

4.0 SUMMARY AND CONCLUSIONS

The design of this project was intended to fulfill three objectives;

- 1) Collect baseline data to increase the general understanding of the Lake Mohawksin ecosystem.
- 2) Collect detailed information regarding invasive plant species within the lake, with the primary emphasis being on Eurasian watermilfoil and curly-leaf pondweed.
- 3) Collect sociological information from Lake Mohawksin stakeholders regarding their use of the lake and their thoughts pertaining to the past and current condition of the lake and its management.

The three objectives were fulfilled during the project and have led to a good understanding of the Lake Mohawksin ecosystem, the folks that care about the lakes, and what steps can be taken by the FOLM to protect and enhance the system.

FOLM's participation in the Citizens Lake Monitoring Network program since 2006 has allowed for consistent water quality data being available. Lake Mohawksin contains *good* water quality compared to other shallow lowland drainage lakes. Lake Mohawksin is classified as a eutrophic lake being shallow, warm, and having high plant biomass though it is too shallow generally to exhibit marked thermal stratification. Water clarity, total phosphorus, and chlorophyll-a parameters are all similar to mean values of other shallow lowland drainage lakes. The water clarity of Lake Mohawksin is largely impacted by staining compounds called organic acids, which gives the lake a tea-color, restricting sunlight penetration and plant growth to shallower areas up to about six feet deep. Increases in precipitation can flush more of these tannins into the lake, decreasing water clarity. Lake water pH is around 7.4 in July, being considered close to *neutral*. While this is the preferred pH for zebra mussels (an invasive species), the low amount of calcium within the flowage suggests *very low susceptibility* for zebra mussel establishment.

The Lake Mohawksin Waters covers about 2,100 acres of navigable waters. The Lake Mohawksin watershed is incredibly large – almost 615 times larger than the system itself. The streams that enter the flowage have much land from which to draw water; however, with this water comes nutrients, sediment, and staining compounds from the watershed as well. But in having this large of a watershed, the system has a high flushing rate that pushes phosphorus through before used by algae. At times, large nutrient pulses from precipitation events in the watershed may result in periodic algal blooms especially in more stagnant parts of the system. Analysis of water flow at the dam indicates increased flows since 2012, with high spring spikes in many years.

Lake Mohawksin is known for its natural scenic beauty. The shoreland condition assessment found that 70% of Lake Mohawksin's shoreline consisted of shorelines in the two most ecologically beneficial categories (*developed–natural* and *undeveloped*), whereas only 16% were categorized as being within the two most impactful categories (*urbanized* and *developed–unnatural*).

Lake Mohawksin is a popular destination for anglers that target plentiful gamefish, including trophy-sized muskellunge. Riparian stakeholder respondents believe the fishery is currently *fair* to *good* and that the fishery has *remained the same* or has become *somewhat* worse since they first

started fishing the lake. The next comprehensive fisheries survey is planned by the WDNR to occur in 2022 or 2023.

Since 2006, approximately 80 different species of plants were located within and along the margins of the Lake Mohawksin Waters, much higher than most Wisconsin systems. Lake Mohawksin contains a wide range of habitats, including sandy shoals, sediment-rich backwater bays, and riverine areas. Different aquatic plant species favor these habits and results in the high species richness. A statistical measurement of aquatic plant diversity indicates that there is a 95% chance of the next plant species encountered being different from the previous one. Lake Mohawksin waters also harbors two species listed by the Natural Heritage Inventory as being species of special concern: northern naiad and vasey's pondweed. Since 2006, some of the more-prevalent species like coontail and water celery have had relatively stable populations. However, most other species are declining during this time period, likely related to the increased flow. Most notable to anglers and lake users, this includes large-leaf pondweed (aka musky cabbage) and all floating-leaf species (i.e., white water lily, spatterdock, and watershield). Continued monitoring of these populations will be important to understand if these populations are able to recover.

Two primary non-native submergent aquatic plant species are known to exist in Lake Mohawksin: Eurasian watermilfoil and curly-leaf pondweed. In recent years there has been a change in preferred strategy amongst many lake managers and regulators when it comes to established aquatic invasive species populations, especially established Eurasian watermilfoil populations. Instead of chasing the entire Eurasian watermilfoil population with management, perhaps focusing on the areas that are causing the largest impacts can be more economical and cause less ecological stress to the lake. As part of this planning effort, FOLM created a plan for Eurasian watermilfoil management with aquatic herbicides when navigation and recreation are impeded – which has historically proven effective on Lake Mohawksin. Approximately 68% of respondents to the stakeholder survey indicated support (pooled *moderately support* and *strongly support*) for future herbicide management, 12% opposed (pooled *moderately oppose* and *completely oppose*), and 20% where *unsure/neutral*. Curly-leaf pondweed was found in a 2013 survey in the eastern Wisconsin river arm of the lake, hand harvesting was carried out in 2016 and 2018 and recent surveys have only found low density populations.

The shorelines of Lake Mohawksin Waters also contain a few non-native emergent plants, including purple loosestrife and pale-yellow iris. FOLM is seeking partnership with Wisconsin Public Service in monitoring and managing these species to ensure the natural habitat and nutrient buffering qualities of the near-shore area continue to function at a high level.

Through the process of this lake management planning effort, the FOLM has learned much about their system, both in terms of its positive and negative attributes. The FOLM continues to be tasked with properly maintaining and caring for this resource. It is particularly important to protect high quality aspects of the Lake Mohawksin ecosystem.