

Winnebago Walleye Management Plan



Spring view of Fox River upstream of the Highway 21 Bridge in Oshkosh with Rainbow Park boat landing on left

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The Winnebago System walleye population has been a focal point for fisheries management for decades. Two major staples in Winnebago walleye management were the formation of the Winnebago Walleye Workgroup in 1988 and implementation of the Winnebago Walleye Management Plan (WWMP) in 1991. The Winnebago Walleye Workgroup, now referred to as the Winnebago Fisheries Advisory Committee (WFAC), consists of over 25 citizen representatives from local conservation groups that focus on non-sturgeon fisheries management issues on the Winnebago System. In 1991, DNR fisheries staff worked closely with the WFAC to develop and implement the WWMP. The group recommended management actions in five core areas including: Regulation/Management, Physical Habitat, People/User Conflicts, Water Quality, and Fish Populations/Communities. As a result, there have been 4 major actions taken since implementation of the 1991 WWMP, including:

- Reduction of carbon monoxide emissions into the Fox River in Oshkosh, thus mitigating potential impacts on walleye fry survival during spring drift events to Lake Winnebago.
- Implementation of a 15 inch walleye minimum length limit from 1992-1997 to provide greater protection of the strong 1990 and 1991 year classes and improving their potential for recruitment to the adult population.
- Increasing walleye spawning habitat on the system via purchase or lease of suitable marsh habitat adjacent to the Wolf and upper Fox Rivers, conducting marsh maintenance to restore or enhance functional walleye spawning areas, and creating “No Entry” zones on walleye spawning marshes to allow walleye to spawn and eggs to develop undisturbed.
- Implementation of an intensive walleye tagging program (1993-Present) to track angler exploitation, estimate population abundance, monitor trends in size/age distributions of the adult stock, observe general movement patterns, and create working relationships with anglers throughout the Winnebago System.

As a result of these actions, the Winnebago System currently supports a healthy self-sustaining walleye population. However, proactive fisheries management will continue to be needed to manage the Winnebago walleye population and maintain a strong self-sustaining recreational fishery. Many of the issues outlined in the 1991 WWMP have since been addressed, but some reoccurring issues still remain and new issues/concerns are emerging. Therefore, it is crucial to update the goals, objectives, and tactics that will help guide future Winnebago walleye management.

In 2010, DNR fisheries staff hosted four public meetings around the Winnebago System to attain public input on the current issues regarding walleye management. Overharvest was ranked as the number one issue, but various habitat issues also ranked high among attendees (Table 1). The impact of tournaments, electrofishing, and high forage levels were also noted as issues that should be addressed. It should also be noted that issues were not ranked the same among meeting areas, for example, overharvest was expressed as a concern by over 50% of participants in Menasha and Fond du Lac while only 9% of participants in Shiocton considered this a major issue. Ultimately these public meetings provided DNR fisheries staff critical input on the public’s current concerns regarding walleye management.

Table 1. Results from 2010 public meetings in Shiocton, Menasha, Quinney, and Fond du Lac (FDL) indicating top ranking issues regarding Winnebago System walleye management.						
Issue	Rank	Average Vote %	Shiocton Vote %	Menasha Vote %	Quinney Vote %	FDL Vote %
Overharvest	1	38%	9%	58%	32%	53%
Overharvest during Spring Run	2	21%	0%	24%	47%	12%
Vegetation and Water Clarity	3	19%	0%	8%	15%	53%
Impact of Tournaments	4	19%	0%	18%	22%	35%
Insufficient Marsh Restoration	5	13%	8%	18%	8%	18%
Impact of Electro-fishing	6	10%	33%	7%	0%	0%
High Forage and Slow Walleye Bite	7	9%	3%	16%	16%	0%
Low Water Levels	8	5%	10%	0%	3%	6%
Number of Meeting Attendees			98	38	59	17

Following the public input meetings held in 2010, DNR fisheries staff began to meet with the WFAC in 2013 to discuss future Winnebago walleye management strategies and identify updates needed for the WWMP. Similar to the 1991 plan, four major areas of emphasis were identified including: Biological/Fish Communities, Physical Habitat and Water Quality, Social/User Conflicts, and Regulation/Enforcement. Goals were identified for each area of emphasis along with the objectives and tactics needed to successfully achieve the goals for future management. Although the current Winnebago walleye population is healthy and self-sustaining, proactive fisheries management in all four areas was viewed to be crucial for maintaining a strong walleye population and fishery.

The overall goal of the WWMP is to:

Manage the Winnebago System walleye fishery to protect and enhance walleye habitat, maintain a self-sustaining walleye population, and maintain beneficial recreational uses of the walleye resource.

The four major areas including their goals, objectives, and tactics are broken down as follows:

1.0 Walleye Population and Fish Community Management

Background:

Prior to the 1980s, the Winnebago System walleye population was self-sustaining and management practices were limited. Priegel intensively studied diet, movement, exploitation, age/growth, and early life history of the Winnebago walleye population throughout the 1960s and 1970s. Conversely, management efforts from the 1970s and much of the 1980s were mostly limited to data collected during rough fish removal trawling efforts. However, the combination of poor walleye year classes throughout the late 1980s, deteriorated conditions on walleye spawning marshes, and an aging adult population led to a significant decline in walleye abundance in the early 1990s. Other factors including a diminished forage base, high harvest rates on the remaining fish, and overall changes in the fish community were also thought to be contributing factors.

The declining walleye population spurred an increase in DNR fisheries management actions including: the development of the Winnebago Walleye Workgroup that was instrumental in drafting the WWMP in 1991, an intensive period of spawning marsh improvement work, and an increase in monitoring of the walleye population. The increase in monitoring efforts involved the start of three annual surveys including: the Lake Winnebago annual bottom trawling assessment in 1986, spring electrofishing adult stock assessment in 1989, and summer tournament monitoring in 1991.

The annual Winnebago trawl assessment is conducted at 46 GPS waypoints using the same methodology annually. The survey targets YOY fishes and provides year class strength and relative abundance estimates for walleye, various panfish species, and forage fish species. Several strong year classes of walleye have been documented during that time with 1996, 2008, 2013, 2001, and 2005 representing the five largest year classes (Figure 1). Although walleye recruitment has been inconsistent from year to year, a strong year class has emerged every 3-5 years since the 1990s. Continuing to conduct the trawling survey annually will be crucial for evaluating walleye year class strength as well as the strength of the forage base and relative abundance of other fish species.

The adult walleye population has been monitored annually since 1989 via spring electrofishing surveys conducted in spawning marshes on the Wolf and upper Fox Rivers. Primary goals of the survey are to 1) floy tag adult fish to attain angler exploitation estimates through the walleye tag return program, 2) assess size and age structure of the adult stock, 3) evaluate spawning marsh conditions and identify marshes in need of maintenance.

Walleye exploitation has been tracked annually on the Winnebago System since 1993 and relies heavily on anglers returning tags from tagged fish that they catch. Historically, annual adult male and female walleye exploitation has been calculated using the estimate that about 50% of anglers return their tags, which is a critical parameter that can alter exploitation estimates. The Department conducted a walleye reward tag study in 2016 and 2017 to further investigate angler tag reporting rates. The results indicated that the estimated angler tag reporting rate was 29% (95% CI 23.0%-37.5%) in 2016 and 42% in 2017. A third year of study will be conducted in 2018 to further evaluate angler tag reporting rates.

Thus far, the study has indicated that walleye exploitation rates on the Winnebago System were higher than previously estimated. The average annual adult male walleye exploitation is currently estimated at 20.5% and 28.3% for adult females (using 35% tag reporting rate; Figure 2). For adult females, annual exploitation surpassed 40% in 6 years since 1993. In addition, the Department has also begun tagging immature female walleye in the system and estimated annual exploitation at 58% in 2015, 23% in 2016, and 19% in 2017. The high exploitation on immature females in 2015 was focused mainly on 15-18 inch fish from the 2011 walleye year class.

Exploitation estimates on the Winnebago System can fluctuate annually and are often tied to forage base trends, particularly gizzard shad. For example, adult female walleye exploitation was 43.9% in 2009 before falling to 16.4% in 2010 after a large shad hatch occurred in the summers of 2009 and 2010 (Figure 3). More recently, adult female walleye exploitation was 39.2% in 2015 and decreased to 26.0% in 2016 following a strong 2016 shad hatch. Immature female walleye followed the same pattern with 56.9% exploitation in 2015 and 22.7% exploitation in 2016.

Therefore, gizzard shad can provide the walleye population protection from high exploitation during years with strong hatches. However, it is impossible to predict when strong year classes of shad will occur which leaves the walleye population vulnerable to high exploitation years, particularly when there are multiple years in a row without shad hatches. Therefore, tracking exploitation annually is fundamental for making management decisions and discussing potential regulation changes.

Walleye tournament monitoring has also been conducted annually at two major tournaments to 1) collect age data for estimating mortality and growth rates of the adult female stock, 2) determine size and age distribution of tournament caught fish, and 3) serve as the recapture sample for estimating population abundance. Survival rates are also monitored at the major tournaments in order to ensure that proper release methods are being practiced. The Winnebago System consistently hosts over 40 walleye tournaments annually, thus tournament monitoring is important for assessing possible impacts and user conflicts.

The combination of the annual Winnebago trawl, spring adult stock, and tournament assessments have provided the data necessary for tracking the Winnebago walleye population status and maintaining a proactive management program. Aside from population monitoring, the proactive management program also includes implementing special projects, such as the reward tag study that was conducted in 2016 and 2017. Other special projects include the sonic tagging study conducted from 2011-2013 to evaluate walleye movement patterns, comprehensive walleye age and growth evaluations, and genetic analyses. Continuing to develop special projects by working with local conservation groups, WFAC, and local citizens will be fundamental for maintaining a proactive management program.

Monitoring of other gamefish and panfish species has also become more of a priority to track changes in the overall fish community and possible impacts on the walleye population. Until recently, the Winnebago bottom trawl survey was heavily relied on to provide information on other gamefish and panfish species. However, near shore species such as northern pike, largemouth bass, and many of the panfish species are often underrepresented in the trawling survey. As a result, comprehensive fish surveys that include fyke netting and bass/panfish electrofishing are being conducted on a rotational basis throughout the Upriver Lakes and Lake Winnebago.

Nonetheless, the Winnebago fisheries management program has expanded to better understand fish community dynamics and effectively manage the entire fish community, including the walleye population. Monitoring for aquatic invasive species (AIS) also continues to be a priority during all fisheries assessments throughout the Winnebago System. The multiple sampling gears used throughout the year provide surveillance for invasive fish species, but additional sampling for invertebrate groups such as zooplankton would provide a better overall AIS surveillance program. Therefore, continuing to work with the Winnebago System AIS team and other department programs and entities will also be required.

Goal: Conduct annual assessments to monitor the Winnebago walleye population, the overall fish community, and AIS to allow for proactive decision-making regarding overall management strategies.

Objectives:

- 1.1 Continue conducting annual Winnebago System walleye assessments in order to assess year class strength, age and growth, exploitation and mortality, and relative adult abundance. Modify or explore other walleye assessment techniques as needed for the collection of data to manage walleye.

- 1.2 Continue to monitor the overall Winnebago System fish community and develop additional sampling protocols as needed to further assess changes in the fish community that may influence the walleye population.
- 1.3 Monitor for AIS during annual fisheries assessments and increase AIS monitoring activities throughout the Winnebago System as needed.

Recommended Tactics:

- 1.1a Evaluate walleye year class strength and adult relative abundance via annual bottom trawling assessments on Lake Winnebago
- 1.1b Monitor adult walleye exploitation rates by conducting annual spring electrofishing tagging surveys on the Wolf and upper Fox Rivers and evaluating tag returns from recreation and tournament anglers
- 1.1c Evaluate immature female walleye exploitation rates by conducting spring electrofishing surveys on Lake Winnebago and Upriver Lakes
- 1.1d Conduct a reward tag study as needed to better estimate angler tag return rates and attain more accurate exploitation rates
- 1.1e Further evaluate walleye harvest demographics through periodic creel census surveys
- 1.1f Evaluate age, growth, and mortality metrics during spring electrofishing surveys and major walleye fishing tournaments
- 1.1g Determine adult abundance estimates based on recaptures of tagged walleye observed at major fishing tournaments
- 1.1h Explore additional biological factors impacting the walleye population such as zooplankton abundance, walleye population genetics, contributions from lake spawning fish, and diet trends
- 1.1i Partner with other entities (universities, consultants, conservation groups, volunteer groups, etc.) when necessary to gather a broader range of data
- 1.2a Conduct the annual Lake Winnebago trawling survey to assess year class strength and relative abundance of game and non-game fish species

1.2b Within time and budget constraints, expand monitoring protocols to evaluate the status of other panfish and gamefish species on the system as needed

1.3a Continue to monitor for invasive fish species during standard fish surveys and expand AIS surveillance for other invertebrate groups such as zooplankton through continued interaction with the Winnebago System AIS Team, other department programs, and additional local entities

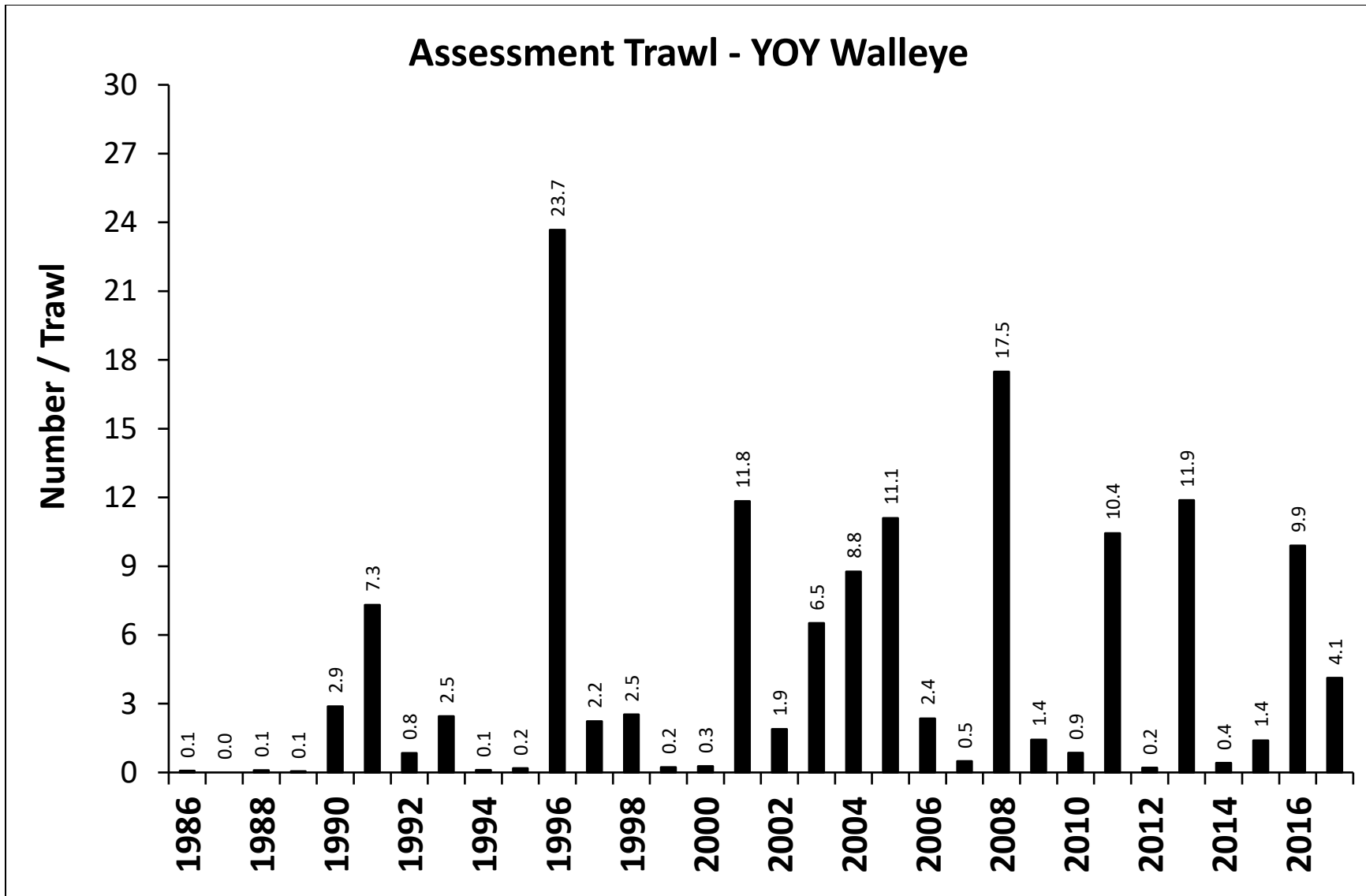


Figure 1. Average number of young of year (YOY) walleye sampled during Lake Winnebago trawling surveys from 1986-2017.

Exploitation of Walleye on the Winnebago System (1993-2017) with 35% Tag Reporting Rates

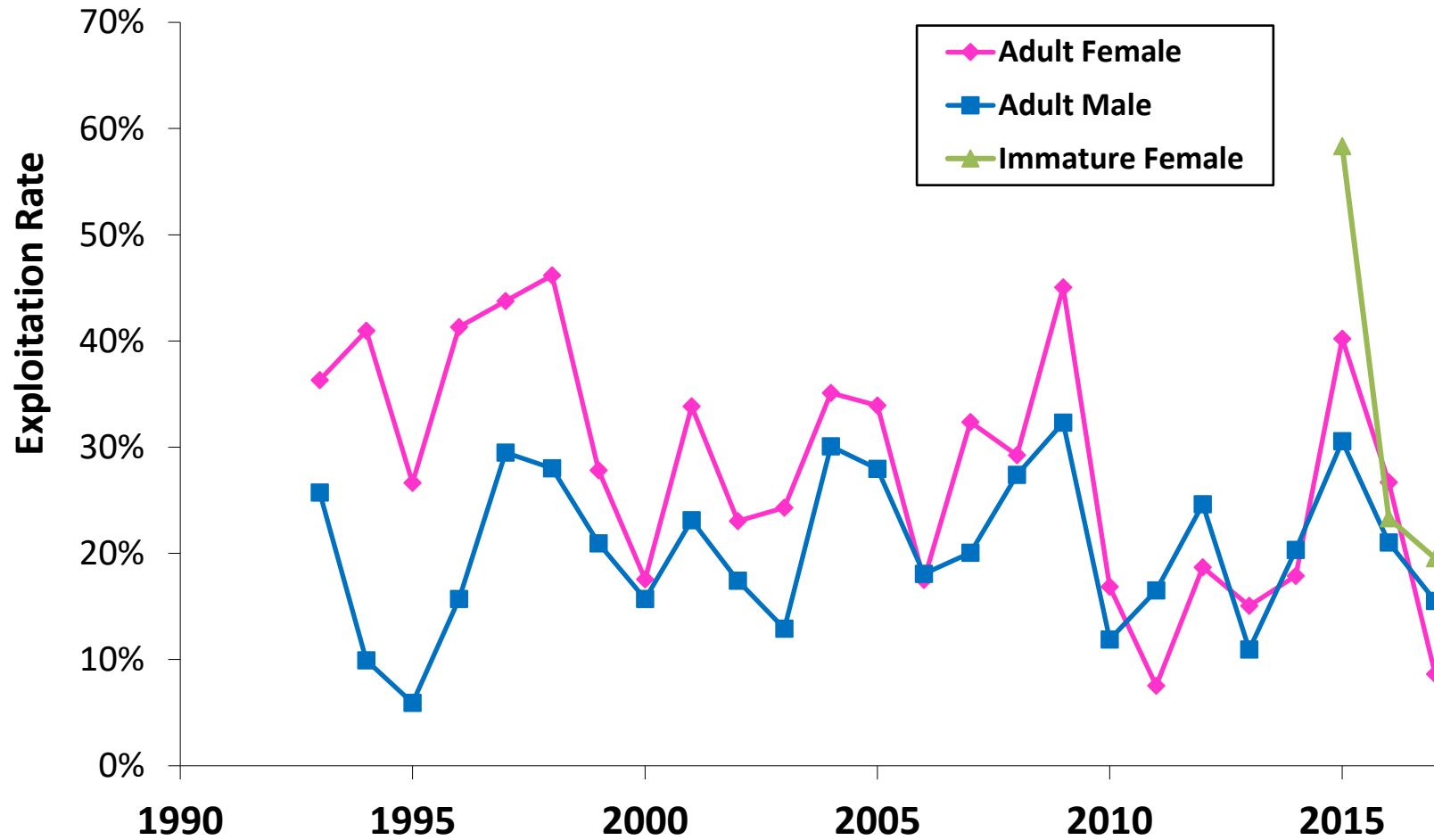


Figure 2. Winnebago System mature male and female (1993-2017) and immature female (2015-2017) walleye exploitation rates assuming 35% angler tag return reporting rates.

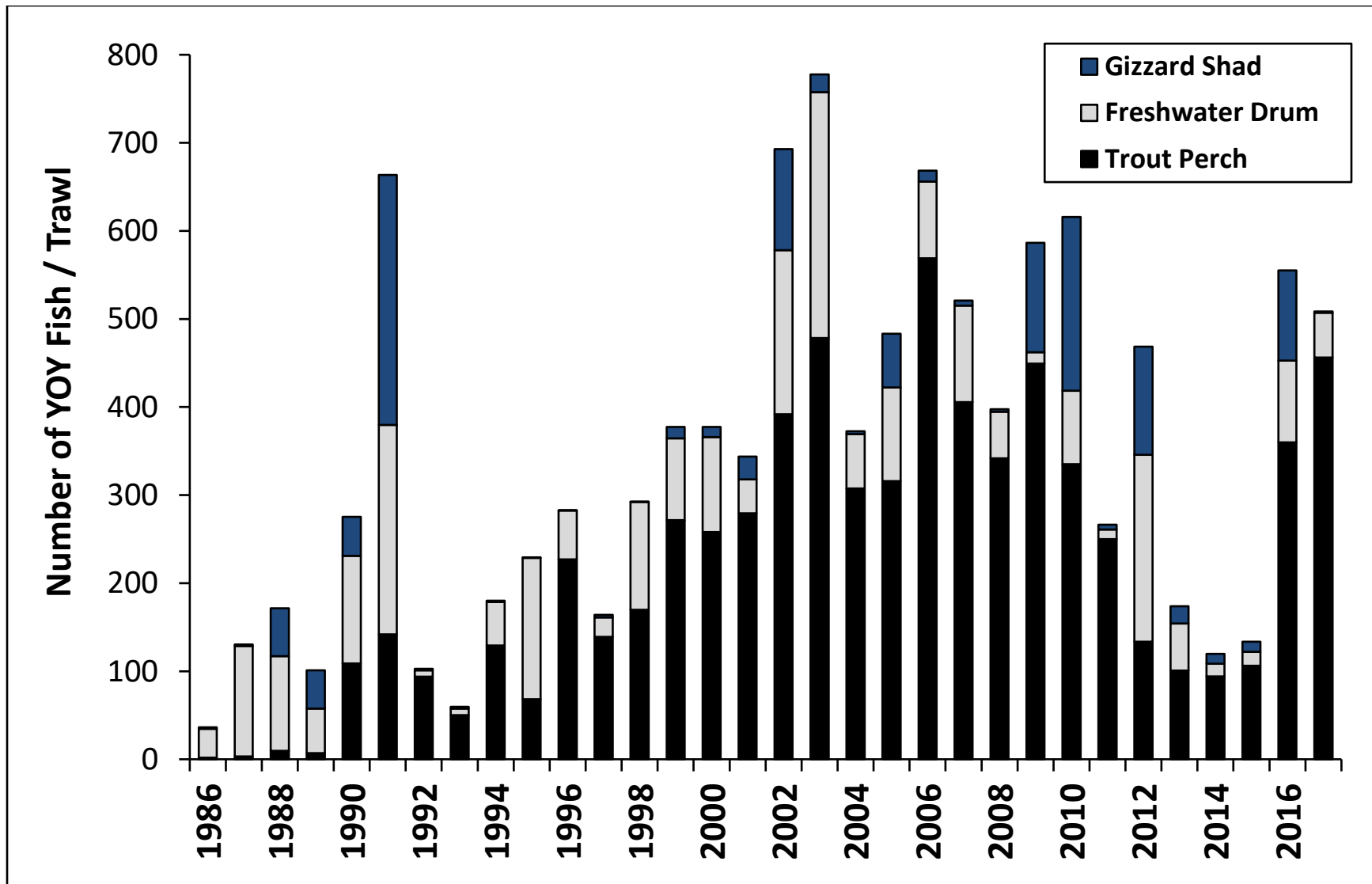


Figure 3. Average number of YOY trout perch (black bars), freshwater drum (gray bars), and gizzard shad (blue bars)/trawl in Lake Winnebago from 1986-2017.

2.0 Physical Habitat and Water Quality

Background:

During the mid-late 1900s critical walleye spawning habitat had degraded throughout the Wolf and upper Fox River Basins. Ditching, dike construction, impounding, road construction, brush encroachment, changing land practices, development, and other factors had severely interrupted natural river fluvial dynamics and reduced the viability of many key walleye spawning marshes. In addition, it was thought that carbon monoxide emissions in Oshkosh was contributing to decreased survival of walleye fry drifting down from spawning marshes into Lake Winnebago, an issue that has since been resolved. Perhaps the cornerstone of Winnebago walleye management has been the restoration of walleye spawning marshes on the Wolf and upper Fox Rivers by both the DNR and conservation clubs, resulting in a substantial increase in walleye recruitment.

The restoration program focused on attaining cooperative walleye spawning marsh improvement agreements on productive walleye spawning marshes throughout the Wolf and upper Fox Rivers. The land use agreements included the establishment of “No Entry Zones” in designated spawning marshes from March 15 through the first Saturday in May to avoid disturbing spawning adult walleye, their eggs, and hatched fry. In addition, the land use agreements allowed DNR fisheries staff and conservation groups to conduct maintenance activities such as restoring natural flows, mowing, brushing and tree removal, dike modification, the installation of culverts and bridges, and prescribed burns to maintain productive walleye spawning marsh habitat. In addition to the leases, the department also actively purchased several suitable properties to preserve them as spawning areas. As a result, several key walleye spawning areas have been identified and maintained including Spoehrs, Ruedens, and Bernerggers Marshes on the Wolf River as well as Schrammers and Hopps Marshes on the upper Fox River (Figure 4). Nonetheless, the mitigation of walleye spawning marshes has been a key component in walleye management and must continue to be an area of emphasis.

Water quality and habitat, particularly vegetation in Lake Winnebago, also play major roles in walleye management. Past water quality and vegetation monitoring has included some sporadic sampling throughout the system, but a system wide water quality and vegetation monitoring program has been non-existent. A period of increased water clarity and aquatic vegetation growth occurred on Lake Winnebago from the mid-1990s and peaked in 2010. Several strong year classes of panfish species (notably yellow perch, bluegill, and black crappie) also occurred during the same time span and these strong year classes were likely at least partially due to the increased water clarity and vegetation growth in Lake Winnebago. Anecdotal observations indicate that Lake Winnebago vegetation growth and water clarity have

been improving overall since the 1990s; however, conditions appear to be degrading on the Upriver Lakes. As a result, there is a strong need for developing a system wide water quality and vegetation monitoring program to better track trends and understand ramifications for walleye management.

Goal: Protect, maintain, and create walleye spawning habitat throughout the Winnebago System.

Objectives:

- 2.1 Maintain and protect walleye spawning marshes, acquire new critical spawning marshes when possible, and explore new spawning habitat areas on the Wolf and upper Fox Rivers

Recommended Tactics:

- 2.1a Continue or expand maintenance activities on walleye spawning marshes on the Wolf and upper Fox Rivers, including water flow management, brush mowing, and explore the use of prescribed burns to manage vegetation
- 2.1b Continue to work closely with local conservation groups, county staff, department staff, and others to complete spawning marsh habitat work and help maintain working relationships with local landowners
- 2.1c Expand spawning marsh inventory and acquire additional quality spawning habitat throughout the system, particularly on the upper Fox River
- 2.1d Increase walleye spawning habitat availability during low water springs by identifying potential low water marshes and conducting habitat improvement to increase their function in low water conditions
- 2.1e Maintain walleye spawning marsh agreements and renew as needed
- 2.1f Maintain “No Entry Zone” walleye spawning marsh signs in designated areas
- 2.1g Further investigate in-lake walleye spawning on Lake Winnebago

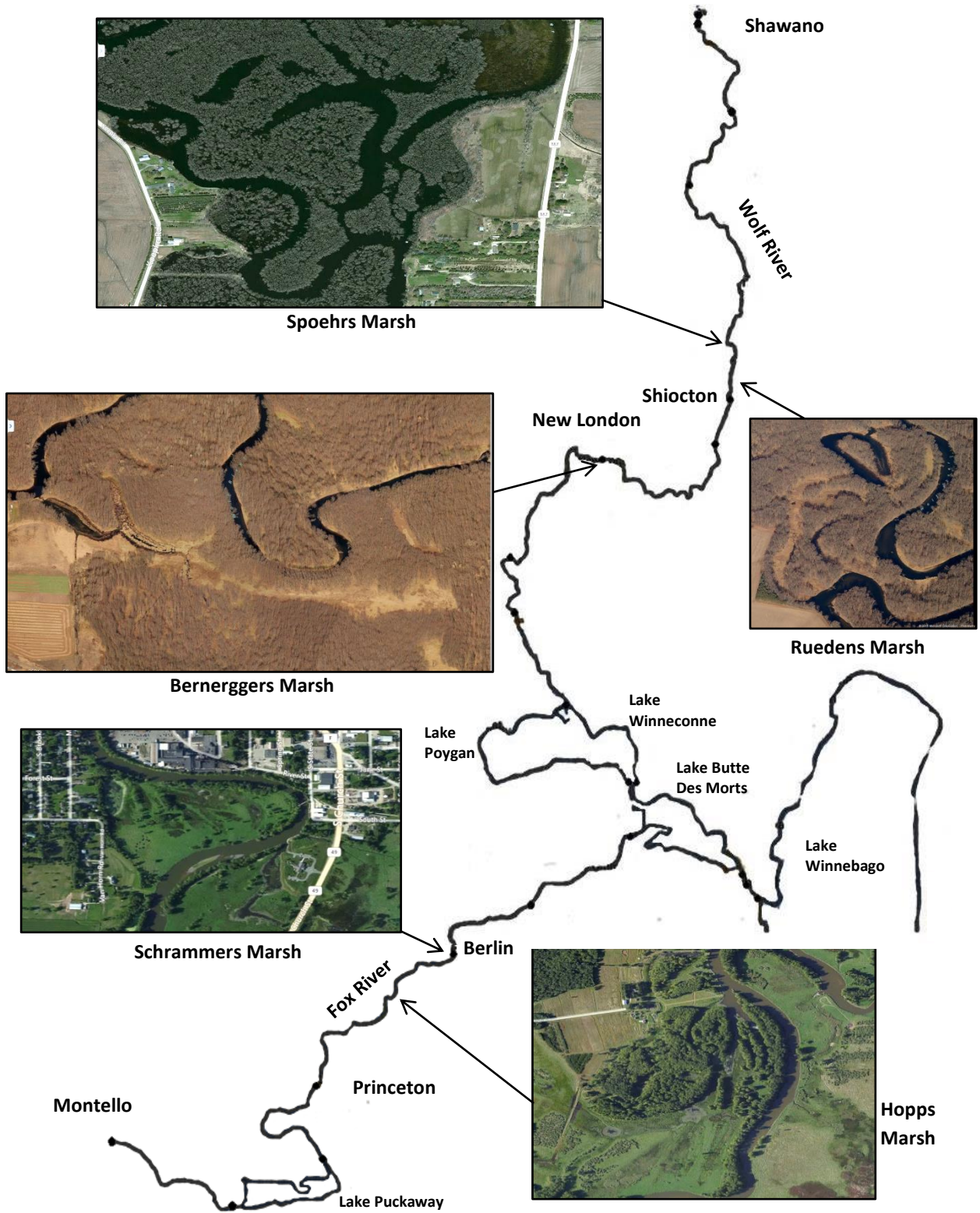


Figure 4. Map of fundamental walleye spawning marshes located on the Wolf River (Spoehrs, Ruedens, and Bernerggers) and the upper Fox River (Schrammers and Hopps).

3.0 Social and User Management

Background:

The 1991 WWMP called for the development of an active public involvement plan. Outreach efforts since then have focused on public education for all user groups. These efforts include working with the WFAC and Winnebago Land Conservation Alliance, presenting at local fishing club and conservation group meetings, sending reports through an email distribution list, and distributing information through local media outlets and department social media. As a result, the public has become more engaged in DNR fisheries management of the system and has provided a strong volunteer base to help complete critical annual fisheries assessments. For example, volunteers often outnumber DNR staff during the annual Winnebago trawling assessment.

The walleye tag return program also requires strong cooperation from the public to effectively estimate exploitation rates that are vital for managing the walleye population. The program began in 1993 and relies heavily on anglers to report tagged walleye caught throughout the system to track annual exploitation rates. The tagging program requires constant public outreach to remind anglers to report the catch of tagged fish and maintain strong angler tag reporting rates. Aside from the tag reporting program, public awareness of fisheries management efforts, AIS, and habitat issues are also a priority to maintaining a healthy fishery and ecosystem.

Although fisheries staff has strived to provide extensive public outreach, conflict among different user groups still remains. The Winnebago System is used for a variety of activities including fishing, hunting, boating, water skiing and tubing, sailing, bird watching, and many others. Different types of walleye angling activities including tournament, recreational, shoreline, and bridge angling also exist throughout the year, particularly during the spring spawning run. As a result, boat traffic and congestion at popular onshore fishing locations continue to lead to conflict among different user groups. Continued public outreach is required to balance the interests and needs of different user groups.

Goal: Engage the WFAC, local conservation clubs, and the public in Winnebago walleye management and provide educational outreach opportunities to various user groups to promote a greater understanding of Winnebago walleye management.

Objectives:

- 3.1 Continue to engage the WFAC, local conservation clubs, and the public in walleye management
- 3.2 Continue to enhance the public understanding of the Winnebago walleye population, DNR management efforts, and various stakeholder needs
- 3.3 Revitalize and increase awareness of the walleye tagging program

Recommended Tactics:

- 3.1a Hold 1-2 annual meetings with WFAC to discuss walleye and other species management issues that need to be addressed
- 3.1b Present annual walleye stock assessment, trawling survey reports, and other pertinent information to local conservation clubs
- 3.1c Continue to engage WFAC and conservation clubs in projects that address walleye management and resource questions
- 3.1d When needed, hold public meetings to engage/inform the public on high priority topics such as potential regulation changes, management plan updates, and other issues that may arise
- 3.2a Provide annual summary reports to public users via email distribution list, Wisconsin DNR website, and local media outlets
- 3.2b Present informational updates regarding walleye management at local club meetings, radio shows, and other media outlets
- 3.2c Recruit new public volunteers to participate in annual walleye assessments and provide a hands on experience with managing the walleye resource
- 3.2d Recruit new members to the email distribution list to provide greater public outreach and explore other social media options for distributing information
- 3.2e Produce a comprehensive report regarding walleye management on the Winnebago system every 5 years

3.3a Conduct a reward tag study as needed to evaluate the walleye tag return program and evaluate public interest/participation in the program

3.3b Rejuvenate outreach efforts for the walleye tagging program through public outreach, posting signage at boat landings, and pursuing other media outlets when necessary

3.3c Explore new tag return format opportunities such as an online website for anglers to report tagged fish

4.0 Regulation and Enforcement Action

Background:

Regulation changes have been utilized in the past to manage the Winnebago System walleye fishery. For example, a 15 inch minimum length limit was implemented in 1992 to provide greater protection of the strong walleye year classes from the early 1990s. The regulation was later lifted and reverted back to the no minimum length limit in 1997. Implementing the 2018 WWMP would ensure that walleye population trends are monitored and the proper regulations are implemented. However, timely regulation changes may be difficult due to the current regulation process that takes 2-3 years. This time frame is not ideal for a high profile walleye population and fishery that experiences extremely variable year class strength, size structure, and exploitation rates on an annual or even seasonal basis. Changes in environmental variables, forage base levels, angler harvest patterns, and other factors can also occur quickly. Therefore, maintaining a proactive fisheries management program is vital and investigating the potential for an alternate process to make more timely walleye regulation changes may be necessary.

Maintaining an effective law enforcement program throughout the Winnebago System is also critical to ensuring that rules and regulations are followed. Considering the Winnebago System encompasses over 165,000 surface acres and 177 river miles, there is an expansive area of diverse habitats for law enforcement personnel to oversee. Local anglers and sportsman have often expressed concern that there is not enough law enforcement presence patrolling the waters. Therefore, the department has often applied a teamwork approach to focus on high use areas that are often seasonally driven fisheries. A teamwork approach among law enforcement and fisheries staff to identify problem areas, along with cooperation from the public sporting community will be needed to help maintain the walleye and other fisheries into the future.

Goal: Implement proper harvest regulations in a timely manner based on results from walleye population assessments, while also maintaining an effective law enforcement program that incorporates public outreach.

Objectives:

- 4.1 Ensure that the proper harvest regulations are in place to maintain a healthy, self-sustaining Winnebago walleye population
- 4.2 Maintain an effective law enforcement program throughout the Winnebago System to ensure compliance with the walleye harvest regulations

Recommended Tactics:

4.1a Implement the 2018 WWMP to monitor population trends and evaluate need for potential regulation changes

4.1b Investigate the potential for creating an alternate regulation change process that would allow for timely walleye regulation changes when necessary

4.2a Maintain a teamwork approach for addressing law enforcement issues, particularly in high use areas

4.2b Encourage the public to be vigilant about reporting regulation violations