

Management Vision

That Shawano Lake is a quality water body managed by watershed residents to be useable for various types of recreation. The lake contains a broad array of habitats, supports diverse communities of native plants, fish and wildlife species.



The Shawano Lake Watershed
management
STRATEGIC PLAN



THE STORY BEHIND THIS PLAN

Extensive scientific studies of Shawano Lake have been conducted. The studies were conducted by the U.S. Army Corp of Engineers, University of Wisconsin Stevens Point Center for Limnology, and Bonestroo, Inc. Following the studies, several meetings were held by the Technical Committee and the Steering Committee over two years. The Steering Committee included members of Shawano Area Waterway Management, Inc. (SAWM), and other citizens.

The meetings were held in response to the scientific studies to determine how to proceed with the management of the Shawano Lake. This strategic plan is based on the above process, as well as Bonestroo's recommendations and the reports on the scientific studies.

The goals, objectives, and actions are general in scope and will require work at the local level to see them through to implementation. Those concerned with aquatic plant management and watershed protection should begin to work with the WDNR and SAWM to implement this plan by following the listed action steps.





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“SAWM” refers to Shawano Area Waterways Management, Inc, also referred to as Shawano Area Waterways Association.

“Property Owner” refers to residents of the Shawano Lake Watershed in general, and may in particular, refer to lakeshore/ watercourse land owners, businesses, and government facilities.

“EWM” refers to Eurasian watermilfoil.

“CLP” refers to Curly-leaf pondweed.

“AIS” refers to aquatic invasive species.

“WDNR” refers to the Wisconsin Dept. of Natural Resources.

This plan incorporates recommendations from and references to the Aquatic Plant Management Plan for Shawano Lake, Shawano County, Wisconsin, prepared for Shawano Area Waterways Management, Inc. by Bonestroo, Inc.

*Prepared for Shawano Area Waterway Management, Inc.
Approved by Citizen-based Steering Committee: August 3, 2009
Approved by SAWM Board on (DATE)*

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Layout by Bonestroo, Inc.



MONITORING

OUR GOAL:

To obtain sufficient management and planning data to maintain the lake for its uses and habitats.

OBJECTIVE:

SAWM's Monitoring Committee will recruit volunteers for aquatic invasive species monitoring near sensitive areas, areas un-colonized by EWM or CLP, and near areas of chemical herbicide treatment.

TARGET:

Have SAWM volunteers use their boats to monitor for AIS in areas treated above twice during the summer season.

TIME:

Start immediately

ACTIONS:

- Each member of the SAWM Monitoring Committee will recruit 3 volunteers to monitor for AIS twice a summer season.
- Volunteers will use their own boats to monitor select areas and mark a map with their AIS findings.

MEASURE OF SUCCESS:

Areas previously unmarked will be mapped and potentially targeted for chemical treatment, (or hand removal in case of pioneering populations or single plants).



MONITORING

OUR GOAL:

To obtain sufficient management and planning data to maintain the lake for its uses and habitats.

OBJECTIVE:

SAWM's Monitoring Committee will obtain professional aquatic plant surveyors (such as Bonestroo or a public agency such as WDNR staff) to do a full point-intercept survey of the plant community in Shawano Lake in 2015.

TARGET:

Every 5 years update the full plant survey on Shawano Lake.

TIME:

Start next survey in 2015

ACTIONS:

- Coordinate with WDNR regarding the feasibility of applying for AIS Control dollars for a plant survey and report.
- Hire a professional service or find public sector agency that will conduct the plant surveys.

MEASURE OF SUCCESS:

Tabulated aquatic plant survey results with maps in a report by the end of 2015.

Notes: Work on this objective is dependent on funding.

Because the lake is vitally important to the local economy, SAWM or the local governments on the lake should seek a full-time employee to coordinate lake management activities. Such an individual could be supported by WDNR AIS Control Grant dollars. Work with WDNR to see what activities will be required for comprehensive management and hire an individual that is capable of carrying out such activities (see funding section).



HARVESTING

OUR GOAL:

To reduce nuisance of exotic plants in Shawano Lake.

OBJECTIVE

Hand remove aquatic invasive plant species along privately owned properties¹.

TARGET

Within the next five years have 300 residents of Shawano Lake hand removing invasive plants from in front of their property.

TIME

Start immediately

ACTIONS

- Prior to 2009 spring/summer season SAWM members will recruit ten (10) property owners to participate in an aquatic garden weeding program.
- Each new aquatic garden weeding program participant will recruit one (1) new participants for the following season.

MEASURE OF SUCCESS:

- Year 1 (2010) = 10 participants
- Year 2 (2011) = 20 (10 existing and 10 new) participants
- Year 3 (2012) = 30 (20 existing and 10 new) participants
- Year 4 (2013) = 40 (30 existing and 10 new) participants
- Year 5 (2014) = 50 (40 existing and 10 new) participants



HARVESTING

OUR GOAL:

To reduce nuisance of exotic plants in Shawano Lake.

OBJECTIVE:

Use aquatic plant harvester in select areas for nuisance aquatic plant control and to clean up floating nuisance plants².

TARGET:

Adaptive management is needed on an annual basis to decide location of navigation channels to provide boating access to the lake and to collect mats of fragmented EWM.

TIME:

Use harvesters only when motorized boating activity is hindered by nuisance levels of aquatic vegetation or when EWM fragments form mats (usually on the east side of the lake).

ACTIONS:

- SAWM will monitor Shawano Lake and work with the WDNR to determine if harvesting is needed and to what degree (location and area).
- SAWM will continue to file for Mechanical / Manual Aquatic Plant Control permits with the WDNR when the organization feels it is necessary.
- SAWM will continue management and maintenance of harvesting equipment as usual.
- SAWM will publish amount of annual harvest tonnage in local and other publications.

MEASURE OF SUCCESS:

Shawano Lake accessible for a variety of different boating activities at different locations.

Note: Work towards above objective is dependent on grant funding.



HARVESTING

OUR GOAL:

To reduce nuisance of exotic plants in Shawano Lake.

OBJECTIVE:

Use aquatic plant harvester to remove CLP in spring and early summer³.

TARGET:

The harvesters will focus on areas of CLP as soon as ice comes off the lake and through early June when native plants begin to grow rapidly.

TIME:

Use this technique as long as dense stands of CLP are on the lake.

ACTIONS:

- SAWM's Monitoring Committee will survey Shawano Lake for CLP growth and work with the local lakes coordinator at the WDNR to determine if harvesting permits can be issued to target CLP only.
- SAWM will continue to file for Mechanical / Manual Aquatic Plant Control permits with the WDNR working in management of the beds of CLP.
- SAWM will continue management and maintenance of harvesting equipment as usual.

MEASURE OF SUCCESS:

Shawano Lake should experience lower levels of CLP, with less spread and reduced phosphorus (levels will have to be determined).

Note: Work towards above objective is dependent on grant funding.



CHEMICAL TREATMENT*

OUR GOAL:

To reduce nuisance of exotic plants in the lake.

OBJECTIVE:

Use the chemical herbicides Endothol and 2, 4-D in tandem in May on areas of CLP and EWM or a 2, 4-D product such as Weedar (liquid) or Navigate (solid/granular).

TARGET:

Chemically treat areas of EWM and CLP overlay and areas where mechanical harvesters will be used.

TIME:

When the harvester is used EWM should be reduced as much as possible in the harvesting area.

ACTIONS:

- SAWM will monitor the lake and work with the WDNR local lakes coordinator to determine if chemical treatment is needed and design a chemical treatment program that fits with the harvesting program on an annual basis.
- SAWM will continue to file for chemical herbicide aquatic plant control permits with the WDNR but include area for restoration.

MEASURE OF SUCCESS:

Areas where the harvesters operate will be clear of EWM and CLP prior to nuisance native plant control thereby supporting native plant restoration.

Note: EWM and CLP overlap with Sensitive Areas to some degree, mostly in the western part of Shawano Lake. Designated sensitive areas should be avoided by harvesters and chemical herbicide applicators unless future studies show that invasive plants are changing the structure, composition and function of Sensitive Area habitats. If the aquatic invasive plants EWM or CLP become a problem early season chemical treatment as described above would be appropriate.

**For more information on Chemical Treatment, see Reference 4 on Page 24.*



CHEMICAL TREATMENT*

OUR GOAL:

To reduce nuisance of exotic plants in the lake.

OBJECTIVE:

Treat Sensitive Areas with the chemical herbicides Endothol and 2,4-D in tandem in May for EWM and CLP control or a 2, 4-D product such as DMA4 (liquid) or Navigate (solid/granular) to control EWM alone.

TARGET:

Early spring treatments of Sensitive Areas with selective herbicides.

TIME:

Chemically treat Sensitive Areas only when invasive plants threaten the habitat composition.

ACTIONS:

- SAWM will monitor Sensitive Areas and work with the WDNR local lakes coordinator and staff ecologists to determine if chemical treatment is needed (location and area) on an annual basis.
- SAWM will file for a chemical herbicide aquatic plant control permits with the WDNR to include Sensitive Area restoration.

MEASURE OF SUCCESS:

To be determined

**For more information on Chemical Treatment, see Reference 4 on Page 24.*



PROPERTY OWNER PARTICIPATION*

OUR GOAL:

To develop and maintain a lake that is useable for various types of recreation, and that is home to a diverse communities of native plants, fish and wildlife species.

OBJECTIVE:

SAWM will work with Shawano County & UW-Extension for education and assistance for lakeshore property owners to install best management practices that will limit nutrient inputs⁶.

TARGET:

Have vegetated buffer, rain gardens, swales, and other best management practices on shoreline properties around Shawano Lake.

TIME:

2010

ACTIONS:

- SAWM's Education Committee will hold an annual workshop to teach lakeshore property owners about the benefit of storm water prevention technologies.
- SAWM will work with Shawano County to see what they have to offer as far as cost-sharing for shoreland restoration and best management practices.

MEASURE OF SUCCESS:

10% of the lawns along the shoreline on Shawano Lake are restored or contain some form non-lawn vegetation shoreline by 2019.

**For more information on Property Owner Participation, see Reference 5 on Page 25.*

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

Shawano County, or the county in cooperation with other entities, hires a full time employee to coordinate lake management activities⁸.

TARGET:

Have hired lake manager be responsible for activities that would be paid for or for which there are not sufficient volunteers.

TIME:

Hire a lake manager when volunteers are exhausted or when sufficient dollars to support a professional are being allocated on an annual basis.

ACTIONS:

- Find sponsor (SAWM and Shawano County) to apply for a WDNR AIS Education, Planning and Prevention Grant to fund position (see Recommendations 14).
- Create a job description and share it with WDNR.
- Hire a lake manager.

MEASURE OF SUCCESS:

Professional lake manager working to educate, monitor, and control AIS.

**For more information on Funding, see Reference 7 on Page 26.*

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

SAWM solicits funds from watershed towns, villages, the city, and Shawano County to support Shawano Lake management activities⁹.

TARGET:

Financial support from government bodies that benefit from tax revenues due to proximity to Shawano Lake.

TIME:

SAWM requiring dollars beyond that in the current budget to carry out comprehensive management of Shawano Lake.

ACTION:

SAWM board members will approach local towns, villages and the city and county chairmen and request funds for Shawano Lake Management.

MEASURE OF SUCCESS:

Awarded town, village and county funds to support SAWM's nuisance plant control, restoration and education efforts on Shawano Lake.

**For more information on Funding, see Reference 7 on Page 26.*

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

SAWM creates a business membership category and help promote businesses that participate in funding Shawano Lake management activities¹⁰.

TARGET:

Financial support from businesses that benefit from the proximity to Shawano Lake.

TIME:

SAWM requiring dollars beyond that in the current budget to carry out comprehensive management of Shawano Lake.

ACTIONS:

- Create a poster, certificate or other display document to present to business members of SAWM.
- SAWM board members will approach local business to sequester a business membership at a premium level.

MEASURE OF SUCCESS:

Have 20 local business that support SAWM's restoration and education efforts on Shawano Lake.

**For more information on Funding, see Reference 7 on Page 26.*

OUR GOALS:

- To successfully implement this plan.
- To reduce nuisance of exotic plants in the lake.
- To assist watershed citizens in developing and maintaining a lake that is a useable for various types of recreation, and home to diverse communities of native plants, fish and wildlife species.

OBJECTIVE:

SAWM will work on education for lakeshore property owners about best management practices that will limit nutrient inputs¹¹.

TARGET:

Have vegetated buffer, rain gardens, swales, and other best management practices on shoreline properties around Shawano Lake.

TIME:

Start immediately

ACTIONS:

- SAWM's Education Committee will work with UW-Extension & Shawano County Land Conservation Division to hold an annual workshop to teach lakeshore property owners about the benefit of stormwater prevention technologies
- SAWM's Education Committee will hold an annual workshop to teach lakeshore property owners about the benefits of stormwater prevention.
- SAWM will work with Shawano County to see what they have to offer as far as a cost-sharing for shoreland restoration and best management practices.

MEASURE OF SUCCESS:

10% of the lawns along the shoreline on Shawano Lake are restored or contain some form of non-lawn shoreline.

OUR GOALS:

- To successfully implement this plan.
- To reduce nuisance of exotic plants in the lake.
- To assist watershed citizens in developing and maintaining a lake that is a useable for various types of recreation, and home to diverse communities of native plants, fish and wildlife species.

OBJECTIVE:

SAWM educates watershed property owners on best management practices and other steps to limit nutrient inputs and maintain lake quality.

TARGETS:

Best management practices, including:

- Retention and infiltration ponds
- Shoreline and watercourse buffers
- Restoration and creation of wetlands
- Protect/conservate existing natural areas, including wetlands, corridors, etc.
- Reduce and minimize amount of connections between watercourses & lake; and impervious surfaces (including permeable pavement, rain gardens, etc.)
- Road & bridge design considerations include retention of water on land
- Boat landing/launch design considerations include retention of water on land
- Design/build for deviation of flow to filtration
- Control storm water run-off on new development
- Lawn care best practices

ACTIONS:

- SAWM Educational Committee will work with UW-Extension & Shawano County Land Conservation Division to provide educational programming.
- SAWM's Education Committee will hold an annual workshop to teach watershed non-farm property owners about the benefit of best management practices.

MEASURE OF SUCCESS:

Best management practices used on 30% of the non-farm property in the watershed.

OUR GOALS:

- To successfully implement this plan.
- To reduce nuisance of exotic plants in the lake.
- To assist watershed citizens in developing and maintaining a lake that is a useable for various types of recreation, and home to diverse communities of native plants, fish and wildlife species.

OBJECTIVE:

SAWM and Shawano County communicate with partners on education for farmers in the watershed on management practices that will limit nutrient inputs.

TARGETS:

- Manure management (including bringing manure storages up to adequate capacity and current specifications, .stopping Winter spreading, feedlot run-off control operations, phosphorus -based nutrient management plans)
- Cattle exclusion from watercourses
- Nutrient management planning
- Soil monitoring/testing prior to use of fertilizer
- Best management practices generally

TIME:

Start immediately

ACTIONS:

- SAWM's Education Committee will work with UW-Extension & Shawano County Land Conservation Division to provide educational programming.
- Hold an annual workshop on farm best management practices.
- SAWM's Education Committee will hold an annual workshop to teach watershed property owners about the benefits of stormwater prevention.

MEASURE OF SUCCESS:

Farms in watershed using best management practices.

OUR GOALS:

- To successfully implement this plan.
- To reduce nuisance of exotic plants in the lake.
- To assist watershed citizens in developing and maintaining a lake that is a useable for various types of recreation, and home to diverse communities of native plants, fish and wildlife species.

OBJECTIVE:

Shawano Lake implementation of a Clean Boats, Clean Water Program (CBCW)
<http://www.uwsp.edu/cnr/uwexlakes/CBCW/>

TARGET:

To educate users of Shawano Lake, and eventually all watershed Lakes on how to limit and end their transport of aquatic invasive species.

TIME:

2010

ACTIONS:

- Work with UW-Extension and the Shawano County Parks & Highway Department to implement CBCW program.
- Apply for WDNR AIS Control Grants as necessary.
- Initially set up the program for Shawano Lake County Park.
- Expand program to all landings in the watershed.

MEASURE OF SUCCESS:

A functioning CBCW program throughout the watershed.

OUR GOAL:

To determine if a drawdown would significantly reduce the presence of nuisance exotic plants in the lake.

OBJECTIVE:

Investigate drawdown as AIS management option and conduct feasibility study¹².

TARGET:

Conduct a feasibility study investigating potential for a drawdown and outlining the full process with associated costs.

TIME:

Public support for an approximate four (4) foot drawdown for a given period (winter, summer, year-long) of time as an AIS management option.

ACTIONS:

- SAWM will meet with local political leaders and community members and determine if they would support the concept of a drawdown.
- SAWM will determine whether a consultant or public-sector technician should conduct a feasibility study.
- SAWM could apply for a WDNR Lake Management Planning or Protection Grant for the feasibility study.

MEASURE OF SUCCESS:

Either a completed feasibility study or a determination by the SAWM Board that there is no support for a drawdown as a management option.

OUR GOAL:

To reduce the presence of nuisance exotic plants in the lake.

PURPOSE:

To access the ability to use chemicals to meet that goal.

OBJECTIVE:

Investigation of expanded chemical treatment of the lake¹³.

TARGET:

Work with WDNR to investigate the feasibility of expanding chemical treatment to areas other than primary navigation "channels".

TIME:

Start in 2010

ACTIONS:

To be determined

MEASURE OF SUCCESS:

To be determined

OUR GOAL:

To reduce the presence of nuisance exotic plants in the lake.

OBJECTIVE:

Investigation of feasibility of dredging.

TARGET:

Work with WDNR and other stakeholders to investigate the feasibility dredging as a means to increase depth and decrease photosynthesis activity.

TIME:

Start in 2010

ACTIONS:

To be determined

MEASURE OF SUCCESS:

To be determined

OUR GOAL:

To reduce the presence of nuisance exotic plants in the lake.

OBJECTIVE:

Investigate feasibility of obtaining property at stream mouths.

TARGET:

Determination of the feasibility of obtaining property at mouths of inflow streams for filtering of water via wetland complexes and sediment retention.

TIME:

Start in 2010

ACTION:

See if WDNR Lake Protection Grants could be used for the purchase of relevant properties.

MEASURE OF SUCCESS:

To be determined

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

To investigate the feasibility of creating a lake district for Shawano Lake.

TARGET:

Determine whether or not establishing a lake district would enhance the carrying out of this plan, and would be feasible.

TIME:

Start in 2010

ACTIONS:

- SAWM establish a Committee to study creation of a lake district. The committee studied the organizational financial, legal, and public support aspects of the question.
- SAWM work with UW-Extension to hold a public workshop on the question for citizens.

MEASURE OF SUCCESS:

To be determined

GOVERNANCE

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

SAWM will develop an Education Committee and a Monitoring Committee that will recruit volunteers to implement certain aspects of the APM plan¹⁴.

TARGET:

(The citizen-based Steering Committee wanted no target for this objected).

TIME:

2010

ACTIONS:

- Recruit committee members from SAWM, lake community, and local government agencies.
- Hold at least four (4) meetings a year and prepare summary reports for annual SAWM Board meeting.

MEASURE OF SUCCESS:

Annual progress reports presented at annual SAWM board meeting.

GOVERNANCE

OUR GOAL:

To successfully implement this strategic plan.

OBJECTIVE:

SAWM will review and update its Watershed Management Plan & its Aquatic Plants Management Plan every five years.

TARGET:

To maintain relevant and function plans.

TIME:

Summer 2014, and every five years thereafter.

ACTIONS:

- Appoint a review committee during the previous fall.
- Review Committee coordinate review and revision.

MEASURE OF SUCCESS:

Revised plans every 6 years.

REFERENCES

1From APM plan: Hand Removal of Aquatic Plants

Individual riparian landowners implementing site specific (their property only) weed harvesting programs to control aquatic vegetation which has floated up on shore is common on Shawano Lake. Raking this vegetation, which has a generally large component of EWM, is not detrimental to habitat and is an appropriate way to remove mats of plants from shallows and shorelines. Removing these floating vegetation mats can actually foster native aquatic plant growth because the mats shade out rooted plants trying to get established. Removal of the mats also eliminates phosphorus generated when this biomass decomposes. Removal should be conducted and thought of as a restoration activity. WDNR Aquatic Invasive Species Control Grants (see Recommendations 14) might be a source of funding for a professional service provider to remove this vegetation.

Hand pulling or raking of both native and invasive aquatic plants still growing on the lake bottom is permitted along a shoreline lot within a 30-foot-wide (along shoreline) swath known as the "recreation zone". Bonestroo does not recommend removing rooted native vegetation even in the recreation zone as this can open a niche for aggressive invasive species or inadvertently destroy habitats. Hand removal of native vegetation is also blatantly contradictory to restoration of a native plant community. Hand removal (raking or pulling) of invasive species is allowed anywhere within the lake. Hand pulling of EWM or CLP is recommended especially at the early stages of infestation in new areas (pioneer colonies). When hand pulling EWM, it is important to remove any and all floating fragments of the plant to avoid spread-

ing or future colonization. All fragments should be disposed of upland in an area where they will not be blown back into the lake. If every riparian owner took on the responsibility of weeding aquatic invasive plants from the aquatic garden in front of their property the abundance of EWM and CLP would be substantially less.

Hand removal of EWM or CLP requires little equipment. It is helpful to have a bag or net to place the plant in once removed. In mucky sediments removal can be done with bare hands. As sediment types compact it or become more gravelly, small garden trolleys may be helpful. Removal of the root-wad is the goal and should be worth the extra time spent. Water clarity quickly diminishes as plants are pulled/dug from the lake bottom substrate, and for that reason, working with a mask and flippers is usually just as efficient as having a SCUBA tank. A riparian land owner can dive in and remove plants for five to ten minutes and come out when the water clarity begins to hinder selectivity for target invasive plants. Repeated frequently, this technique will have a cumulative effect on the EWM and CLP in Shawano Lake.

2From APM plan: Use of Harvesters to Limit Nutrients and Remove Plants

The need for reasonable boating access throughout Shawano Lake is a concern for many lake users. One past management practice was to use aquatic plant harvesters (harvesters) to clear navigation areas through heavily vegetated areas of the lake. Harvesters are one method to maintain these channels.

REFERENCES

Sensitive Areas should be left undisturbed and by and large inaccessible unless management becomes part of a habitat protections project.

Harvesters have fewer potential perceived "side effects" than chemical herbicides and, once purchased, they can be more affordable than long-term herbicide applications. The WDNR as a department is moving away from permitting chemical herbicides for nuisance native aquatic plants, preferring that harvesters be used for this maintenance activity. Harvesters may also play a role in the restoration of native plant communities if used to reduce AIS or collect viable parts of AIS.

In general, harvesters are not recommended for plant management in areas with EWM because cutting of this AIS could lead to fragmentation of the plant, creating free floating fragments capable of spreading to uninfested parts of the lake. In fact, the WDNR Sensitive Area Survey Report, recommendation four, suggests "No mechanical harvesting in or near beds of Eurasian Watermilfoil." As stated above (Section 3.2 Lake Management History), SAWM was granted a WDNR Mechanical/Manual Aquatic Plant Control permit (for mechanical harvesting of 170 acres of nuisance level aquatic plants and increase navigation and recreational opportunities in designated navigation channels). While pursuing that course of action, SAWM also spent \$300,000 in new non-paddle-type harvesters in hopes that this technology would limit fragmentation of EWM when harvesting. Such harvesters may actually be used to clean up floating fragments of EWM and or native plants that have been cut by boaters or otherwise uprooted. This is a common complaint on the east side of the lake.

³SAWM, Inc. has a five year permit for 2009 - 2014

From APM plan:

Harvesters may also be used to limit the spread of CLP, and remove CLP biomass (a potential phosphorous source) from the lake. Within the lake itself, a significant source of phosphorous comes from the die-off of CLP in late June. Given that CLP begins growing before ice out, harvesting efforts should focus on removing as much CLP as possible before the formation of the plants' turions. Turions are the nutlet-like structure the plant creates as a way to seed itself in new areas. Once turions are formed, the plant will begin to die off and harvesting could, in fact, spread the turions to other parts of the lake. Removing much of the CLP biomass prior to the formation of turions will limit the phosphorus added to the lake as the plant breaks down. Limiting phosphorous in the peak of summer will aid in limiting aquatic plant and algae growth. For this activity, the harvester should be set low and brought up as natives begin to form a specific harvesting component.

⁴From APM plan: Chemical Herbicide Use

Shawano Lake has an estimated 2,640 acres of milfoil and 1,640 acres of curly-leaf pondweed per the US Army Corps of Engineers survey from 2005. At approximately \$500 per acre of chemical treatment, SAWM most likely will not have the resources to chemically treat all the beds of these AIS with the goal of native plant restoration. Site-specific restoration is possible and the basis of these recommendations. The chemical herbicide Reward (used in the past) is not a selective

REFERENCES

herbicide as used in Shawano Lake. To focus more on native plant restoration and the control of AIS, Bonestroo makes the following recommendations:

In areas of EWM, early season chemical herbicide application of 2,4-D product such as Weedar (liquid) or Navigate (solid/granular) is a good control measure. For areas where EWM and CLP are occurring together, a prescription of Aquathol and Weedar in tandem is a good choice for chemical herbicide to restore the native plant community if used in early spring. Bonestroo, working as a chemical applicator with the WDNR, used this approach in an experimental fashion on Little Green Lake and it produced good results (natives up and AIS almost eradicated in test plots). Since this test study, other chemical applicators have been using this technique throughout Wisconsin.

The 2008 permits for harvesting and chemical treatment do appear to be in areas where EWM and CLP overlap and EWM certainly occurs in areas with perceived nuisance aquatic plants. In this case, it would be prudent to free the harvesting lanes of as much EWM as possible to avoid fragmentation of the plant in the process of harvesting. A late-May chemical herbicide application as described above could be applied to the harvest lanes prior to harvesting activities. This would reduce EWM fragmentation and open more lake bottom for native plants. The harvest areas could be considered a designated restoration area in this case even though harvesting is not a restoration activity.

5From APM Plan: Nutrient Management

Nutrients, particularly phosphorus and nitrogen, are the fertilizer of aquatic plants. The topic of complete

nutrient inputs and management within the Shawano Lake watershed is too involved to discuss in this APM Plan, but it is discussed in great detail in the 2008 Watershed Assessment of Shawano Lake by the University of Wisconsin-Stevens Point Center for Watershed Science and Education. Bonestroo does believe that watershed residents and the agricultural community should use best management practices to limit nutrient inputs. At a March 3rd, 2008 Shawano Lake technical team (same as Steering Committee for APM plan) meeting, the Shawano County Land Information Department set the goal of reducing phosphorus input by 20% by 2020. SAWM's commitment to the implementation of the above-mentioned goal was to advocate for a local watershed phosphorus fertilizer ban, from which farmers would be exempt.

6From APM Plan:

Specific to SAWM members and lakefront property owners, Bonestroo recommends maintaining or restoring a buffer of native vegetations at least 30 feet from the lakeshore, but preferably 50 to 75 feet. Such a buffer of native vegetation will serve as a filter and help capture stormwater runoff that carries nutrients. If a lawn or otherwise manicured garden landscape is to exist, fertilizers should be excluded from routine management of lawn/garden. If a soils test indicates that fertilizers are essential, then phosphorus-free fertilizers should be used. Where impervious areas (hard surfaces non-penetrable by rain water, such as a roof or driveway) are adjacent to steep or sloping terrain that would lead to stormwater runoff reaching the lake, best management practices such as constructed swales, rain gardens, or rain barrels should be installed. More information on installation

REFERENCES

and design of rain gardens can be found at: <http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf>. Swale design and installation may require a professional landscaper or engineer.

7From APM Plan: Potential Funding Sources

All of the activities mentioned above require time and materials for successful implementation and completion. Some of the time and materials may be donated by volunteers, but certainly there is a need for money to pay professionals and run equipment. The State of Wisconsin has set up a grant funding program called the Aquatic Invasive Species Control Grant program, managed by the WDNR under NR 198 (see Appendix G NR 198). There are two basic categories of the AIS Control Grants SAWM would be eligible for: Established Infestation Control, and Education Planning and Prevention; both will provide up to 75% of project costs. Some of the activities mentioned as recommendations may be funded through the AIS Control grant program; however, nuisance native plant control activities are not eligible, only restoration activities controlling AIS. Restoration activities could be covered under the Established Infestation Control section of the AIS Control Grants if the WDNR has approved a SAWM adopted APM plan. Educational efforts, such as a coordinator for Clean Boats, Clean Waters watercraft inspection, etc., may be covered under the Education, Planning and Prevention section of the AIS Control grant (pending WDNR approval of the APM plan), or incorporated into a larger project under the Established Infestation Control section of an AIS Control Grant (again, pending WDNR approval of the APM plan) if restoration activities are occurring simultaneously.

8From APM Plan:

Managing Shawano Lake is a huge responsibility for a citizen lake group. Even if SAWM forms committees, there are a few key individuals that coordinate almost all lake management activities and often this scenario leads to burn out. Because the lake is vitally important to the local economy of Shawano, Bonestroo recommends that SAWM or the Town of Shawano seek a full-time employee to coordinate lake management activities. Such an individual could be supported by WDNR Control Grant dollars (see Recommendations 14). To make such a position worth having, Bonestroo recommends working with the WDNR to see what activities will be required for comprehensive management and hire an individual that is capable of carrying out such activities. Spending money on an individual who simply works to raise awareness of AIS is probably not a benefit to SAWM and the community of Shawano.

9From APM Plan:

Nuisance aquatic plants are often a matter of perception and for that reason, this APM plan was largely designed with the restoration of native plants in mind, albeit site specific. If the public at large feels nuisance aquatic vegetation must be managed, then those entities that benefit from public use of Shawano Lake should also be considered a funding source. Surrounding cities, towns, and counties should be targeted for substantial contributions to SAWM's management efforts of Shawano Lake. TLPOA, Inc., the group that voluntarily manages Tomahawk Lake, Oneida County, Wisconsin, receives funds from different towns that collect taxes from shoreland property

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owners on Tomahawk Lake, and businesses that benefit from proximity to that healthy lake. The Town of Minocqua is one of the supporting towns, and it contributes over \$40,000 annually to two different lake associations working to control AIS in the area. These funds help but hardly cover the total cost of management.

¹⁰From APM Plan:

Local businesses, especially those that are directly tied to recreation on Shawano Lake, should be targeted for special business memberships to SAWM. SAWM could create business membership certificate or other form of acknowledgement for businesses to display that would show their proud support of Shawano Lake Management. A business membership category could have an entry level higher than a personal membership, such as a \$100-\$150 entry level membership.

¹¹From APM Plan:

Specific to SAWM members and lakefront property owners, Bonestroo recommends maintaining or restoring a buffer of native vegetations at least 30 feet from the lakeshore, but preferably 50 to 75 feet. Such a buffer of native vegetation will serve as a filter and help capture stormwater runoff that carries nutrients. If a lawn or otherwise manicured garden landscape is to exist, fertilizers should be excluded from routine management of lawn/garden. If a soils test indicates that fertilizers are essential, then phosphorus-free fertilizers should be used. Where impervious areas (hard surfaces non-penetrable by rain water such as a roof or driveway) are adjacent to steep or sloping terrain

that would lead to stormwater runoff reaching the lake, best management practices such as constructed swales, rain gardens, or rain barrels should be installed. More information on installation and design of rain gardens can be found at: <http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/documents/rgmanual.pdf>. Swale design and installation may require a professional landscaper or engineer.

¹²From APM Plan: Water Level Manipulation (Drawdown)

Water level manipulation or drawdown should be considered as an alternative to large-scale chemical treatments or to be used in conjunction with site-specific chemical treatment. The objective is to freeze or dry out the CLP and EWM roots and reduce their occurrence the following growing season. Additionally, nuisance levels of coon tail and other native plants may be affected. Some emergent plants, such as bulrushes, are actually stimulated to grow and increase the areas they occupy when water levels fluctuate such as during a drawdown, and this can be considered a restoration activity. Bulrushes and other emergent vegetation are the primary selection mechanism for Sensitive Areas designated on Shawano Lake.

Commonly, the advantages of a drawdown include relatively low costs in comparison to chemical management alternatives, reduction in EWM and CLP, and compaction of the exposed sediments (depending on season of drawdown). Disadvantages include unpleasant aesthetics during the drawdown, reduced recreational use during the drawdown, potential seasonal-loss of fish habitat downstream, reimbursement for

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hydropower not generated, and the unpredictability of weather conditions. Reimbursement for hydropower is not an activity funded under NR 198, the Wisconsin AIS Control Grant Program (described in Recommendation 14).

The type of drawdown required is dependant on what the desired results are (see below for drawdown descriptions). If the primary goal is to be control of EWM and CLP, then a winter drawdown is needed. A summer drawdown is recommended when the primary goal is to increase lake depth (compact soils). However, if both options are to be achieved to their maximum extent, a year-long drawdown would be best fit. A brief description of drawdown types follows:

Winter Drawdown:

During winter drawdown, water will be drawn down before October 1, giving time for over-wintering amphibians and reptiles to adjust and find safe hibernating sites. Once drawn down, water levels will remain constant throughout the winter and should be checked at least weekly to maintain proper water levels. Normal pool elevation will be resumed in late March when spring melt has begun, supplying ample water to return water levels to normal.

This process is not species-specific, and freezing must occur for a minimum of six weeks to be effective. Some sediment compaction may occur, but significant increase in lake depth is not expected. This process should be repeated every three to five years, when AIS may again be approaching nuisance levels.

Summer Drawdown:

For a summer drawdown, the goal is to dry out the roots and biomass of the plants. The drawdown

should begin in early June, allowing targeted plants to begin growing. The drawdown should continue until late August or early September to allow ample drying time. Normal pool elevation will be restored at this time.

This process is not species-specific, and significant drying must occur to be effective. With the summer drawdown, higher rates of sediment compaction and decay of mucky materials will increase lake depth as compared to a winter drawdown. However, this type will have less of an effect on the plants and will have a greater limitation of recreational opportunities by limiting or preventing boat access. This process should be repeated every three to five years, when AIS may again be approaching nuisance levels. Less water will be available to re-fill the lake when compared to the winter draw-down and care should be taken not to dry out the waterway below the dam. This method is not fitting for control of phragmites species; in fact, this method would likely allow phragmites to spread rapidly.

Year-Long Drawdown:

Year-long drawdown is essentially a combination of the summer and winter drawdowns. It will begin in early June, once plants have begun growing. The water will be drawn down to the chosen level and held there until mid-August. Normal water level will be established for about a month, allowing for any additional AIS seed bank or plants to re-grow to be targeted during the winter. In late September, but before October 1, the water will again be drawn down to the selected level and remain there until late March, when ample water should be available to resume normal levels.

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This process is not species-specific, but will provide the most effective combination to achieve both the sediment and AIS goals. However, this type will have the greatest affect on recreational activities by limiting them throughout the year.

A water level drawdown of Shawano Lake is physically possible using the dam located down stream on the Wolf River. The dam is managed for hydroelectric power generation and is managed by a company known as North American Hydro. The Company holds a license to operate the dam authorized by the Federal Energy Regulatory Commission (FERC). The license has certain limitation and FERC may have to authorize any water level drawdown after working with North American Hydro. The WDNR would also have to authorize a drawdown. The WDNR manages the Wolf River for sturgeon that gather near the dam in the high water season of the spring. Any drawdown would probably require that the dam limit runoff in the spring to fill the reservoir that is Shawano Lake. A WDNR fisheries biologist would need to be consulted closely if this alternative is pursued.

Another hurdle when considering the drawdown option is the reimbursement of funds lost to North American Hydro for the term of energy production lost as the water was refilling (North American Hydro was not able to provide a cost estimate). This reimbursement would potentially come from SAWM, the WDNR (not WDNR grants), or other partners in managing Shawano Lake. The first step in pursuing authority from North American Hydro and the agencies they answer to is to present North American Hydro with a formal letter of proposal. Going into the level of detail that such a letter would entail is not an efficient use of limited dollars when designing this management plan. That activity

will need to be spearheaded by a consultant or public-sector technical expert. A drawdown feasibility study could be conducted to fully assess the potential of this management option, but SAWM should work to assess the political support for this option before allocating substantial funds to the project.

¹³Shawano Lake is approximately 6200 acres in area.

The current estimated EWM coverage is 2600 acres, and CLP at 1600 acres. Chemical treatment is only allowed currently for 51 acres.

¹⁴From APM Plan: Education, Prevention and Monitoring

In order to share information and educate Shawano Lake users, Bonestroo strongly recommends that SAWM form an Education Committee. It would be easy for the Education Committee to cover most topics surrounding lake management, so in order not to overwhelm members of that committee, Bonestroo also recommends that SAWM form a Monitoring Committee to look for new outbreaks of AIS, track existing AIS and work with professional monitors and chemical applicators. Both committees will report to the SAWM board and be responsible for designing additional action steps to accomplish goals.