (5-15% over 8 inches) in the Chippewa Flowage Fisheries Management Plan (2007). , no data are available for 2011 and 2020.*

Bluegill have fast growth in the Chippewa Flowage and exceed the regional average and adults are able to reach 8 inches in 5-6 years. However, 8-inch bluegill are still relatively rate at any point in time (Figure 25, Figure 27). These data provide further

reason to believe that size improvements are possible with reduced exploitation that is expected with the new reduced bag limit.

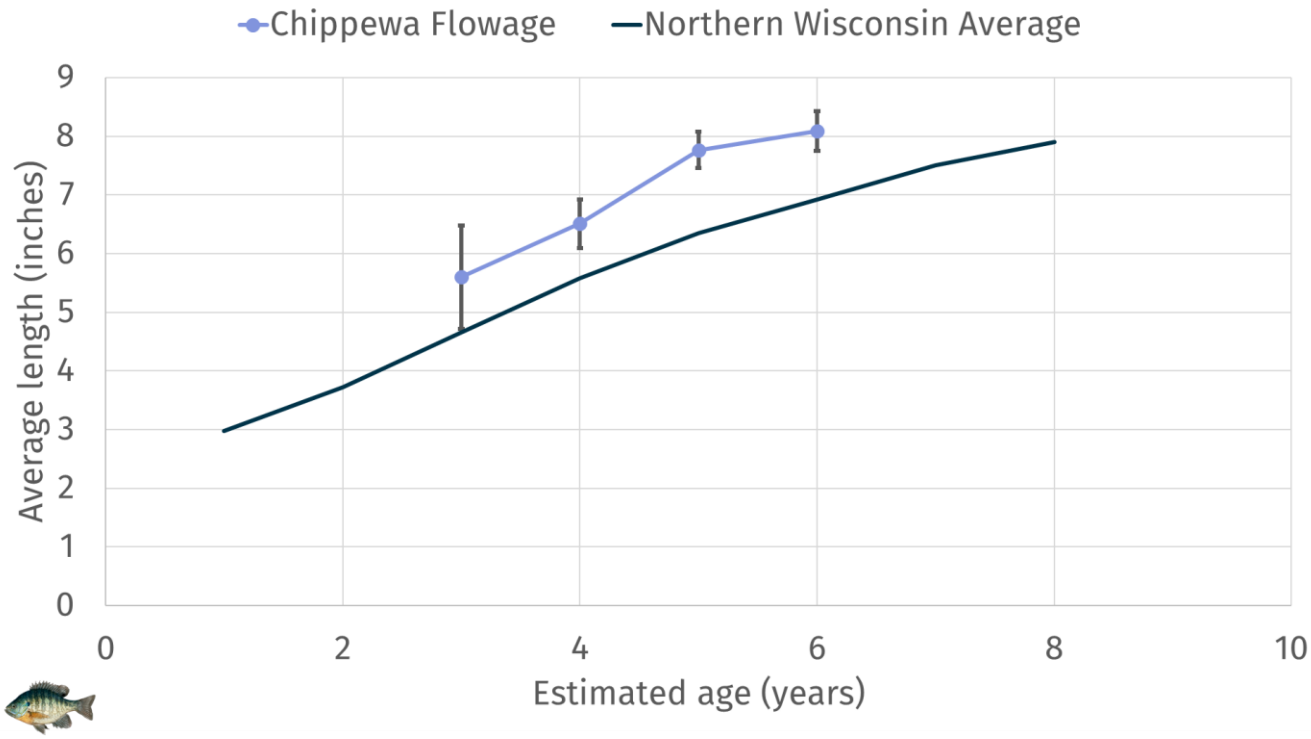

Figure 26. *Bluegill mean length at age (with 95% confidence intervals) in the Chippewa Flowage based on samples collected in 2017 (west side) along with the Northern Wisconsin average for comparison. Ages were estimated using sectioned otoliths.*

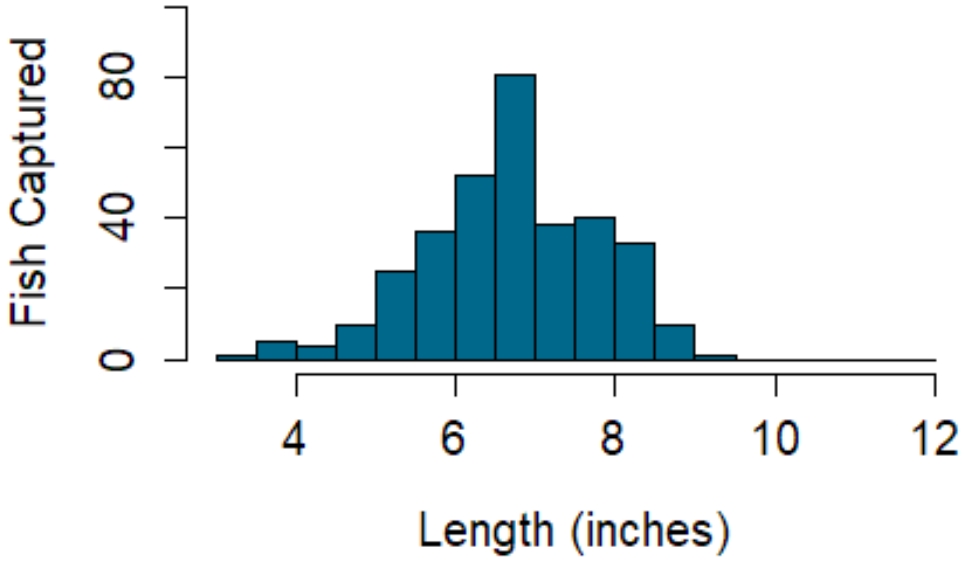

Figure 27. *Length frequency of bluegill captured in the 2022 late spring electrofishing survey of the Chippewa Flowage in 2022 (east side).*

SMALLMOUTH BASS

Smallmouth bass were the more preferred of the two bass species during the development of the CFFMP, yet they consistently receive slightly less angling interest than largemouth bass in the Chippewa Flowage (Figure 2).

Smallmouth bass abundance has most often been below the objective range (9 of 12 surveys, Figure 28), has been above the objective range twice and has been within the objective range once. This is an instance where abundance varies considerably depending on location within the lake. The east side of the Chippewa Flowage (surveyed in even years) has consistently higher smallmouth bass abundance than the west side (surveyed in odd years). Catch rates on the east side are consistently above the 90th percentile when compared to other lakes in the same lake class, while catch rates on the west side more often fall around the 50th-75th percentile. The abundance objective for smallmouth bass in the CFFMP appears to be more appropriate for the east side than the west. An update to the CFFMP might consider separate abundance objectives for each side, based on demonstrated and consistent differences in catch rate that stem from differing habitat suitability.

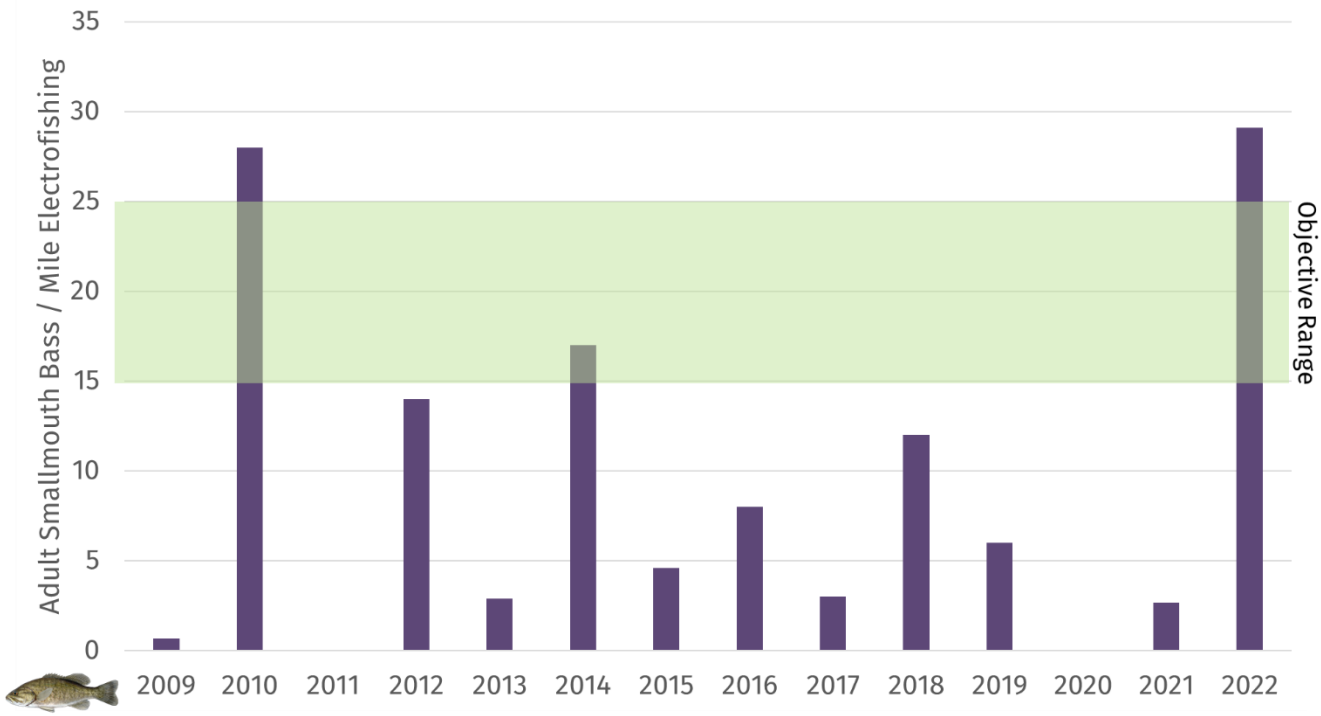

Figure 28. *Smallmouth bass relative abundance (catch/mile) in the Chippewa Flowage late spring electrofishing surveys from 2009-2022. No survey data were available in 2011 and 2022. Green shaded area represents the objective range for relative abundance (15-25 per mile electrofished) in the Chippewa Flowage Fisheries Management Plan (2007).*

Size of smallmouth bass has most often met the objective in the CFFMP (7 of 12 survey years, Figure 29), and this has been true for both the east and west sides. Size was below the objective range in other years.

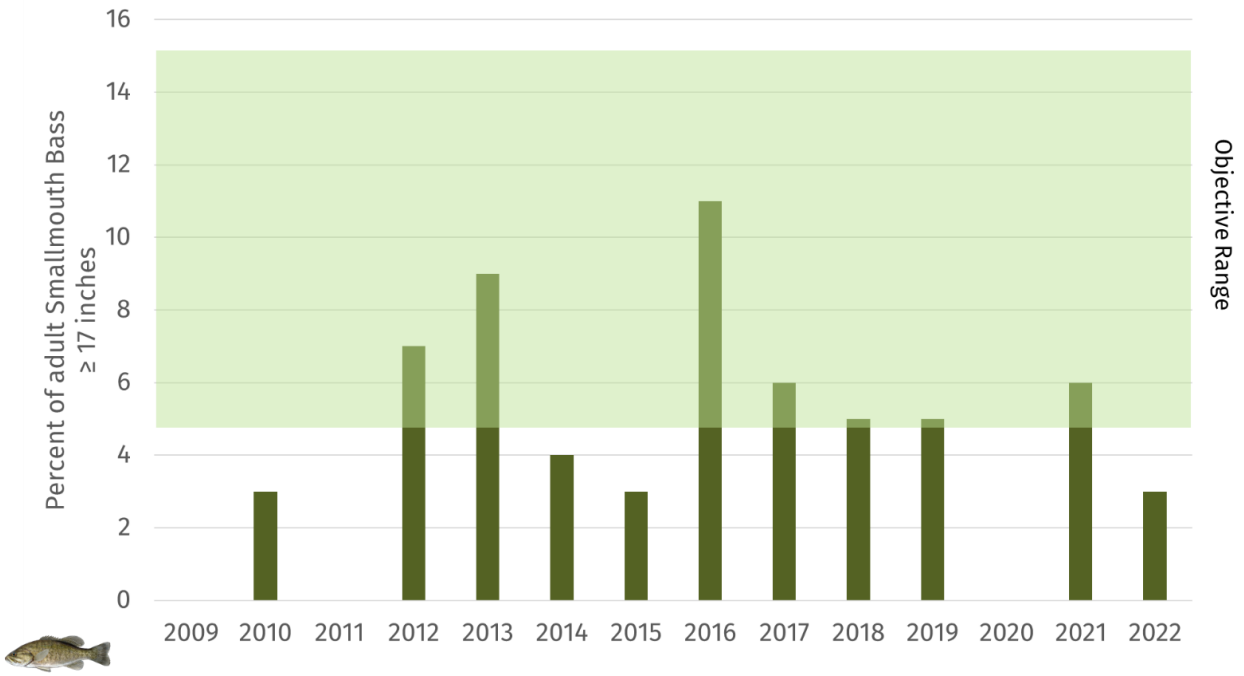

Figure 29. *Size structure of smallmouth bass (PSD-17, or percentage of over 17 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (5-15% over 17 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from late spring electrofishing surveys, no data are available for 2011 and 2020.*

Interestingly, less than 1 in 1,000 smallmouth bass captured in DNR surveys of the Chippewa Flowage over the years have been over 20 inches, despite that mark being regularly achieved in surveys of many other nearby lakes and rivers. No 20-inch smallmouth bass have been captured since the early 2000s. It is not clear why this size is so seldom achieved in this large waterbody that otherwise seems suitable to the species. Typical size of smallmouth bass captured in electrofishing surveys is 17 inches or less (Figure 30).

There are no recent age and growth data available for Chippewa Flowage smallmouth bass. This may be a future information need.

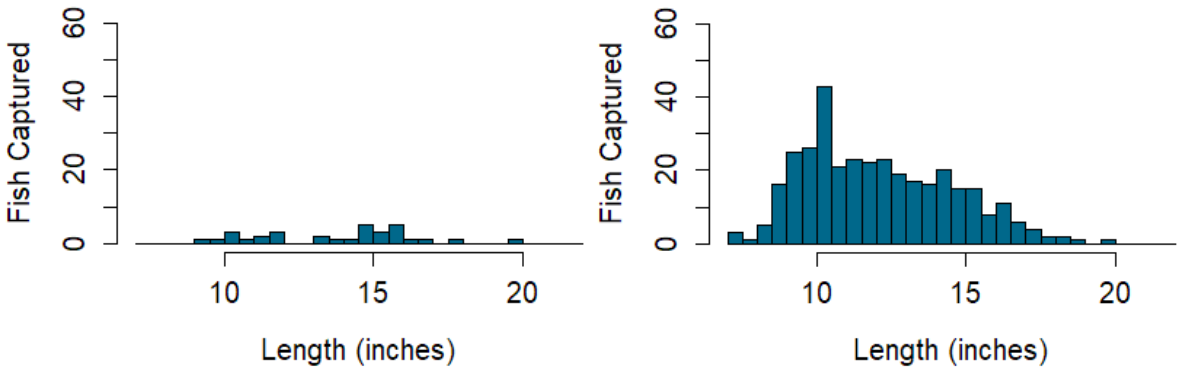

Figure 30. *Length frequency of smallmouth bass captured in 2021 (left, west side) and 2022 (right, east side) late spring electrofishing surveys in the Chippewa Flowage.*

YELLOW PERCH

Yellow perch hold an interesting position in the fishery as both an ecologically important species and one with high harvest interest.

Abundance of yellow perch has not been consistently assessed, since few surveys target them specifically. Relatedly, the CFFMP does not specifically establish an objective for yellow perch abundance. An abundance objective for yellow perch could be added in an updated CFFMP, particularly if more regular survey data are expected to be available. Lake class percentiles could be used to establish a desired general abundance until more lake-specific data are collected.

There have been recent surveys where enough yellow perch were captured to describe their size structure. Size of yellow perch in the Chippewa Flowage has most often been below the objective range in the CFFMP (6 of 7 survey years) and has been above the objective range in one survey year (Figure 31).

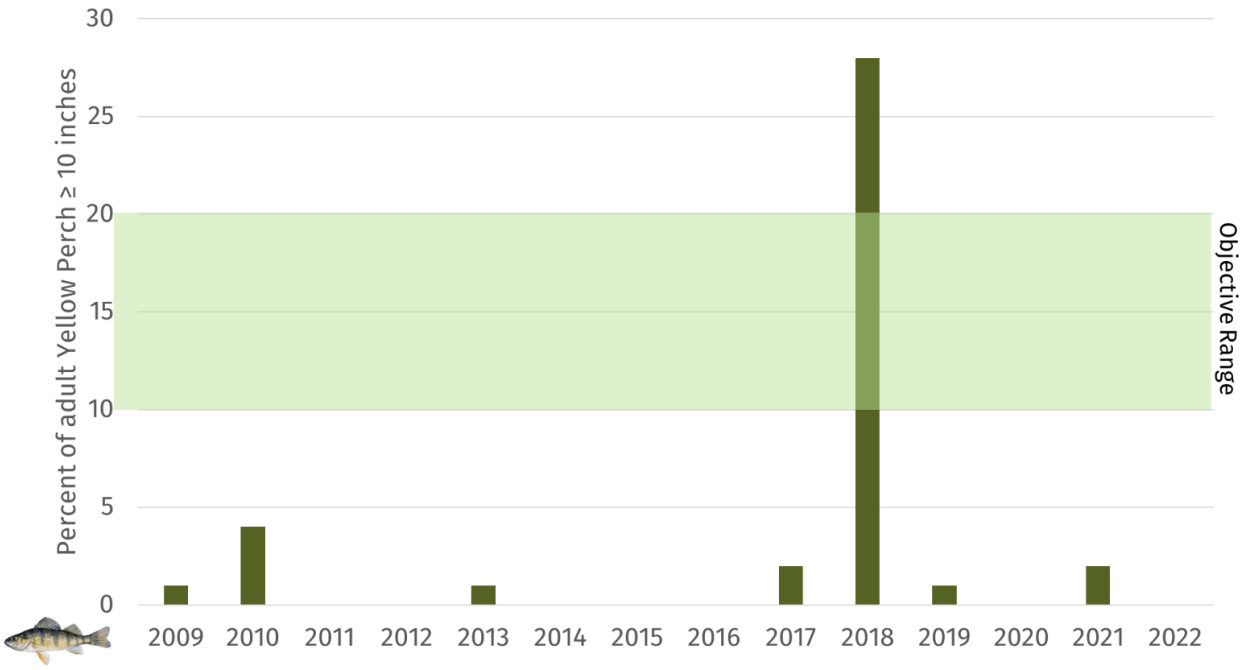

Figure 31. *Size structure of yellow perch (PSD-10, or percentage over 10 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (10-20% over 10 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from late spring electrofishing surveys, no data are available for 2011-2012, 2014-2016, 2020 and 2022.*

Yellow perch growth in the Chippewa Flowage appears to be close to average for the region, with perch reaching 8 inches in about 5 years (Figure 32).

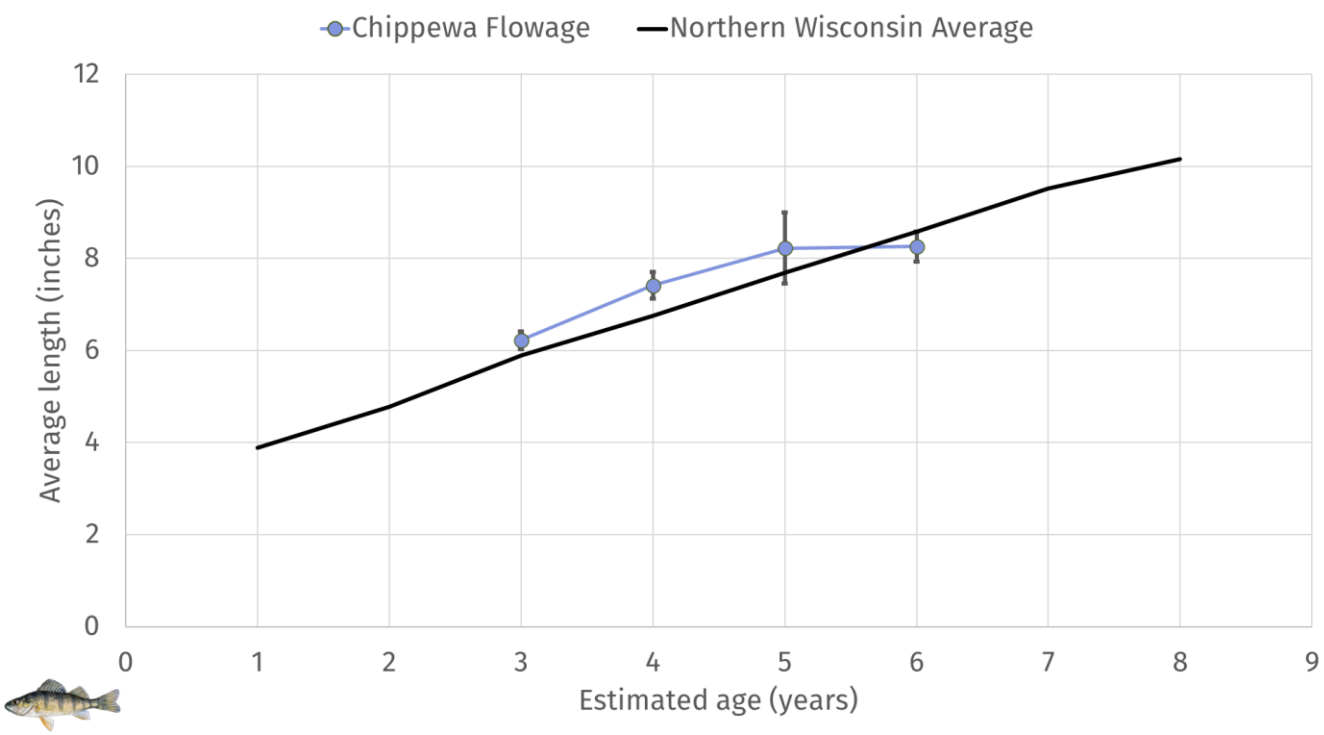

Figure 32. *Yellow perch mean length at age (with 95% confidence intervals) in the Chippewa Flowage based on samples collected in 2019 (west side) along with the Northern Wisconsin average for comparison. Ages were estimated using sectioned otoliths.*

LARGEMOUTH BASS

Largemouth bass received the ire of many stakeholders during the creation of the CFFMP, having become a "suspect" in the investigation of declining walleye recruitment that was starting to be observed throughout the region around that time. Any link between largemouth bass and walleye recruitment was never well-established in the Chippewa Flowage, and walleye recruitment has returned, largely negating the issue. Largemouth bass are not a top target for the general fishing community on the Chippewa Flowage, but have unquestioned popularity among a minority group. The Chippewa Flowage hosts a number of bass tournaments annually, including some moderately high-profile events.

Managing largemouth bass at a low abundance is reflective of angler interest and the greater goals for the fish community. Largemouth bass abundance has been within the target range in 5 of 12 survey years, has been below the target in 5 of 12 survey years and has been above the target in two years (Figure 33). There is also evidence that largemouth bass abundance has declined since habitat drawdowns started being conducted (the four years with the highest abundance were all before habitat drawdowns began, Figure 10). Still, observed largemouth bass catch rates have fallen

in the 50th-75th percentile for the lake class, indicating that the current abundance of largemouth bass falls within a normal range (particularly on the west side).

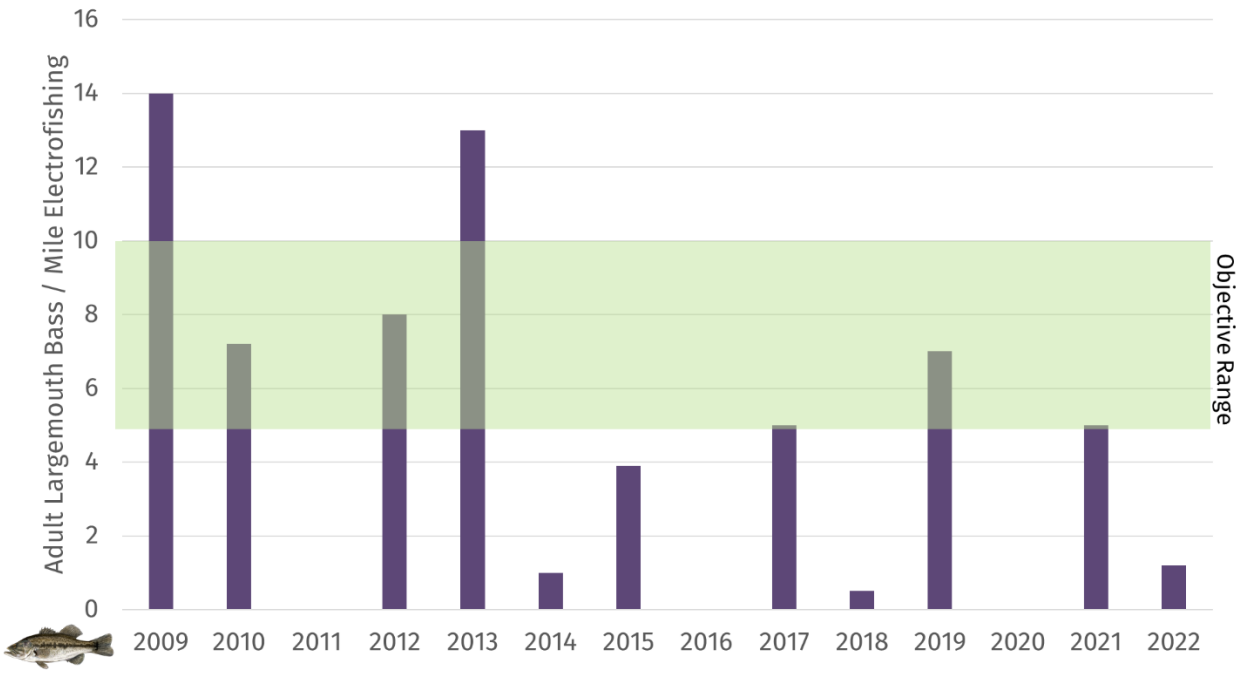

Figure 33. *Largemouth bass relative abundance (fish/mile) in the Chippewa Flowage from 2009-2022. Data are from late spring electrofishing surveys. No survey data were available in 2011 and 2022. Green shaded area represents the objective range for relative abundance (5-10 per mile electrofished) in the Chippewa Flowage Fisheries Management Plan (2007).*

Size of largemouth bass observed in surveys has consistently been much lower than the objective range in the CFFMP (Figure 34). This appears to be a clear example of an objective that is in need of updating since the population has never been close to meeting the target and there are no new management actions that would substantially change the population.

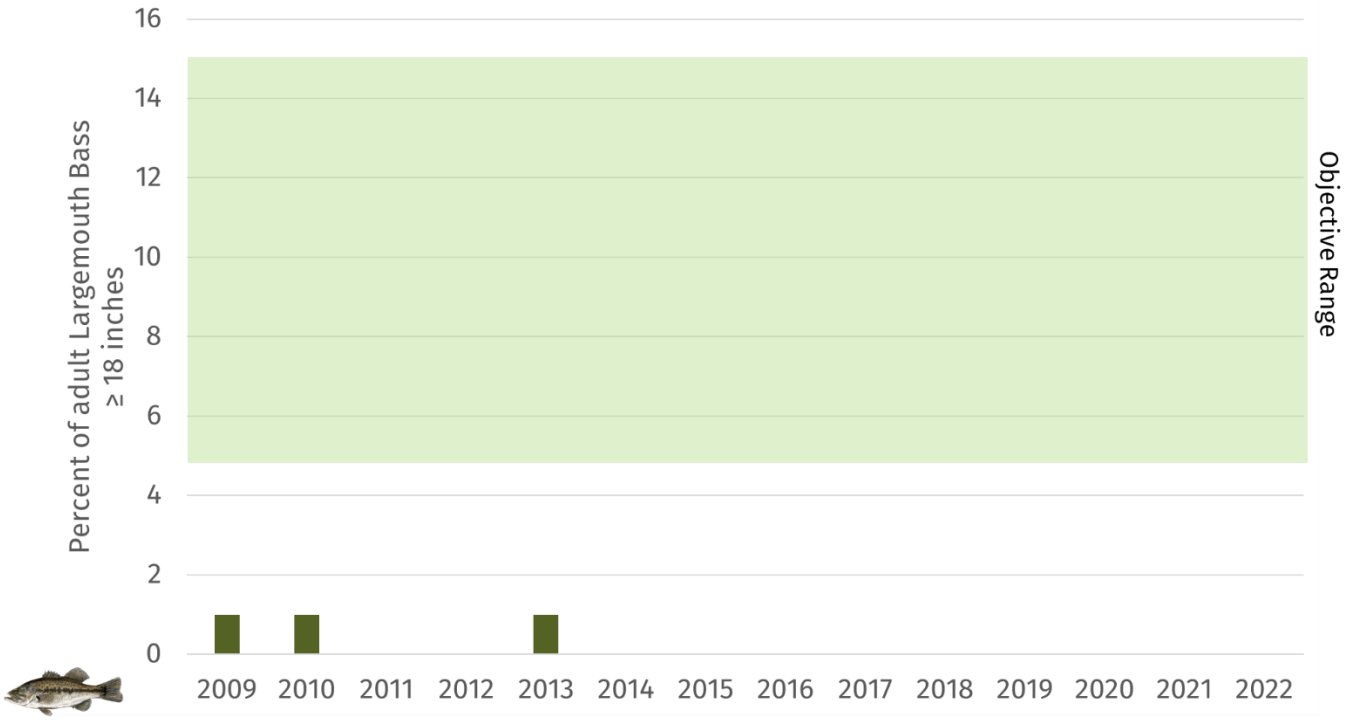

Figure 34. *Size of largemouth bass (PSD-18, or percentage over 18 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (5-15% over 18 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from late spring electrofishing surveys, no data are available for 2011 and 2020.*

Largemouth bass growth has been around average or even a little below average in the past which resulted in the species being exempted from the minimum length limit for angling harvest in 2011. An analysis in 2020 showed slight improvements in largemouth bass growth since 2012 at ages 4, 5 and 6 (Figure 35), possibly a reflection of their decreasing abundance (Figure 33). Still, largemouth bass growth in 2020 was similar or below the regional average, which indicated that largemouth bass will have a difficult time consistently achieving large sizes. These growth data in combination with past observations of largemouth bass size (Figure 34) suggest that expectations for the largemouth bass fishery may need to be recalibrated.

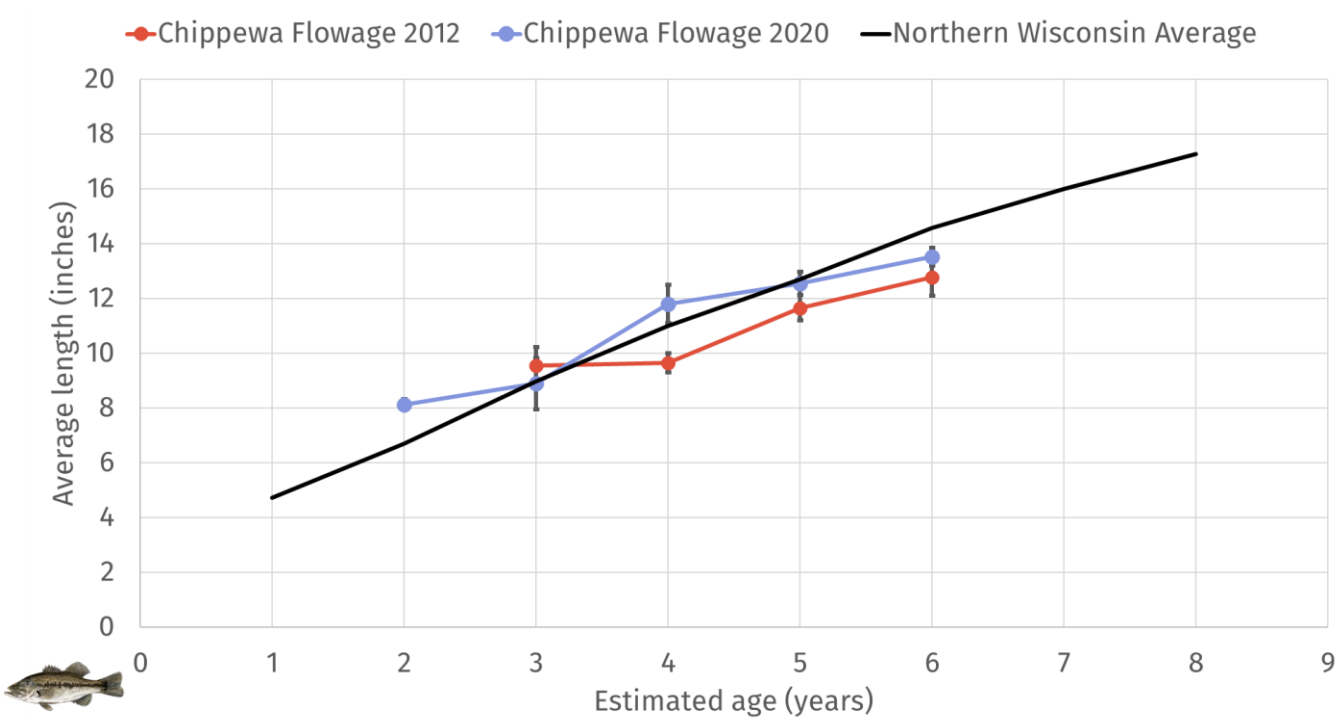

Figure 35. *Largemouth bass mean length at age (with 95% confidence intervals) in the Chippewa Flowage based on samples collected in 2012 and 2020 along with the Northern Wisconsin average for comparison. Ages were estimated using sectioned otoliths.*

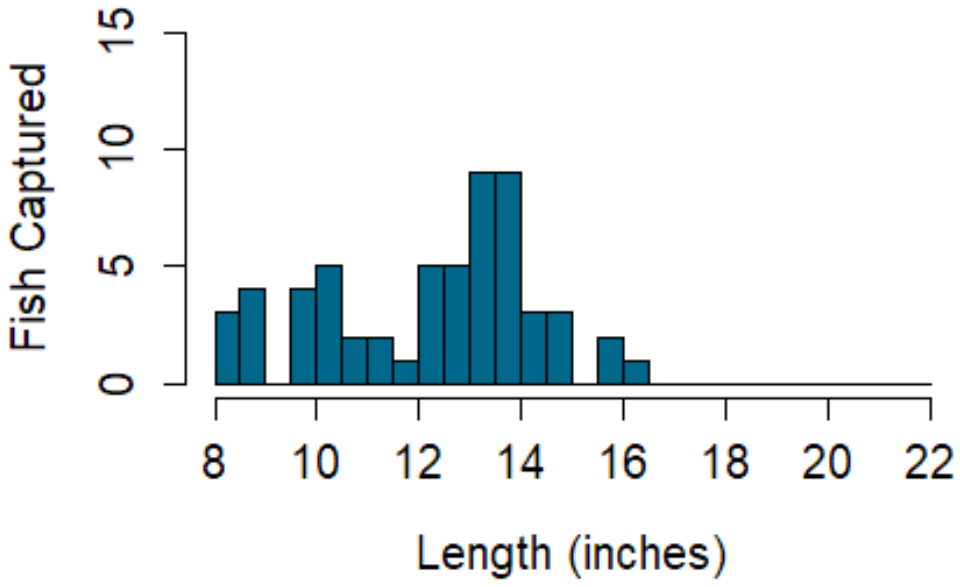

Figure 36. *Length frequency of largemouth bass captured in the late spring electrofishing survey of the Chippewa Flowage in 2021 (west side).*

NORTHERN PIKE

Northern pike are a respected and popular gamefish in most of Wisconsin, but are an introduced species to the Chippewa Flowage. Chippewa Flowage anglers rate northern pike below all other gamefish species and they consistently attract less than 10% of total angling effort, despite the species being relatively abundant (about as many northern pike are caught as walleye each year).

Efforts to manage northern pike have typically centered on minimizing their abundance, and therefore their potential to impact other species, while maximizing the size of pike that are present. The CFFMP set an abundance objective for northern pike that is reliant on population estimates, which have never been generated for pike in this waterbody and are unlikely to occur in the future.

Northern pike relative abundance has varied over time but has shown little indication of increasing or decreasing (Figure 37). Northern pike catch rates have been >90th percentile in almost all survey years when compared to other complex-cool-dark lakes.

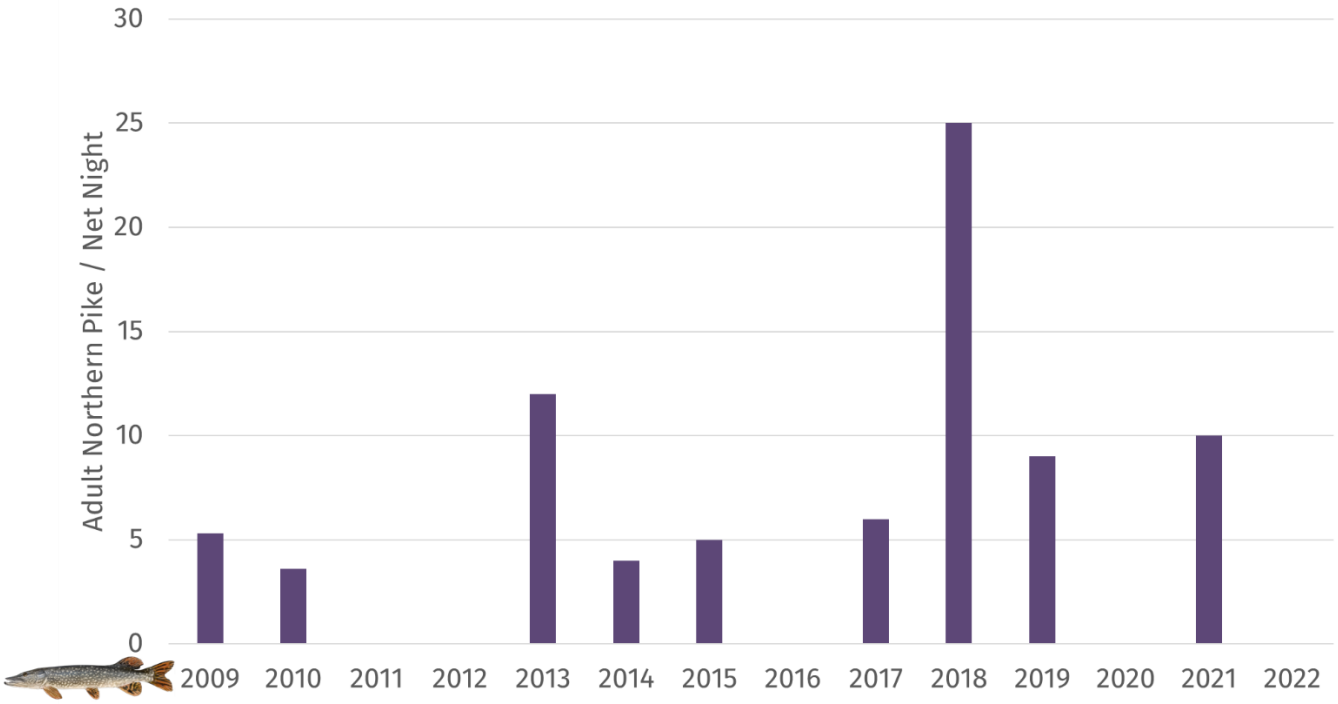

Figure 37. *Northern pike relative abundance (fish/net night) in the Chippewa Flowage from 2009-2022. Data are from spring netting surveys. No survey data were available in 2011-2012 2016, 2020 and 2022. There is no objective range for relative abundance of northern pike in the Chippewa Flowage Fishery Management Plan.*

Northern pike size has not met the objective in the CFFMP in any survey year and may be declining over time (Figure 38). The lack of success in achieving this objective may be justification for reevaluating its use. A northern pike size objective focused on the proportion of the population over 21 inches, rather than 28 inches, may be more appropriate and responsive to smaller changes in size structure.

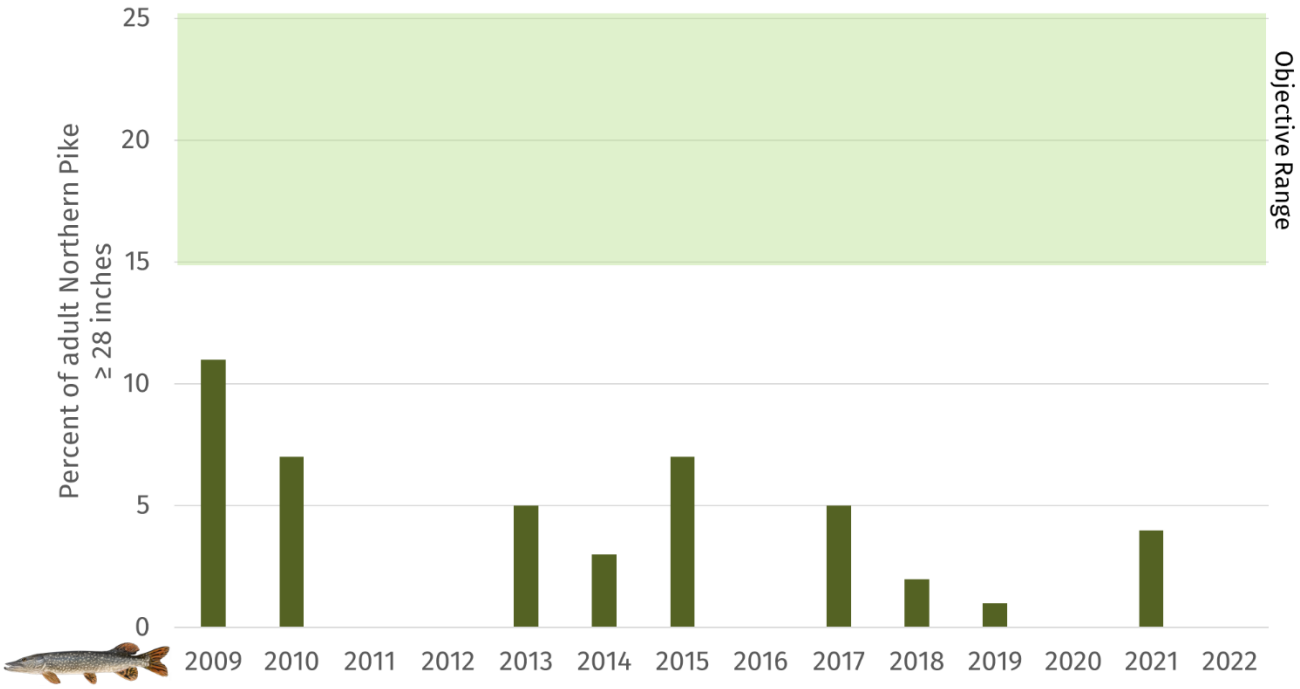

Figure 38. *Size structure of northern pike (PSD-28, or percentage of northern pike over 28 inches) in the Chippewa Flowage between 2009-2022. Green shaded area represents the objective range for size (15-25% over 28 inches) in the Chippewa Flowage Fisheries Management Plan (2007). Data are from spring netting surveys, no data are available for 2011-12, 2016, 2020 and 2022.*

Northern pike growth in the Chippewa Flowage lags far behind regional averages with both males and females needing an average of 7 years or more to reach 20 inches (Figure 39). Slow growth is a major contributing factor to the generally poor size structure and lack of large fish (Figures 38 and 40).

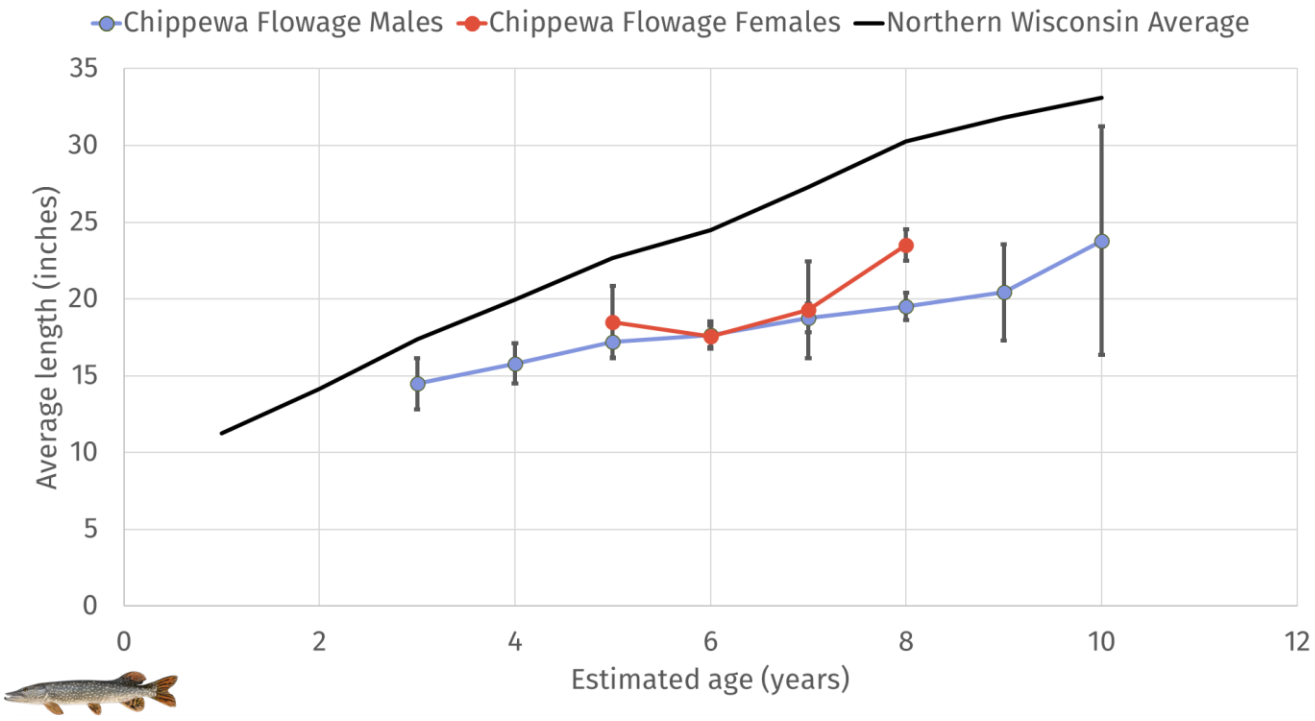

Figure 39. *Northern pike mean length at age, by sex, in the Chippewa Flowage based on samples collected in 2021 (west side) along with the Northern Wisconsin average for comparison. Error bars represent 95% confidence intervals. Ages were estimated using sectioned cleithra.*

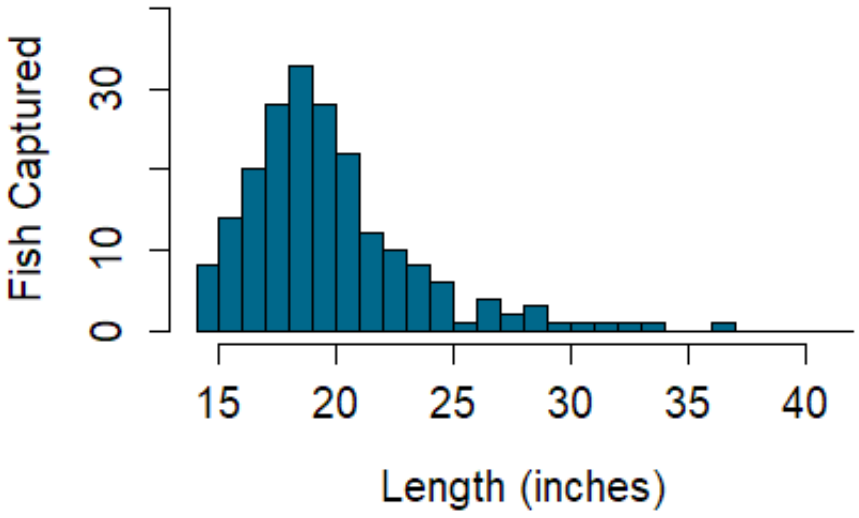

Figure 40. *Length frequency of northern pike captured in a netting survey of the Chippewa Flowage in 2021 (west side).*

CONCLUSIONS AND RECOMMENDATIONS FOR THE FUTURE

Management strategies for walleye, the top priority species according to angler preference data on the Chippewa Flowage, appear to be largely paying off. Drawdowns have been successful at restoring and sustaining recruitment, though we must be aware that this tool may not work indefinitely. Moderately protective angling regulations have allowed the population to meet both abundance and size objectives, resulting in a productive angling and tribal spear fishery.

Muskellunge present a strong angling opportunity for anglers, with some indication that catch rates for anglers are improving. However, it has not been possible to assess total population size and size structure has fallen short of the lofty objective established in the CFFMP.

Available data for other species offers a mixed bag of results. Recent management changes (angling regulations) may improve panfish populations. Bass appear to be sensitive to water level manipulations, and corresponding declines in largemouth bass have been offset by modest increases in smallmouth bass abundance. Northern pike remain a management challenge. Controlling northern pike abundance will be important for achieving objectives for musky abundance (Inskip 1986 and Dombeck et al. 1986) and northern pike size (Jacobson 1992). The relationship between these two species is the focus of an upcoming research project in the Hayward area. Results of that study may have important implications for waterbodies like the Chippewa Flowage.

While the CFFMP has served the fishery well over the last 15 years, there are a variety of reasons that it should be considered for an update. First, some objectives may need to be reconsidered now that more data are available (Table 8). For example, the objective for bluegill abundance is lower than has ever been observed in the fishery and, if achieved in the future, may be lower than anglers will tolerate. Size objectives for muskellunge, northern pike and largemouth bass may also warrant reexamination. There may be instances where an objective is being met, but it does not translate to angler satisfaction. For example, black crappie abundance has met or exceeded the target range in most survey years, yet many anglers express concern about population abundance. Exploring whether these disconnects are occurring and why would be valuable for future fish management, though that exercise may be challenging.

Secondly, much has changed in how water levels have been managed in the Chippewa Flowage, with the “Habitat Drawdown” emerging as a powerful fish management tool. An updated plan could better reflect the new possibilities of water level management and identify strategies for the future.

Lastly, the world has changed considerably in the last 15 years in numerous ways that are relevant to fish management in this waterbody. Changes in fishing technology, potential changes in waterbody use, continued erosion of shorelines and law enforcement are all frequent concerns among anglers that could be at least partially addressed in an updated fisheries plan. Additionally, angler preferences for fish management may have shifted over time in ways we cannot discern unless we take steps to gather those data as a part of a planning process. New technology will make it easier to gather such preference data from a more diverse and geographically wide-ranging population of anglers, as has been done with other recent fisheries plans in the area (See Chetac/Birch Lake Fishery Management Plan).

Updates may even be required for species where we have experienced success in meeting management objectives if angler preferences or expectations have shifted. This may include further refinement of ranges for objectives, adding or shifting the size benchmarks that are used, or adding other metrics that capture the angler experience (i.e., catch per hour of angling).

We are not in a position to commit to a specific timeline for updating the CFFMP, but conclude that that exercise should be completed at the earliest opportunity, with this report as an important reference document for both managers and stakeholders.

Table 8. *Status of abundance and size objectives for important fish species in the Chippewa Flowage compared to the Chippewa Flowage Fisheries Management Plan. GREEN indicates an objective that is being met, YELLOW indicates an objective that is inconsistently being met, RED indicates an objective that is rarely or never being met and BLUE indicates an objective that cannot be assessed or may need to be revised for other reasons.*

SPECIES	ABUNDANCE OBJECTIVE STATUS	SIZE OBJECTIVE STATUS
WALLEYE	Currently MEETS objective. Expected to continue if recruitment remains strong	Currently MEETS objective
MUSKELLUNGE	Has not been measured. May need new objective with other metrics	Typically BELOW objective
BLACK CRAPPIE	MEETS or EXCEEDS objective in most years	Meets objective INCONSISTENTLY, but reduced bag limit may lead to improvements
BLUEGILL	EXCEEDS objective in all surveys. May need new objective	Typically BELOW objective, with some signs of improvement over last few

		years. Reduced bag limit may lead to improvements
YELLOW PERCH	None developed	Typically BELOW objective, but sampling limitations exist
SMALLMOUTH BASS	Typically BELOW objective, especially for surveys on west side	Generally MEETS objective
LARGEMOUTH BASS	Meets objective INCONSISTENTLY	BELOW objective in all surveys. May need new objective
NORTHERN PIKE	Has not been measured. May need new objective with other metrics	BELOW objective in all surveys. May need new objective

Acknowledgements

We are grateful to the numerous DNR, LCOCD, GLIFWC and U.S. Forest Service professionals who have collaborated with us over the years on fish management issues. We are also thankful for the many private individuals and groups who have given their time and resources to partner with us.

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Appendices

Appendix 1. Survey Types and Frequency

Table A1. General survey method and frequency for fish species in the Chippewa Flowage in Sawyer County, Wisconsin. Notes on data availability are also included.

SPECIES (AGE)	SURVEY METHOD/TIMING	GENERAL FREQUENCY	NOTES ON DATA
Walleye (adult)	Early spring netting	Once every 2 or 3 years	Adult walleye growth and size structure data collected between population estimates
Walleye (juvenile)	Fall electrofishing	Annual	Completed in almost every year going back to the early 1980s
Muskellunge (adult)	Early spring netting	Once every 2 or 3 years	Additional data sometimes collected by hatchery crew when collecting eggs
Muskellunge (juvenile)	Fall electrofishing	Annual	Completed in almost every year going back to the early 1980s, however, stocking events have frequently happened before surveys, limiting their usefulness
Largemouth and Smallmouth bass	Late spring electrofishing	Annual	Continuous since 2009 under current protocol. Rotating east and west side.
Northern pike	Early spring netting	Once every 2 or 3 years	Data usually collected in years when walleye are targeted in netting surveys.
Black crappie	Late spring netting	Once every 2 or 3 years	Data usually collected in years when muskellunge are targeted in netting surveys.
Bluegill	Late spring electrofishing	Annual	Continuous since 2009 under current protocol. Rotating east and west side.
Yellow perch	Late spring netting	Once every 2 or 3 years	Timing difficulties limit data availability.

Appendix 2. Stocking History

Table A2. *Stocking history for the Chippewa Flowage in Sawyer County, Wisconsin, from 1980-2022 based on available DNR electronic and hard-copy records. This is likely an incomplete list of all stocking events that have occurred since the lake was created.*

YEAR	SPECIES	AGE CLASS	NUMBER STOCKED	AVERAGE LENGTH (INCHES)	Source Type
2022	WALLEYE	LARGE FINGERLING	9,780	7.4	TRIBAL HATCHERY
2021	WALLEYE	SMALL FINGERLING	53,992	1.6	TRIBAL HATCHERY
2020	WALLEYE	LARGE FINGERLING	4,259	7.1	DNR HATCHERY
2019	MUSKELLUNGE	LARGE FINGERLING	5,003	12.8	DNR HATCHERY
2018	WALLEYE	LARGE FINGERLING	4,259	6.4	DNR HATCHERY
2017	WALLEYE	LARGE FINGERLING	2,264	6.7	TRIBAL HATCHERY
2017	WALLEYE	LARGE FINGERLING	51,940	4.4	DNR HATCHERY
2016	MUSKELLUNGE	LARGE FINGERLING	7,526	13.2	DNR HATCHERY
2016	MUSKELLUNGE	LARGE FINGERLING	269	12.5	TRIBAL HATCHERY
2016	WALLEYE	SMALL FINGERLING	15,000	1.5	TRIBAL HATCHERY
2016	WALLEYE	LARGE FINGERLING	2,395	6.8	TRIBAL HATCHERY
2015	WALLEYE	LARGE FINGERLING	68,648	7.76	DNR HATCHERY
2015	WALLEYE	LARGE FINGERLING	4,302	7.7	DNR HATCHERY
2014	WALLEYE	SMALL FINGERLING	31,930	1.65	TRIBAL HATCHERY
2014	WALLEYE	LARGE FINGERLING	997	8.3	TRIBAL HATCHERY
2013	MUSKELLUNGE	LARGE FINGERLING	3,055	11.7	DNR HATCHERY
2013	WALLEYE	LARGE FINGERLING	23,000	6	PRIVATE HATCHERY

2013	WALLEYE	LARGE FINGERLING	34,352	6.7	DNR HATCHERY
2012	WALLEYE	LARGE FINGERLING	27,999	7.5	PRIVATE HATCHERY
2012	WALLEYE	SMALL FINGERLING	89,043	3.25	TRIBAL HATCHERY
2011	WALLEYE	LARGE FINGERLING	8,359	7.8	TRIBAL HATCHERY
2011	WALLEYE	LARGE FINGERLING	20,000	7	PRIVATE HATCHERY
2010	WALLEYE	SMALL FINGERLING	40,460	4.5	TRIBAL HATCHERY
2009	MUSKELLUNGE	LARGE FINGERLING	2,496	10.6	DNR HATCHERY
2009	WALLEYE	SMALL FINGERLING	4,372	7.2	TRIBAL HATCHERY
2008	WALLEYE	LARGE FINGERLING	7,684	7.2	TRIBAL HATCHERY
2007	MUSKELLUNGE	LARGE FINGERLING	1,907	12.4	DNR HATCHERY
2006	MUSKELLUNGE	LARGE FINGERLING	72	13	TRIBAL HATCHERY
2006	YELLOW PERCH	SMALL FINGERLING	21,906		TRIBAL HATCHERY
2005	MUSKELLUNGE	LARGE FINGERLING	1,885	11.9	DNR HATCHERY
2005	MUSKELLUNGE	LARGE FINGERLING	250	12	PRIVATE HATCHERY
2004	MUSKELLUNGE	LARGE FINGERLING	840	13	TRIBAL HATCHERY
2003	MUSKELLUNGE	LARGE FINGERLING	175	12	PRIVATE HATCHERY
2003	MUSKELLUNGE	LARGE FINGERLING	2,675	11.4	DNR HATCHERY
2002	MUSKELLUNGE	LARGE FINGERLING	1,134	13	TRIBAL HATCHERY
2001	MUSKELLUNGE	LARGE FINGERLING	7,650	10.38	DNR HATCHERY
2000	WALLEYE	FRY	75,000	0.3	DNR HATCHERY
2000	MUSKELLUNGE	LARGE FINGERLING	2,500	12	DNR HATCHERY
2000	MUSKELLUNGE	LARGE FINGERLING	1,124	10	TRIBAL HATCHERY

1998	MUSKELLUNGE	FRY	25,000	0.5	DNR HATCHERY
1998	MUSKELLUNGE	LARGE FINGERLING	500	12	PRIVATE HATCHERY
1997	MUSKELLUNGE	FINGERLING	811	10	TRIBAL HATCHERY
1997	MUSKELLUNGE	LARGE FINGERLING	1,880	11.7	DNR HATCHERY
1996	MUSKELLUNGE	FINGERLING	1,170	10	TRIBAL HATCHERY
1996	MUSKELLUNGE	FINGERLING	3,475	10.7	DNR HATCHERY
1995	WALLEYE	FRY	300,000	0.2	DNR HATCHERY
1993	MUSKELLUNGE	FINGERLING	6,000	12	DNR HATCHERY
1993	MUSKELLUNGE	FINGERLING	1,170	10	TRIBAL HATCHERY
1992	WALLEYE	FRY	5,070,000	2	DNR HATCHERY
1992	MUSKELLUNGE	FINGERLING	2,500	11	DNR HATCHERY
1992	MUSKELLUNGE	FRY	275,000		DNR HATCHERY
1991	MUSKELLUNGE	FINGERLING	900	10	TRIBAL HATCHERY
1991	WALLEYE	FRY	1,500,000	0	DNR HATCHERY
1991	MUSKELLUNGE	FINGERLING	500	11	PRIVATE HATCHERY
1991	MUSKELLUNGE	FINGERLING	4,574	12	DNR HATCHERY
1990	MUSKELLUNGE	FINGERLING	900	10	TRIBAL HATCHERY
1990	WALLEYE	FRY	1,000,000	1	DNR HATCHERY
1990	MUSKELLUNGE	FINGERLING	2,950	11	DNR HATCHERY
1990	MUSKELLUNGE	FINGERLING	1,000	9	DNR COOP PONDS
1989	MUSKELLUNGE	FINGERLING	3,500	9	DNR HATCHERY
1989	WALLEYE	FRY	2,700,000	3	DNR HATCHERY

1989	MUSKELLUNGE	FINGERLING	900	10	TRIBAL HATCHERY
1988	MUSKELLUNGE	FINGERLING	5,000	10.5	DNR HATCHERY
1988	WALLEYE	FRY	911,264	1	DNR HATCHERY
1988	MUSKELLUNGE	FINGERLING	1,000	10	TRIBAL HATCHERY
1987	MUSKELLUNGE	FINGERLING	900	10	TRIBAL HATCHERY
1987	MUSKELLUNGE	FINGERLING	5,000	10	DNR HATCHERY
1987	WALLEYE	FRY	7,500,000	1	DNR HATCHERY
1986	MUSKELLUNGE	FINGERLING	1,084	11	DNR HATCHERY
1986	WALLEYE	FRY	6,846,000	1	DNR HATCHERY
1986	MUSKELLUNGE	FINGERLING	1,416	11	DNR COOP PONDS
1986	MUSKELLUNGE	FRY	320,000	1	DNR HATCHERY
1985	WALLEYE	FRY	6,144,000	1	DNR HATCHERY
1985	MUSKELLUNGE	FINGERLING	490	9	FIELD TRANSFER
1985	MUSKELLUNGE	FINGERLING	7,990	10.6	DNR COOP PONDS
1984	MUSKELLUNGE	FINGERLING	2,850	9.67	DNR COOP PONDS
1984	WALLEYE	FRY	10,606,945	1	DNR HATCHERY
1984	MUSKELLUNGE	FINGERLING	900	10	TRIBAL HATCHERY
1984	MUSKELLUNGE	FINGERLING	350	10	PRIVATE HATCHERY
1984	MUSKELLUNGE	FINGERLING	2,500	9	DNR HATCHERY
1983	MUSKELLUNGE	FINGERLING	1,985	9	DNR COOP PONDS
1983	MUSKELLUNGE	FINGERLING	400	10	TRIBAL HATCHERY
1982	MUSKELLUNGE	FRY	274,875		DNR HATCHERY

1982	WALLEYE	FRY	5,847,621		DNR HATCHERY
1982	MUSKELLUNGE	FINGERLING	1,250	12	DNR COOP PONDS
1982	MUSKELLUNGE	FINGERLING	200	10	TRIBAL HATCHERY
1981	MUSKELLUNGE	FRY	749,600		DNR HATCHERY
1981	MUSKELLUNGE	FINGERLING	735	10	DNR COOP PONDS
1981	WALLEYE	FRY	4,270,572		DNR HATCHERY
1980	WALLEYE	FRY	7,148,000		DNR HATCHERY
1980	MUSKELLUNGE	FRY	250,000		DNR HATCHERY
1980	MUSKELLUNGE	FINGERLING	200	10	TRIBAL HATCHERY

Appendix 3. Habitat Drawdown Recommendation Guide

This is a version of the Habitat Drawdown Recommendation Guide that has been used by the Chippewa Flowage Partners Group to make decisions on recommending habitat drawdowns to Xcel Energy. This guide has had previous iterations and will continue to be updated as our understanding of how drawdowns affects important resources in the Chippewa Flowage continues to evolve.

Chippewa Flowage Habitat Drawdown Recommendation Guide v3.1

Instructions: The Chippewa Flowage Partner Group may use this guide to develop the basis for a *habitat drawdown* recommendation for the Chippewa Flowage. This guide is not intended for making recommendations for other drawdown types (See definitions of drawdown types at end of document). To determine the need for a habitat drawdown recommendation using this guide:

1. Complete each applicable question, using the most objective data, observations, and expert opinions provided by a single designated representative from the group(s) identified in italics. When multiple groups are identified, a consensus may need to be reached.
2. Add up the total number of points generated by responses to all questions.
3. Consult the recommendation key at the end of this document by applying the accrued points.
4. The resulting recommendation can then be delivered to Xcel Energy to be taken into consideration as they make decisions about fall/winter operations.

Please note that this is considered a "living document" that can be updated, with Partner Group approval, as conditions change through time or future studies improve our understanding of drawdown impacts on important resources. As such, questions may be added, dropped, modified, or point totals may be adjusted in future versions of this guide to give it more effectiveness.

This process should be completed as soon as the relevant information can be compiled so drawdown decisions can be communicated to the public.

<u>Section A. Drawdown history</u>

1. **How many habitat drawdowns have been conducted in the last two years? –** *consult records*

   Zero = 2 points

   One = 1 points

   Two = -1 points

<u>Section B. Aquatic plants</u>

1. **Is Eurasian watermilfoil having impacts on recreation or access? –** *Resort Owners Association (LCFRA)* and *Property Owners Association.*

   Type of input accepted:

IDEAL: Surveys of flowage users from Clean Boats Clean waters monitors, property owners, guides, or other frequent users.

ACCEPTABLE: Documented (photos, maps, testimonials, etc.) anecdotal reports from flowage users.

Major negative impacts = 2 points (double points if data is not available for question B2)

Minor negative impacts = 1 point (double points if data is not available for question B2)

No reported impacts = 0 points

2. **What percentage of littoral zone points in the most recent complete, or subset, point intercept plant survey contained Eurasian milfoil?** – *Consult available survey data from current year or previous year, if no data are available points for question B1 may be doubled.*

>15% = 6 points

10-15% = 4 points

5-10% = 2 points

0-5% = 0 points

Section C. Fisheries

1. **How many walleye year classes larger than 20/mile young of year (measured with fall electrofishing surveys) have been produced the last three years (include current year if data is available)? –** *Consult WDNR/GLIFWC survey data*

Zero year classes >20/mile = 4 points

One year class >20/mile = 2 points

Two or three year classes >20/mile = 0 points

2. **Is abundance of bluegill higher, lower, or within the target range established in the 2006 Fisheries Management Plan (50-100/mile electrofishing)? –** *Consult most recent spring DNR survey data*

Higher = 1 point

Within range = 0 points

Lower = -1 point

3. **Is abundances of crappie higher, lower, or within the target range established in the 2006 Fisheries Management Plan (10-20 per net night for crappie)? –** *Consult most recent spring DNR survey data*

    Higher = 1 point

    Within range or no survey available = 0 points

    Lower = -1 point

Section D. Special Projects

1. **Are there any infrastructure projects or shoreline erosion projects on public land or associated with public safety or critical maintenance of the dam that could benefit from a habitat management drawdown? –** *DNR, LCO Conservation Department, USFS, Xcel, local townships should be contacted in early summer to ask if they have plans that might be impacted and could be included as medium or low priority projects.*

    Yes, high priority projects need to be completed as soon as possible = 4 points

    Multiple (3 or more) medium to low priority projects could be completed = 2 points*

    One or two medium to low priority projects could be completed = 1 point*

    No projects have been identified at this time = 0 points

*Private projects could be considered in this category if there is demonstrable public benefit.

Section E. Tourism concerns

1. **Would tourism or special events be impacted by a habitat drawdown?** *LCFRA*

    No = 0 points

    There are **minor** concerns that a habitat drawdown would hurt tourism (e.g. resort booking could be reduced) = -1 points

    There are **major** concerns that a habitat drawdown would hurt tourism (e.g. large events would be impacted/canceled) = -2 points

Point totals

A1: ____

B1: ____

B2: ____

C1: ____

C2: ____

C3: ____

D1: ____

E1: ____

Recommendation Key – *add up points from above*

0-7 points – Based on factors considered, a habitat drawdown does not appear to be necessary at this time and/or there are reasons to believe it would be detrimental to important resources. No recommendation for habitat drawdown.

8+ points – Resource factors point towards a strong need for a habitat drawdown. The Chippewa Flowage Partners Group strongly recommends a habitat drawdown be completed.

Categories of Drawdowns Performed on the Chippewa Reservoir.
Revised September 15, 2016

Water levels in the Chippewa Reservoir are dictated by an exemption order that was granted by the Federal Energy Regulatory Commission (FERC) on September 28, 1984. The exemption order requires Northern States Power Company – Wisconsin (d.b.a. Xcel Energy) to maintain reservoir elevations between a minimum elevation of 1297.0 ft. and 1315.0 ft. (emergency full). The reservoir level may be lowered during the winter season below elevation 1297.0 ft. to accommodate maintenance requirements at the dam and under unusual precipitation conditions under mutual agreement with appropriate regulatory agencies. The normal full elevation of the reservoir is 1313.0 ft. The FERC exemption order also requires a minimum flow of 90 cfs be discharged from the dam at all times; although, a side agreement between the Wisconsin DNR, U.S. Fish and Wildlife Service and the Lac Courte Oreilles Band of Chippewa Indians increased the minimum flow to 250 cfs in 1987.

The Chippewa Reservoir dam was built to provide water for flow augmentation to downstream hydro plants and for flood control. The dam is operated such that it captures water during periods of excess river flow (typically spring and fall) and releases water during periods of low river flows (winter and summer months).

This information was developed in consultation with the Chippewa Reservoir Partners Group and will be used to help educate the public to the various drawdowns that may be utilized over the life of the dam.

Drawdowns throughout the history of the reservoir have been performed during the summer and winter months. Drawdowns of up to 22 ft. have been performed during the winter months whereas drawdowns of around 3.5 ft. have occurred during the summer months. Recently, conditions have allowed for coordination of drawdowns that have the potential to reduce invasive species prevalence and improve aquatic habitat, specifically for fish. The categories of drawdowns that are performed on the Chippewa Reservoir are summarized below:

Drawdown 1: Summer Drawdown (June 1 to September 30)

Summer drawdowns are performed during the summer months with the lowest elevations reached typically in late-September or early-October. A typical low elevation of 1310.0 ft is achieved by early-Fall, although summer drawdowns deeper than 1310.0 ft. have occurred during drought conditions.

Drawdown 2: Winter Drawdown (December 1 to March 31)

A winter drawdown generally occurs beginning in early December and ending in mid-March to early April depending on snowmelt runoff. The drawdowns can vary somewhat from year to year based on inflows into the reservoir, the need for downstream hydroelectric production (increased discharge), and the presence or lack of accumulating snowpack. Drawdowns performed during the winter season can reach the minimum elevation of 1297.0 ft., although the 10-year average drawdown is only 4.7 ft. (2006-2015) due to long-lasting drought conditions. Drawdown depths averaged 8.2 ft. from 1970 to 2015 and 13.0 ft. for the period of record (1923 to 2015). Refill of the reservoir in the springtime usually occurs by early May.

Drawdown 3: Habitat Manipulation Drawdown (October 1 through March 31)

Xcel Energy has been a member of the Chippewa Reservoir Partners Group since 2006 to evaluate

environmental conditions in the reservoir. After several years of meetings and research, the committee agreed in the fall of 2013 to perform an earlier (pre-ice) drawdown to return to a more traditional depth of winter drawdown. The hypothesis was that the deeper drawdown would benefit the fishery as well as provide control for the exotic plant species Eurasion Water Milfoil.
The drawdown involves a continuation of the summer drawdown into the fall months until a 5-foot drawdown (elevation 1308.0 ft.) is achieved in mid-November. Lowering the water before ice formation is less harmful to reptiles, amphibians, and furbearing mammals and also aids control of invasive plants. These considerations should be balanced with the need for recreational access to the flowage throughout the fall. The reservoir elevation would then continue to decrease during the winter months until an 8 ft. drawdown is achieved in early-March. A drawdown of 8 feet in the winter has been shown to provide considerable benefits to the fish community as a whole and can reduce invasive Eurasian Water Milfoil populations. Deeper drawdowns carry considerably more risk of fish kills and poor spawning conditions for fish in the spring. Refill of the reservoir may take longer than a normal winter drawdown but it is anticipated that water levels would fill to a satisfactory level by mid-May. Changes to the depth and timing of habitat manipulation drawdowns may be considered as new data becomes available.

Drawdown 4: Construction Drawdown (variable dates)
At some point in the future, it may be necessary to conduct a drawdown to perform construction work. Work at the dam may need to be coordinated through FERC as well as local stakeholders. The drawdown might involve decreasing water levels below the 1297.0 ft. minimum with approval from the FERC depending on the type of work that needed to be completed.

Drawdown 5: Emergency Drawdown (variable dates)
An emergency drawdown may need to be performed if a condition at the dam develops that creates a potential dam safety problem that could lead to the failure of the dam. In order to reduce the likelihood of a dam failure situation, or to minimize the uncontrolled release of water from the dam, the lake would be drawn down in advance. This drawdown would be undertaken very quickly and would involve consultation with FERC and local entities.

For winter drawdowns where drawdown depth will exceed 4 feet, the general recommendation from resource managers is to draw water in the fall, prior to ice formation, to minimize the amount of draw after ice formation. This may provide benefits including 1) reduce amount of hazardous ice shift or cracking after ice formation; 2) reduce impacts to aquatic fur bearers, reptiles and amphibians that overwinter in the ice transition zone; and 3) expose aquatic plant beds to help control invasive plants.