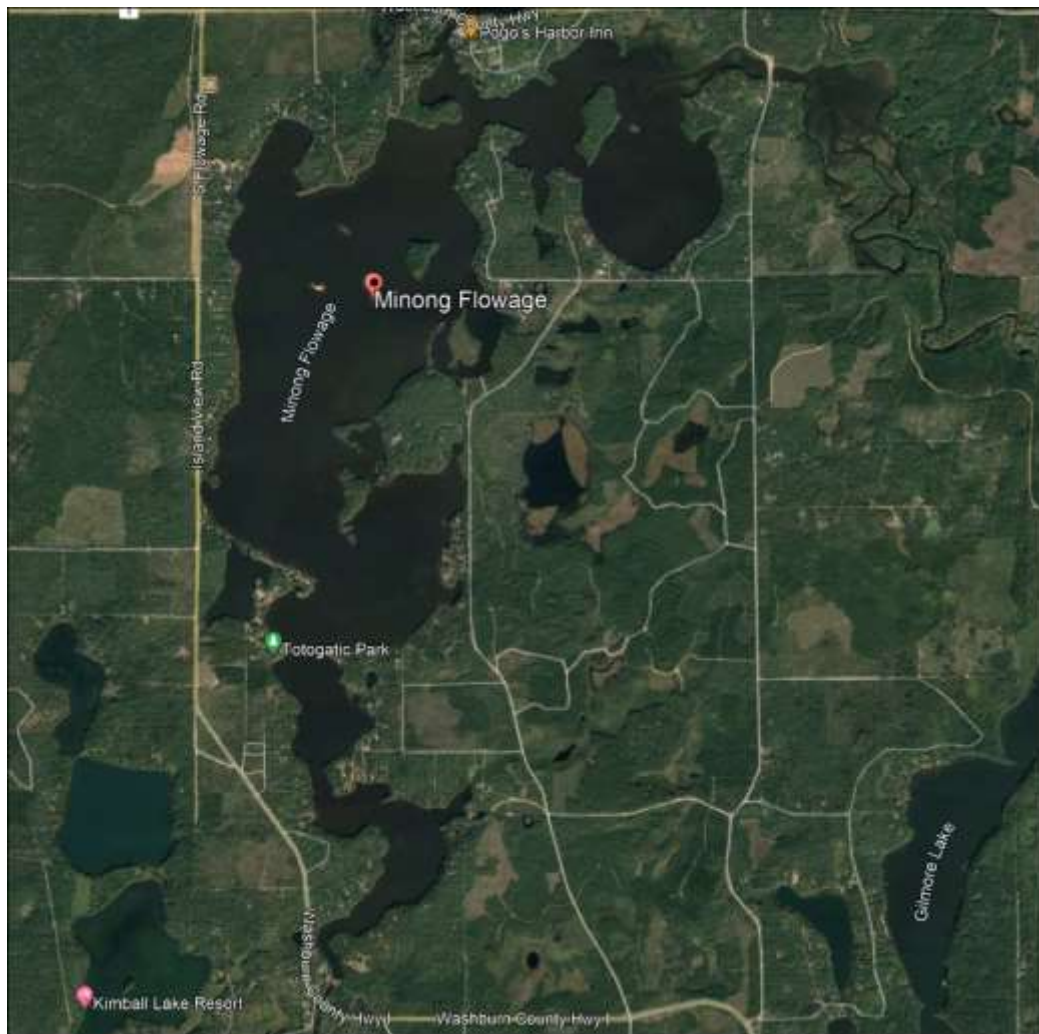


MINONG FLOWAGE WASHBURN COUNTY

2021 MANAGEMENT SUMMARY REPORT WBIC: 2692900

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MINONG FLOWAGE ASSOCIATION

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INTRODUCTION

This report discusses lake management activities completed by the Minong Flowage Association (MFA) and Lake Education and Planning Services (LEAPS) throughout 2021. A majority of these activities were completed as a part of a WI Department of Natural Resources (WDNR) Aquatic Invasive Species (AIS) Large-scale Population Control Grant (ACEI 26521) that was awarded to the MFA in early 2021. The main goal of the grant funded project is to plan and implement a winter drawdown of the Minong Flowage to control Eurasian watermilfoil (EWM). The following actions were completed by LEAPS, private contractors, and/or the MFA in relation to this grant funded project.

- EWM Management Planning
- Constituent and Stakeholders Communication
- Winter Drawdown Information
- Winter Drawdown Implementation
- Watercraft Inspection and Signage
- AIS Monitoring
- Purple Loosestrife Beetle Rearing and Release
- Cold and Warm Water Point-intercept Aquatic Plant Survey
- Fall EWM Bedmapping
- Wild Rice Monitoring
- Water Quality Monitoring
- Lake Level Monitoring
- Precipitation Monitoring
- Island and Shoreland Protection

2021 EWM MANAGEMENT PLANNING

Before any planning for EWM management planning could be completed, the duration of the existing Aquatic Plant Management (APM) Plan which was approved in 2016 had to be extended from its original end date in 2020, to a new end date of 2023. A letter was received from the WDNR on July 20, 2020 approving the requested extension to the APM Plan.

At the end of each year, after fall EWM bedmapping has been completed, discussion about managing EWM in the following year commences. In 2020, 28 beds of EWM covering 112.13 acres were documented during a late summer/fall survey. At the time, it was not known if the MFA would receive a WDNR AIS Population Control Grant to help support the implementation of a winter drawdown. As such, a potential chemical application covering 59 acres, 56 of which was in the area in and around the DNR Public Boat Landing and Swift Nature Camp was developed. The use of herbicides to control EWM has certain limits on it based on the existing APM Plan; however, this treatment proposal met all of those criteria. In the end, the chemical treatment plan was not implemented due in large part to the award of a 3-yr AIS Population Control grant and a pretty reasonable ascertain that a winter drawdown would be implemented over the 2021-22 winter season.

CONSTITUENT AND STAKEHOLDER COMMUNICATION

It has been the goal of the MFA to keep its constituency and the stakeholders involved in the winter drawdown informed as to the process and the progress leading up to, through, and after the winter drawdown. The following is a list of actions taken related to communication prior to the implementation of the 2021-22 winter drawdown. Planning for a stakeholders meeting prior to the start of the 2021 winter drawdown was planned, but in the end the meeting itself was not held – favoring email/phone/ZOOM communication instead. I face to face stakeholders meeting is planned for 2022.

- January (2022)
 - MFA Board Meeting 1/15/2022
- October
 - Constant Contact notice sent out to all constituents and stakeholders
 - Winter drawdown notice posted on the MFA webpage
 - MFA Board Meeting 10/9/2021
- September
 - Back to back postings in the Spooner Advocate announcing the pending winter drawdown
 - Washburn County Hi-Way Department approves the winter drawdown
 - Stakeholders discussion session proposed, but determined unnecessary, as it was felt all knew about it and its details
 - Constant Contact notice sent out to all constituents and stakeholders
 - FAQ document updated for distribution
- August
 - Official winter drawdown announcement mailed in paper copy
 - GLIFWC and other Stakeholders notified directly of the pending winter drawdown
 - Confirmation that the Winter Drawdown Permit was still active (It was, the extension was approved in July 2019 by the WDNR)
 - MFA Board approves the implementation of a winter drawdown over the 2021-22 winter season
 - Winter drawdown plan was updated from the 2018 version and made available to Stakeholders
- July
 - Regional DNR approval for a 2021-22 winter drawdown received
 - MFA Board Meeting 7/10/2021
- June
 - MFA Annual Meeting (6/12/2021) with a presentation about the new grant and pending drawdown
- May
 - Spring/Summer MFA newsletter completed and mailed to all constituents and stakeholders
- April
 - Washburn County Forestry Department Meeting attended by MFA representatives
 - GLIFWC and other Stakeholders informed of grant award to support a winter drawdown
 - MFA Board Meeting 4/10/2021
- March
 - MFA discussion of new AIS population control grant award and the tasks associated with it
 - MFA Board Meeting 3/6/2021

2021-22 WINTER DRAWDOWN INFORMATION AND IMPLEMENTATION

As can be seen in the list of activities in the previous section, several documents related to the winter drawdown were updated in preparation for implementation. Two documents, first developed when attempting to implement a winter drawdown in 2018, were updated in 2021. Both the “Frequently Asked Questions” document and the “2021-22 Winter Drawdown Plan” were updated by LEAPS with input from the MFA, WDNR, Renewable World Energies

(RWE), and other stakeholders. These documents were shared with the constituency, general public, and stakeholders. They are available on the MFA website as well.

Since the drawdown was implemented, it started on September 20, 2021 and reached the 5-ft goal in early November, MFA members have been keeping tabs on it. As of March 1, 2022 the water level remains at 5-ft below normal elevation. Updates have been sent regularly to the MFA Board, Stakeholders, and LEAPS. Refill will begin once spring conditions reflect the ice pulling away from the shore and from stumps and other objects protruding from the lake. Once refill is initiated, likely sometime in late March or April, it is expected that the Minong Flowage will be at full elevation again in 2-3 weeks.

In late Sept and October efforts were made to have WDNR pilots fly over the Minong Flowage and take photos of the areas most impacted. Unfortunately, delays in the availability of the pilots made it too late to take photos, as when finally ready, ice had already formed on the Minong Flowage and a light dusting of snow was laid down. The purpose of the aerial photos was to document newly exposed beds of EWM, but under the conditions that presented themselves when the pilots were ready to fly.

RWE has been sending invoices through Washburn County for “lost power generation” during the drawdown. To date, these losses are within the expected range of losses determined prior to implementation. These invoices from RWE are being paid by Washburn County. Once the refill is complete, the MFA and their partners will file for a reimbursement of expenses from 2021 and early 2022 with the WDNR thereby returning the funds to Washburn County.

When the winter drawdown was finally approved, it was hoped that the winter season would present the best possible scenario for an effective EWM kill. Light snow and very cold temperatures are the ideal conditions, which is exactly what 2021-22 presented. With that in mind, it is expected that the control of EWM in the Minong Flowage as a result of a winter drawdown will be excellent.

AIS PREVENTION AND MONITORING

Several AIS prevention and monitoring activities were completed by the MFA in 2021. Watercraft inspection through the Clean Boats Clean Waters program was supported by the MFA at the WDNR Landing and two smaller landings at Pogo’s and Smith’s Bridge. Nearly 200 volunteer and paid hours were put in with 204 boats and 405 people contacted. Another landing on the Minong Flowage at the County Campground was covered by the Town of Minong. An additional 466 hours of watercraft inspection time was completed there.

Over the course of this project, the MFA has been and will continue to work with Washburn County to have a Decontamination Station built at the public access at the County Campground. Initial talks and plans were completed early in 2021. Additional talks were had as late as July. At that time, a location to install the Decontamination Station at the County Park had still not been determined.

Several MFA volunteers spent time looking for AIS including purple loosestrife, curly-leaf pondweed, Japanese knotweed (which was first identified on the Minong Flowage in 2020 by Endangered Resource Services, Inc), and others. No new AIS were discovered.

In 2021, the ability of the Minong Flowage to support the growth of zebra mussels was changed from “can’t sustain” to “possibly suitable” by Washburn County. Washburn County completed several zebra mussel tows in the lake in 2021. No zebra mussels were identified. Several MFA volunteers in coordination with Washburn County installed and monitored zebra mussel plate samples in the lake. An email was sent through Constant Contact to remind property owners to check their boat lifts and docks for zebra mussels when they are pulled out for the year.

Under the guidance of LEAPS, Swift Nature Camp set up and tended a purple loosestrife Galerucella Beetle rearing station. The station consisted of 12 potted plants in a wading pool. Purple loosestrife rootstock was collected by LEAPS and potted in 5-gallon buckets. The supplies needed to set up the rearing station (pool, nets, fence posts, and wire) were brought to Swift by LEAPS in mid-May. Working with Swift Nature Camp Staff and a small group of

student volunteers, the beetles raised were taken to several locations on the Minong Flowage, including the Sawdust Island adjacent to the DNR Boat Landing, Sand Island, and on the river channel between Serenity Bay and Smith Bridge. Not all 12 buckets were released on the Minong Flowage, simply because there did not appear to be enough purple loosestrife to support the large number of beetles that came out of the rearing station. Washburn County was asked to provide additional release sites for beetles.

Permits and release forms were completed by LEAPS.

AQUATIC PLANT SURVEYS

Several aquatic plant surveys were completed on the Minong Flowage in 2021, however, not all of the reports from those surveys have been completed.

Endangered Resource Services began work on the Minong Flowage June 16-17 when both an early season, whole-lake, point-intercept (PI), aquatic plant survey was completed. This survey samples all 878 points on the lake documenting depth, substrate, and aquatic plant present. The early season PI survey is completed specifically to document the presence of curly-leaf pondweed (CLP) and EWM. This is the fourth time a survey like this has been completed on the Minong Flowage. The following two figures show the changes over time in how many points were identified with CLP and EWM. The year 2008 was the first year that EWM and CLP were mapped. The year 2012 was the year prior to the first summer/winter drawdown of the Minong Flowage; 2014 was the year immediately following the drawdown.

The 6 points with CLP identified in June 2021 equates to about 11 surface acres with CLP. The 55 points with EWM identified in June 2021 equates to about 100 surface water acres with EWM.

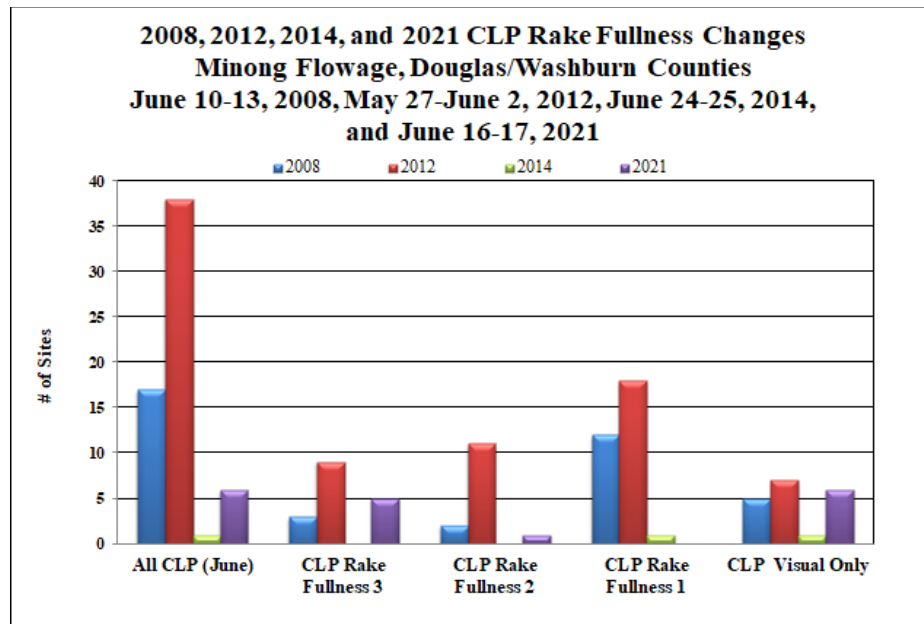


Figure 1

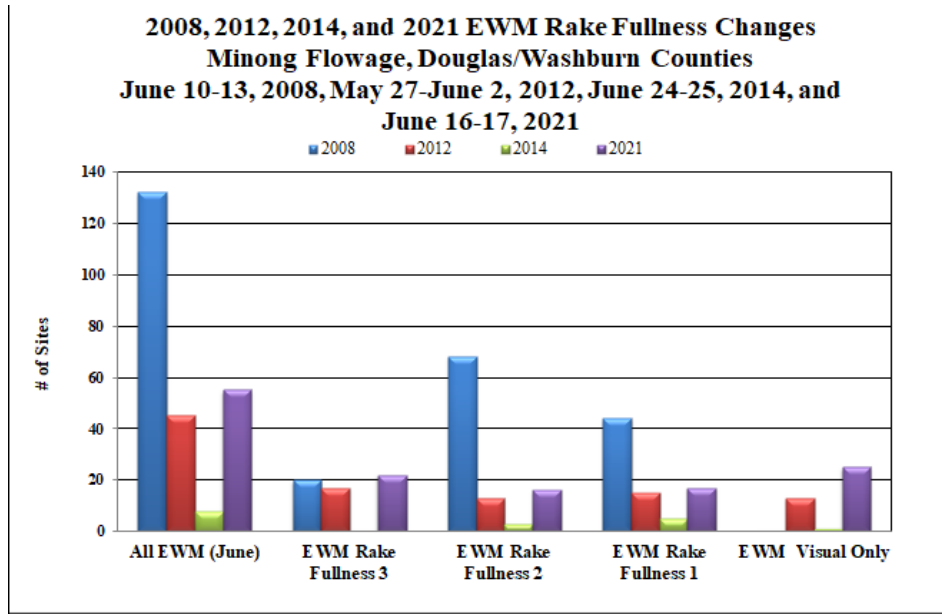


Figure 2

Immediately following the early season PI survey, ERS completed a formal CLP bedmapping survey. This survey adds to the PI survey by delineating actual beds of CLP. A bed is defined as any area that has a definable edge and where at least 50% of the plant species present are the target species. In 2021, only 4.3 acres of CLP was considered bed forming, <1.0% of the surface area of the lake. EWM bedmapping is not completed in this survey.

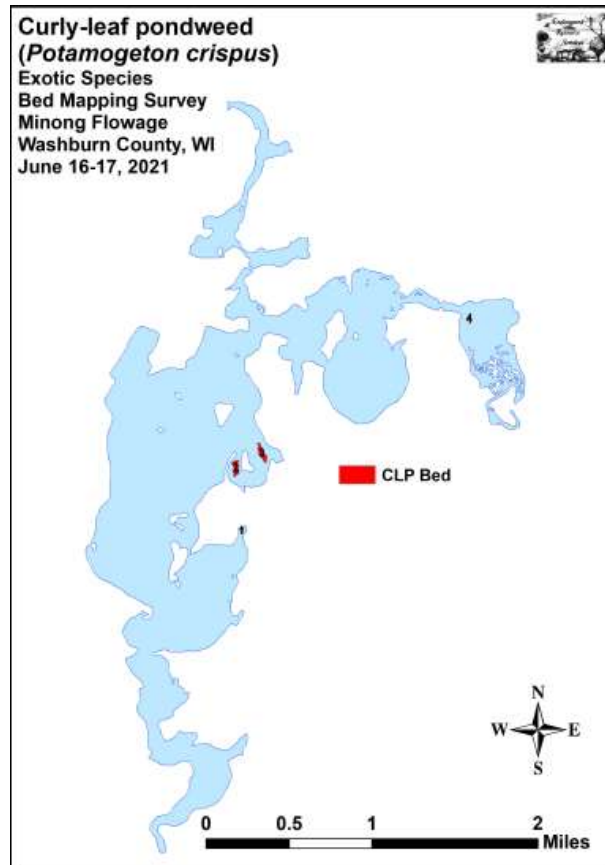


Figure 3

The whole-lake PI survey is completed again in the summer of the same year. During this survey the diversity, distribution, and density of all aquatic vegetation is documented. ERS completed this survey August 4-6, 2021. During the survey, all 878 points were surveyed. Of the points surveyed, 325 had some form of macrophyte (large growth) vegetation present; 510 of the points were considered to be in the littoral area of the lake, or the area that has the ability to support aquatic plant growth due essentially to depth and light penetration. The maximum depth of plant growth was 9.5 feet with a median/mean depth right around 4.0 feet.

During this survey, 68 different aquatic plant species were identified on the rake. With boat and visual documentation, that number increased to 78 different species. The top five most abundant plant species were coontail (114 pts), small pondweed (104 pts), EWM (88 pts), common waterweed or elodea (76 pts) and northern wild rice (69 pts). At 88 pts in August, EWM was present in nearly 160 surface water acres of the Minong Flowage.

This is the fifth time a whole-lake, summer, PI survey has been completed on the Minong Flowage. The first PI survey was completed in 2008, followed by surveys in 2012, 2014, 2018, and 2021. In 2008, 875 pts were surveyed, 377 had vegetation present with 517 pts in the littoral zone. The max depth of plants was 9.5 ft with a mean/median depth of 4.0 ft. During the 2008 survey, only 58 different plant species were identified on the rake with 65 species when boat and visual surveys are added. The top five most abundant plant species were coontail (187 pts), EWM (166 pts), elodea (130 pts), wild celery (90 pts), and fern-leaf pondweed (83 pts). In 2008, wild rice was 7th with 72 pts. The main difference between 2008 and 2021 is the amount of EWM present. At 166 pts, EWM was present in nearly 300 surface water acres of the Minong Flowage.

The last survey completed by ERS in mid-September 2021, was a fall EWM bedmapping survey. During this survey, more than 200 acres of EWM were considered to be bed-forming. This was up from 112 acres in 2020, and is one of the main drivers of the winter drawdown. As previously mentioned, final reports for these surveys had not been completed by ERS at the time of this writing. Final reports are expected this spring.

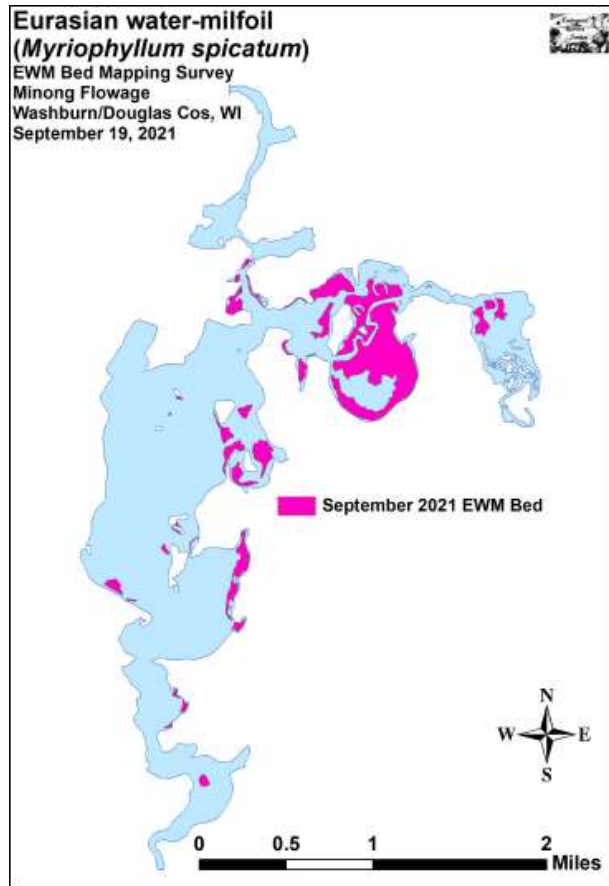


Figure 4

GLIFWC was supposed to have taken aerial photos of the extent of wild rice in the Minong Flowage in 2021, but at the time of this writing it is not known if this was done. Contacts were made, but we are still waiting on details. During the summer PI survey, wild rice was identified at 69 pts suggesting it covered approximately 125 acres of the Minong Flowage, primarily in Serenity Bay, the river channel between Serenity Bay and Smith Bridge, and in the east basin east of Smith Bridge.

Whole-lake PI surveys and EWM bedmapping will be repeated in 2023. Bedmapping will be done in 2022. One change however, will be the addition of survey work in the small pond adjacent to the County Campground. When the water level in the Minong Flowage is normal, this pond is connected to the main body of the lake. In 2021, the area was thick with EWM. No management has ever been done inside that pond, other than through the drawdown process.

2021 WATER QUALITY MONITORING

Water quality data was collected by volunteers in 2021 from three different sites in the Minong Flowage: North Basin (Secchi only), Central Basin (Secchi, Temperature, Total Phosphorus (TP), & Chlorophyll-a (Chl)), and the Deep Hole Near the Dam (Secchi, Temperature, TP, & Chl). Water clarity in the north basin was measured on 16 different dates. In Apr/May water clarity ranged from 4-5ft. In Jun/Jul it ranged from 5-6ft, and in Aug/Sept it tanked to only 3-3.5ft. The water in the north basin was described as clear and brown indicating the present of tannins in the water. Temperature profiles indicated that this area of the Minong Flowage remained mixed throughout the year.

An identical pattern was established in the Central Basin where 17 water clarity measurements were taken. The water in the central basin was described as clear and brown indicating the present of tannins in the water. In addition, water samples were collected to measure TP and Chl concentrations in July and August. It was originally intended that spring and June water samples also be collected, but instead it started in July. The two measurements of Chl were slightly higher than the regional average at 13.8ug/L. TP was measured at 31.1ug/L just slightly higher than what is considered “healthy” for an impoundment (30.0ug/L). Unfortunately, measurements of TP and Chl are not taken past August in any given year. As a result, a very visible increase in algae in the water that reduced water clarity by nearly two feet in late August and September was not recorded. Water color was very green in late Sept, greener than this consultant has ever seen it. Temperature profiles indicated that this area of the Minong Flowage remained mixed throughout the year.

At the deep hole near the dam, only five water clarity measurements were taken. The summer average was 4.0ft and the water was described as clear and brown. In addition to water clarity, water samples were collected in the spring, and then June, July, and August and measured for Chl and TP concentrations. The summer average for Chl was 12.7ug/L and TP was 27.3ug/L. Both of these values were slightly lower that what was recorded in the Central Basin. Temperature profiles suggested that late in the summer, the lake may stratify, at least in the deep hole area, but no dissolved oxygen profiles were completed to document anoxic (no oxygen) conditions. The water was described as clear and brown, but visual indications in late August, Sept, and Oct documented very green water.

Water quality data from all three of these sites strongly indicate that the Minong Flowage is a nutrient rich, eutrophic body of water. On a TSI scale from 0-100, values in the Minong Flowage are consistently in the mid-50s. In the figures below, dark blue is considered oligotrophic (TSI value 0-40); light blue is considered mesotrophic (TSI value 40-50); and green is considered eutrophic (TSI value >50).

At least in 2021, it appears that the Minong Flowage experienced a significant algae bloom in late August and September. Future water quality monitoring may benefit from adding TP and Chl sampling through October, rather than stopping in August.

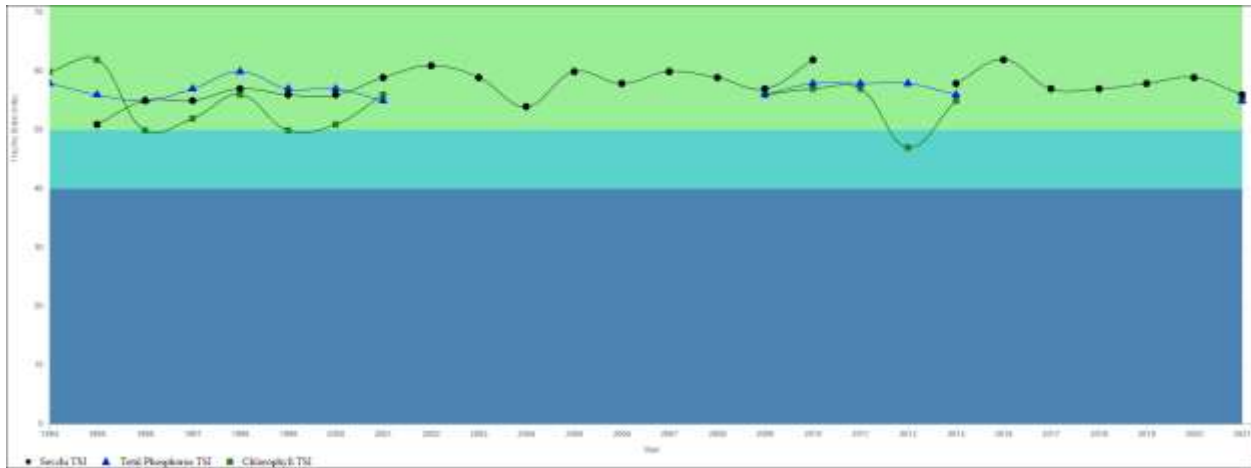


Figure 5: Central Basin

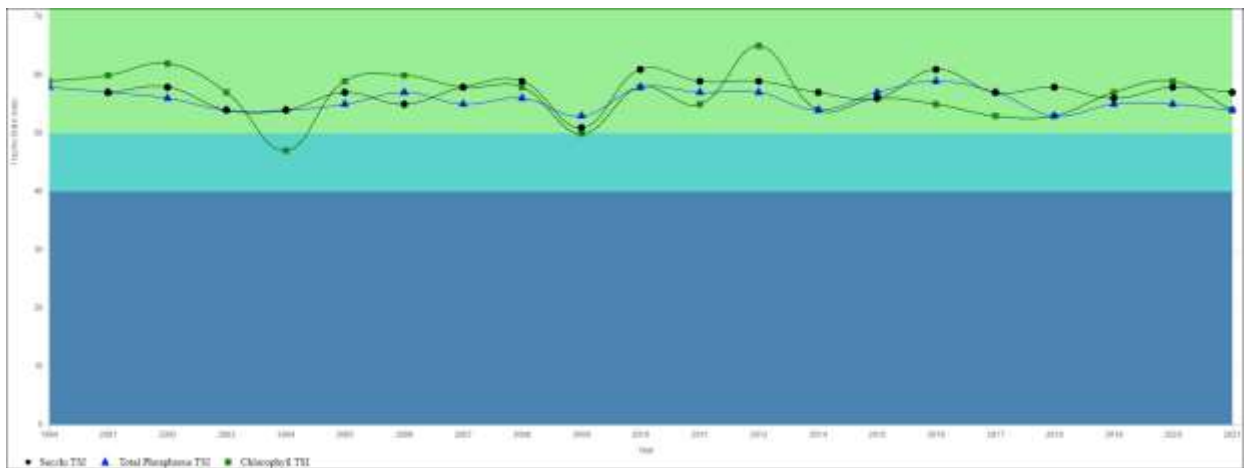


Figure 6: Deep Hole Near Dam

LAKE LEVEL AND PRECIPITATION MONITORING

Due to concerns about changes in water level brought about by the winter drawdown and just every day weather events, Ecological Integrity Services (EIS) was contracted with to install staff gauges and pressure transducers at three different sites on the Minong Flowage: near the dam, near Pogo's and the inlet from the Cranberry Flowage, and at Smith Bridge between the east basin and Serenity Bay. Steve Schieffer installed the hardware in mid-June 2021 and they will remain in place until sometime after the winter drawdown and refill in early 2022. The purpose of the transducers is to document changes in water level prior to, during, and after the winter drawdown. A full report of the findings will be completed by EIS in 2022.

The MFA measured precipitation in 2021 at three sites using rain gauges purchased from the Community Collaborative Rain, Hail, and Snow network (CoCoRaHS). Volunteers were supposed to log daily rainfall into the CoCoRaHS webpage. It is not known if this happened or not. Daily logs of precipitation may be available from volunteers even if it was not entered in CoCoRaHS.

ISLAND PROTECTION AND HEALTHY LAKES SHORELAND IMPROVEMENT PROMOTION

One of the concerns voiced by the MFA constituency and board is how rapidly the sand islands within the Minong Flowage are disappearing. Essentially, they are being “loved” to death by lake users and visitors to the lake. During the hot summers, it is not unusual to see a dozen boats anchored off the main island in the Central Basin with swimmers and picnickers utilizing the shores. The MFA began a signing campaign in 2021 whereby informative signs were placed on the island in an effort to get lake users to become more aware of the problem and take measures to minimize their impacts.

Promotion of the WDNR Healthy Lakes and Rivers shoreland improvement program has been made in the newsletter, webpage, and during the annual meeting.

Fishsticks provide habitat for fish and wildlife in the Minong Flowage. One property owner, Dan Maxwell, has used Healthy Lakes grant funding to install several fishsticks along his property on the south end of the Minong Flowage. The most recent installation was completed in February 2022. It is his goal to get other property owners interested in installing fishsticks on their own properties.

AQUATIC PLANT MANAGEMENT PLAN

As mentioned, the existing APM Plan written in 2016 was extended through the end of 2023. Once all the PI survey data has been received and the Minong Flowage winter drawdown completed, the existing APM Plan will be updated.

2022 AIS PRELIMINARY MANAGEMENT PLANNING

Management planning for 2022 includes purple loosestrife, curly-leaf pondweed, and EWM (with plans to complete property owner physical and rake removal, and possibly some level of underwater removal – snorkeling or diving. As for large-scale management planning, 2022 is a wait and see year to determine how effective the winter drawdown was at controlling EWM. A summer recon survey and a fall bedmapping survey will be completed for EWM in 2022.