

## **Appendix B - Dowling Lake Comprehensive Lake Management Plan Goals, Objectives, and Actions**

Lake management plans help protect natural resource systems by encouraging partnerships between concerned citizens, lakeshore residents, watershed residents, agency staff, and diverse organizations. Lake management plans identify concerns of importance and set realistic goals, objectives, and action items to address each concern. Additionally, lake management plans identify roles and responsibilities for meeting each goal and provide a timeline for implementation.

Lake management plans are living documents which are under constant review and adjustment depending on the condition of a lake, available funding, level of volunteer commitments, and the needs of lake stakeholders.

The following Principles will provide guidance on how the lake management plan will be implemented:

- Lake management decisions are data driven and evidence-based to incorporate an analysis of past, present, and future data and are implemented in a manner that will limit unintended negative environmental impacts.
- Member education, engagement, and neighbor-to-neighbor communications for all generations are important to meet the vision of and manage the future of Dowling Lake.
- Clear and concise multi-channel communications to members express the ever evolving nature of lake management and the complexity of issues.

The following Goals, Objectives, and Actions accompany this Comprehensive Lake Management Plan and are recommended for implementation over the course of the next 10 years (2022-2031).

**Goal 1: Provide information and education with the intent of changing stakeholder behaviors to protect Dowling Lake.**

Getting support and buy in from all Dowling Lake property owners and lake users, along with support from local agencies is imperative to successfully manage the lake.

***Objective 1. Establish a constituent supported “committees” structure to address major areas of lake management.***

- Education and Information
  - Main task would be communication and information sharing through Facebook, webpage, newsletter, and other social media outlets
- Shoreland Improvement
  - Main task would be to encourage, promote, and support activities to improve shorelands
- Water Quality
  - Main task would be to collect water quality data on the lake, report it, and share with other stakeholders
- Aquatic Plants, Algae, and Aquatic Invasive Species
  - Main task would be to support aquatic plant (and algae if determined necessary) monitoring and potential management
- Fisheries and Wildlife
  - Main task would be to work with WDNR and other partners to support fish stocking and other management actions
- Government and Grants
  - Main task would be to coordinate efforts between the ADLMD, Town, County, University, and State. Would also take the lead on soliciting grant funding.

***Objective 2. Use existing channels to deliver at least one focused educational message per quarter to meet the goals of this plan.***

- Community forums, Web and Facebook pages, Newsletters, Emails, Presentations and brochures at the ADLMD meetings, and Press releases in local newspapers
- Special educational sessions such as pontoon classrooms, property tours, Healthy Lakes workshops, and CBCW trainings
- Create stickers or signs to symbolize participation in different lake improvement program as a way to start a conversation with neighbors

## **Goal 2: Reduce nuisance algae growth by reducing sources of phosphorus**

Dowling Lake is on Wisconsin's Impaired Waters List under the Federal Clean Water Act, Section 303(d). Sources of phosphorus should be reduced such that Dowling Lake is removed from the Impaired Waters List as indicated by an in-lake average seasonal total phosphorus concentration of 30µg/L and in-lake chlorophyll value of less than 20µg/L for 30% of the days in the sampling season. Both external and internal sources of phosphorus and other nutrients need to be addressed.

### **2A - External Loading**

#### ***Objective 1. Plan and install 1-3 shoreland improvement projects annually.***

- Develop and deliver an educational message regarding the importance of and what constitutes a healthy shoreland area and how it reduces sources of P
- Organize annual workshops to encourage property owner participation healthy lakes projects: native plantings, rain gardens, diversions, and infiltration practices
  - Use results from the Shoreland Habitat Assessment as a guide
- Identify property owners interested in installing practices
- Prepare Healthy Lakes Grant applications to provide technical assistance and cost sharing to fund practices
- Implement shoreland improvement projects

#### ***Objective 2. Reduce the amount of foreign debris (grass clippings, leaves, road salts, sand and sediment, etc.) that get into the lake.***

- Develop and deliver an educational message regarding the importance of appropriate disposal of lawn debris (encourage sweeping and raking, bagging, composting, mulching, etc.)
- Work with the local Township to come up with ways to clean up/reduce sand and salt applied to roads around the lake (curbs and catch basins, street sweeping, etc.)

#### ***Objective 3. Upgrade 100% of existing non-compliant or failing, and drainfield-based septic systems; eliminate all gray water discharge to the lake.***

- Develop and deliver an educational message regarding the relationship between increased phosphorus in the lake and non-compliant or failing septic systems, septic systems that rely on drainfields, and graywater discharge
- Identify shoreline property owners willing to upgrade their septic system
- Support non-mandatory upgrades to existing septic systems with WDNR Surface Water or other funding if possible

#### ***Objective 4. Protect and preserve undisturbed/undeveloped property around the lake.***

- Identify areas of the lake to protect and preserve
- Research and explore the formation of a conservancy, purchase of easements, grant funding, and other opportunities for protecting and preserving land
- Identify property owners who may be interested in preserving property around the lake

#### ***Objective 5. Restore wetlands adjacent to Dowling Lake.***

- Identify restorable wetland areas adjacent to the lake
- Identify property owners willing to participate in wetland restoration projects
- Develop a wetland restoration plan in cooperation with Douglas County and the WDNR and implement it

#### ***Objective 6. Prevent forestry timber management operation from negatively impacting Dowling Lake.***

- Monitor forestry activities within the direct watershed of Dowling Lake
- Communicate forestry concerns to Douglas County

## **2B - Internal Loading**

### ***Objective 7. Reduce sediment disturbances caused by boating.***

- Develop and deliver an educational message regarding the relationship between boat traffic and P release from the sediment to property owners and visiting boaters
- Consider a boating or wave restriction ordinance to minimize sediment disturbance caused by boating

### ***Objective 8. Maintain or increase the amount of existing shallow lake and wetland/lake fringe vegetation (See Goal 4, Objectives 2-4).***

- Develop and deliver an educational message regarding the importance and value of aquatic vegetation along the shore and in the shallow areas of the lake in reducing shoreland erosion and sediment resuspension

### ***Objective 9. Investigate the construction/installation of a controllable water outlet for the lake.***

- Work with property owners to garner support for and to promote the benefits of water level manipulation in lake management
- Design/engineer and install an outlet structure that would allow controlled water level manipulations
- Develop and implement a water level manipulation plan to encourage growth of aquatic vegetation

### ***Objective 10. Consider the use of biomanipulation to improve water quality.***

- Work with the WDNR and/or Tribal Resources to complete a fisheries survey
- Continue stocking of walleye and other predator fish species
- Complete a zooplankton survey

### ***Objective 11. Consider the use of an alum application to improve water quality.***

- Complete a sediment release study
- Work with property owners to garner support for and to promote an alum treatment for the lake
- Develop and implement an alum application plan

### ***Objective 12. Install one or more fountains and/or artificial floating island/wetland.***

- Research, build, install, and monitor one or more artificial floating islands in the lake
- Research, install, and monitor one or more fountains in the lake

**Goal 3: Prevent the introduction of new invasive species and manage existing invasive species.**

Currently purple loosestrife and yellow iris, two shoreland emergent plants are relatively common along the shoreline of Dowling Lake. New efforts should be made to control purple loosestrife and the impact of yellow iris and the ability to control its spread should be evaluated. Curly-leaf pondweed is the only submerged aquatic invasive species listed to be in the lake, although in the last two surveys (2012 and 2016) none was located. Annual bedmapping survey should be completed to determine the extent of CLP in the lake and if its distribution and density increases over time.

Efforts should be made to keep AIS not already in the lake, out. EWM, giant reed grass (non-native phragmites), zebra mussels, New Zealand Mudsnails, and spiny waterflea are all present in nearby waters.

***Objective 1. Monitoring and management of existing AIS.***

- Purple loosestrife (survey work, physical removal and/or bio-control)
- Yellow iris (survey work, physical removal and/or aquatic herbicides)
- Curly-leaf pondweed (survey work, physical removal)

***Objective 2. Prevent the introduction and spread of new aquatic invasive species.***

- Participate in a Clean Boats, Clean Water monitoring and education program at each boat landing
  - Consider other local measure to inform boaters and lake users given that 200 hours at the Dowling Lake landing is likely unnecessary
  - Combine both the Lake Amnicon and Dowling Lake into one CBCW monitoring program
  - Participate in additional WDNR statewide programs including the Landing Blitz and Drain Campaign
- Place and update AIS signage at the boat landings as necessary
- Participate in the Citizen Lake Monitoring Network AIS Monitoring program
- Develop and implement an AIS Rapid Response Plan

#### **Goal 4: Protect and enhance native aquatic plant growth**

Increasing the amount of aquatic plant growth in Dowling Lake will be critical to improving water quality. The last whole-lake aquatic plant survey was completed in 2012, with a lesser survey completed in 2016. For better information related to density, distribution, and diversity the whole lake needs to be surveyed again as soon as possible, likely in the second year of this plan's implementation. Property owners should be encouraged to minimize any plant removal they might participate in, in an effort to protect what is already present.

Consideration should be given to reintroducing some level of new aquatic plant growth. Wild rice may be the easiest plant to establish, but partnering with St. Croix Tribal Resources and GLIFWC to get this done is a must. Further, if wild rice were to become established in the lake, special plant protection rules automatically come into play. Property owners and lake users should be informed and involved in any such endeavor so they know what to expect. Other species that could be considered would be nitella sp., water celery, flat-stem pondweed, and fern-leaf pondweed. These four species were the most abundant plant species in Amnicon Lake in 2012, which may provide a ready source of plant stock to collect and transplant into Dowling Lake.

##### ***Objective 1. Document changes in native aquatic plant density, distribution, and diversity.***

- Redo a spring and summer whole-lake, point-intercept, aquatic plant survey
  - Apply for grant implementation money in 2022 and with the survey completed in 2023
  - Repeat again in 2028

##### ***Objective 2. Protect existing native aquatic vegetation in the nearshore and wetland fringe area of the lake.***

- Develop and deliver an education and information program to promote the benefits and importance of aquatic plants to improving water quality
- Provide recognition signs to property owners who support no management or re-establishment of aquatic plants on their shoreline

##### ***Objective 3. Re-establish wild rice in Dowling Lake.***

- Work with SCTR, GLIFWC, and lake property owners to develop a wild rice reintroduction program on Dowling Lake
  - Identify property owners willing to support the reintroduction of wild rice adjacent to their property
  - Identify public locations around the lake for wild rice reintroduction

##### ***Objective 4. Reintroduce certain species of native aquatic plants into Dowling Lake.***

- Develop and implement an aquatic plant reintroduction strategy including planting protection if determined necessary
- Identify property owners willing to support re-establishment of aquatic plants on their shoreline
- Identify and collect aquatic plants in Amnicon that can be used to help reestablish aquatic vegetation in Dowling

### **Goal 5: Evaluate the progress of lake management efforts and needs through monitoring**

The main goal of this plan is to improve water quality in Dowling Lake. The main metric for measuring this is positive changes in water clarity, chlorophyll-a, and total phosphorus. These are the values that will be looked at in future impaired waters listings (2024, 2026, 2028, and 2030) included in 10 years covered by this plan. ADLMD volunteers on Dowling Lake should continue their involvement in CLMN, requesting participation in the expanded water quality monitoring program if they are not already in it. If this is not possible, then certain water quality parameters should be included in any grants that are applied for or paid for out of ADLMD funds.

Several whole-lake management actions to improve water quality are being considered in this plan. They include water level manipulation, biomanipulation, aquatic plant re-introduction, and possibly application of alum. Each of these actions does or may include certain additional parameters to be monitored including zooplankton (see Section 7.3.1), lake level, and precipitation. Tributary monitoring should be repeated at least twice during the 10 years of implementation. Each time it should be collected monthly and with storm events for a minimum of two years in a row, three would be better.

Shoreland improvements and a campaign to replace all conventional septic systems with holding tanks justifies additional monitoring for dissolved forms of nitrogen and phosphorus, pH, conductivity, and bacteria/E-coli. Multiple studies have indicated that nitrogen is either more limiting than phosphorus or co-limiting with phosphorus in terms of supporting the growth of algae. In addition, tracking changes in shoreland development either by protecting undeveloped properties or by making improvements to existing shoreland is necessary.

Finally, while bio-control of purple loosestrife has been in place on Amnicon and Dowling lakes for many years, an official survey to determine the extent of the beetle population has not been done.

#### ***Objective 1. Monitor short and long-term changes to water chemistry as a reflection of water quality.***

- Continue to monitor Chlorophyll-a and Total Phosphorus – CLMN expanded monitoring program
- Complete monitoring for the dissolved forms of nitrogen and phosphorus
- Complete NDS testing to help provide greater clarity as the limiting nutrient in Dowling Lake
- Collect pH and conductivity data
- Monitor for bacteria and E-coli

#### ***Objective 2. Monitor physical lake characteristics.***

- Water clarity – CLMN program using a Secchi disk
- Lake level – CLMN program or WDNR/County water level monitoring
- Precipitation – Community, Collaborative, Rain, Hail and Snow monitoring program
- Dissolved oxygen and temperature profiles – CLMN program, digital meter owned by the ADLMD

#### ***Objective 3. Document tributary loading of nutrients.***

- Collect flow, volume, and N and P parameters monthly and during storm events at three inlet sites and the outlet
  - Collect data for a period of 2-3 consecutive years, twice during the 10 year period of this Plan
- Consider upgrading sampling methods for more consistent data

#### ***Objective 4. Document progress made in shoreland improvement.***

- Repeat a Shoreland Habitat Assessment again year 5 and year 10 of implementation

#### ***Objective 5. Document the status of past *Galerucella* beetle rearing and release projects.***

- Complete a general survey of the beetle population around Dowling Lake

### **Goal 6: Follow through with implementation of this plan**

Not every action in the plan is intended to be implemented immediately. Some are intended to be implemented on an annual basis throughout the entire timeframe covered by the plan. Others have a specified time frame. Some actions will require additional support from consultants and the WDNR through its grant funding programs, and some can be done by the ADLMD or other entities with little implementation costs.

Included in the Implementation Matrix is a list of all the individual goals, objectives, and actions that are to be implemented over the course of the next ten years and a when during that ten year period, each of the actions should be implemented. It is important for the ADLMD to view this schedule and determine what parts of it are of highest priority to them so both human resources and financial support can be appropriated. The Implementation Matrix provides a place for the ADLMD to prioritize the actions. Once that has been done, implementation begins leading to the objectives associated with this goal.

#### ***Objective 1. Complete project implementation and assessment reports annually.***

- Prepare annual summary reports of the actions implemented in each year
  - Adapt as necessary

#### ***Objective 2. Complete and mid- and end-of-project reports.***

- Take stock of the actions that have and have not been accomplished midway through the implementation
  - Evaluate the focus of the first five years and modify if necessary for the second five years
- Take stock of the actions that have and have not been accomplished near the end of implementation
  - Fully evaluate the accomplishments of the 10 year project
  - Identify actions that still need to be accomplished, that should be removed, or that should be added for the next 10 years

#### ***Objective 3. Develop and maintain the necessary partnerships to support implementation.***

- Maintain the open dialogue, constituent involvement, partner involvement, etc. necessary to complete the actions in this plan
- Identify new partners and resources that could help implement the actions in this Plan