

CHAPTER III

Specific Elements of Your Aquatic Plant Management Plan

This chapter takes the basics of the planning process discussed in Chapter II and puts it to work. It is designed to help you match the actual techniques and level of detail with your particular situation. This guide will help assure that the plan you develop will meet your needs and gain the approval of the DNR. Every lake is unique and will benefit from an aquatic plant management plan. After assessing your lake, you may find that there is no need for any manipulation, or you may find a moderate problem needing some treatment or a severe or wide spread problem, necessitating a significant manipulation. This guide provides the flexibility to create a plan appropriate to the level of aquatic plant management required for your lake.

This chapter is divided into two parts: the first part includes information everyone must collect to complete an Aquatic Plant Management Plan as a grantee. The second part includes information needed if you plan to do any permit-requiring manipulation on your lake such as chemical treatment, harvesting or a drawdown. You will need to apply for a permit for these and other lake manipulations, but the goal is that your plan will include all the information needed for the permit. We want to have a seamless path between gathering lake information, creating recommendations for treatment and fulfilling the permit requirements. It is critical that you maintain a close working partnership with your local DNR aquatic plant manager so that your analysis and recommendations for treatment will be acceptable to the DNR, who must approve the Aquatic Plant Management Plan (to satisfy the requisites of the grant) and any permit requests.

Maintenance. A protection-oriented plant management plan where no significant plant concerns exist or no management is proposed.

Useful for a lake appraisal where the goal is to begin to understand the lake's plant ecology. A healthy aquatic plant community exists and invasive and non-native species generally are not present.

Low manipulation. Primarily protection-oriented plans where slight to moderate plant concerns exist and some management is proposed. Invasive and non-native species may be present.

High manipulation. Moderate to severe plant concerns exist. Extensive management is proposed that may substantially impact or change the current state of the lake ecosystem. Established infestations of invasive or exotic species usually are present.

MANAGEMENT LEVELS

Part 1. Creating Your Plan

Goals

- A Purpose Statement. This statement identifies the concerns, protection requirements or perceived threats to the aquatic ecosystem presented by aquatic plants including impacts on recreational uses and beneficial functions (such as habitat values). The statement should look at the total history of plant uses and concerns up to the present time, and take into account how these uses and functions may have changed.

Example:

Blue Lake has historically had a healthy plant community inextricably linked to water quality and the animals that share the lake and we strive to maintain it in its present state.

- A Goal Statement. This is a general description of the plan's management goals (see *Chapter II*, page 17).

Example:

We hope to maintain a healthy plant community on Blue Lake by inventorying and monitoring the plant community and being aware of changes and being on guard for invasive species.

Goals typically:

- Specify a desired state of affairs
- Are sufficiently broad and diverse
- Are focused enough to infer action
- Are practical and reasonable

GOALS

Goals do not specify:

- Specific management strategies
- Management intensity
- Specific areas for management
- Specific consultants or manufacturers

Inventory: Lake Information

All plans need to be based on a factual understanding of the lake ecosystem. The purpose is to characterize the historical and current conditions of the waterbody's aquatic ecosystem. Much of this information (raw data) can be presented in appendices. However, the plan should describe what data was collected and how, and include a narrative description of the planning process.

Management History

- Describe the historical control actions taken or those currently being used to manage aquatic plants. Explain the results of those actions and why they are, or are not, still being used. In some cases it may be a statement that says nothing was ever done to manage plants.
- If records are available summarize them in an appendix or in the body of the historical use section. These data can become useful for evaluation even if it happened decades ago.

Plant Community

An evaluation of the aquatic plant community is the foundation of the Aquatic Plant Management Plan. All plant surveys and sampling described below should be conducted between mid-June and the end of August except where noted (e.g. Secchi readings) or when early season growth species like curly-leaf pondweed is a primary concern. Contractors and organizations must consult with the regional APM coordinator regarding survey techniques and what time of year the survey should be done.

All plant surveys and sampling should be conducted between mid-June and the end of August except when early season growth species like curly Leaf pondweed is a primary concern.

The DNR requires the grantee to turn in all data collected, including maps and shape files generated from the data, lists and other information.

Details on the protocol for conducting plant surveys can be found in *Appendix C*.

- Collect quantitative data on the lake's aquatic plant community throughout the littoral zone following the methods in *Appendices C and G*. This will provide:
 - An aquatic plant species list, where in the lake each species is found, and how abundant each species is when it is found.
 - The relative frequency of each species
 - The depth at which each species is found.
 - Lake bottom sediment types.
 - A description of the near-shore vegetation observed during the Boat Survey as described in the plant survey protocol (*Appendix C*).
- Collect two samples of every species (also prescribed in the sampling protocol, *Appendix C* and detailed in *Appendix E*). Press, dry and voucher each sample. The lake organization may keep one specimen, and the regional DNR office will send one on to the vouchering institution.

- Determine the lake's Floristic Quality Index (see *Appendix D*).
- List the stakeholders and identify their interests
- Describe different stakeholder viewpoints and potential conflicting philosophies over plant management.
- A quantitative evaluation (survey) of the lake plant community should be performed at least every five years (see *Plant Community* on page 33). Watch for changes in species diversity or changes in abundance of native species, and not just for the presence or absence of exotics. A decrease in diversity or an increase of one particular species may be an early-warning sign of changing water quality. Track parameters such as the Floristic Quality Index, these can be extremely useful over time (see *Appendix D*).

Lake Map

Most people comprehend faster when given information in a visual format. A map is a very quick and reliable way to assure that everyone knows the place you are talking about when you describe a certain point on your lake. A map will assist in locating plant communities, recreational and habitat use areas, and more.

- Obtain a map with an accurate scale (the US Geological Survey 1:24,000 scale topographic map series is widely available).
- Determine the location of the lake using the township, range and section designations.
- Tabulate the lake area, and maximum and mean depths.
- Find the Water Body Identification Code (WBIC) assigned by DNR.
- Obtain any available aerial photos, preferably those that are to scale (such as the US Department of Agriculture Natural Resources Conservation Service aerial orthophotographs).
- Using the aquatic plant community data, create maps of the lake vegetation. Include:
 - A map showing locations of the various plant communities, including aquatic invasive species (AIS), if present.
 - A map showing proposed treatment areas, if any are expected.
 - A map of areas containing threatened, endangered, and special concern species.
 - Maps created using GIS will be most useful, however all maps should be based on GPS coordinates
 - For all plans, maps should include GPS coordinates as reference points
 - For plans expecting large manipulations (manipulation of more than 10 acres or more than 10% of the littoral zone), maps created on GIS will allow for the most efficient permit planning, evaluation, tracking, and summary.
 - When a state grant is being used to fund an APM Plan, submittal of a copy of the GIS maps and shape files used to maps them will be required to satisfy completion of the grant

Fisheries & Wildlife Habitat

All aquatic life is linked to the aquatic plant community, which supplies habitat and food. It is essential to identify and develop a portion of your plan to assure the protection and enhancement of fish and wildlife habitat, endangered resources, and other local natural resources of concern. Be sure to hold a discussion with the local Fishery Biologist to identify any special issues early in your planning process.

Prepare a narrative characterization of the fish and wildlife community and their ecological relationship to the aquatic plant community from existing data.

- Append a Sensitive Area Designations (SAD) assessment, if one has been done for the lake
- Have discussion with your local fisheries biologist about your plans.
- If there is no SAD assessment, report conservancy areas recognized as having exceptionally good habitat for fish, waterfowl, and other wildlife on a map.
- Please be aware that a permit for chemical treatment may (or may not) be denied in sensitive locations identified by the DNR

Water Quality

There is a relationship between plants and water quality. Changes in the plant community can affect changes in water quality, while changes in water quality (such as nutrient enrichment) can affect the types and densities of aquatic plants. Your knowledge of water quality conditions must increase as the intensity of plant control measures increases. Water quality data should be included in a summarized fashion in an appendix or in the body of the water quality section. Some data can be collected and evaluated with volunteers. For other data you may wish to use a consultant. Reference any ongoing monitoring such as that of the Citizen Volunteer Network if you have one or other long term monitoring programs (<http://www.uwsp.edu/cnr/uwexlakes/clmn/>).

- Obtain one year of current water quality data consisting of a minimum of 4 to 5 secchi disk transparency readings (about every 2 weeks) from June 1 through August 31.
- Prepare a summary of any historical water quality data.
- Prepare a brief analysis of how plants and water quality may be affecting each other.
- **If you plan any lake manipulation**, become a Citizen Lake Monitor and follow the sampling protocol for volunteers doing chemistry monitoring:
 - Collect surface samples to measure total phosphorus concentrations in early spring, and chlorophyll *a* and phosphorus concentrations in mid-summer.
 - Measure water temperature and dissolved oxygen concentrations during summer at the deepest part of the lake at 1-3 meter or 5-10 foot intervals to determine whether the lake stratifies. This information can be helpful in determining some control strategies and in explaining some observed phenomena (e.g., late summer fish kills). The level of dissolved oxygen

may provide information on the possibility of internal nutrient loading, which may fuel late season algal blooms.

- If you are considering plant harvesting, take a turbidity sample in an area that might be harvested.
- **If you are planning a large manipulation (more than 10 acres or 10% of littoral zone)**
 - Measure the levels of seasonal nutrient concentrations: phosphorus (Total Phosphorus, Soluble Reactive Phosphorus) and nitrogen (Total Nitrogen or Total Kjeldahl Nitrogen, nitrate, ammonium, and nitrite). Nutrient budget data should be included if it is available or can be obtained with existing data.

Water Use

Understanding the patterns of recreational use on the water will help determine where and how plants need to be managed. Label the lake map and provide a description of key areas on the lake. Describe any surface use ordinances, use restrictions such as no-wake areas, park hours or motor use hours if applicable.

- Note the established or primary human use areas and use patterns in the lake and on shore (e.g., swimming beaches, boat launches, ski lanes, fishing grounds).
- Mark any areas of the lake where there is restricted use, for any reason.
- Identify the locations of any water intakes for public water supply or irrigation use.
- Identify areas where individual riparian plant concerns exist and where you think management may be proposed.
- **[If you plan to do a large scale manipulation (more than 10 acres or more than 10% of the littoral zone):**
 - Collect lake users' perceptions and opinions on how plant conditions affect recreational use. Do this with surveys, focus groups or other techniques. (See Chapter II.)
 - Try to identify riparian expectations and compare them to the physical conditions of the lake (For example, if plants are native plants and part of a natural lake, is it desired that they be manipulated? Is there an interest to blend management to best coincide with natural conditions, or is there an expectation to reshape conditions into unnatural, high maintenance areas? This is where a group can better understand and form realistic goals.)

Watershed Description

A lake is a reflection of its watershed. The human activities in the watershed may be playing a role in the nutrient loading in the lakes and the nature of the aquatic plant community. (If there is a serious algae problem on the lake, watershed issues will be more important and a nutrient budget may be necessary, but this is beyond the purview of this aquatic plant management plan.)

Map the watershed boundaries showing the major inflows and outflows.

- Determine the watershed area.
- Quantify (i.e. find the percentage of each category) the forested, wetland, agricultural, residential, commercial/industrial and other land use areas within the watershed. This will help to identify potential problem areas and source areas associated with point and nonpoint source pollution. These data will provide baseline information on watershed land use.

Analysis

The purpose of this element of the plan is to demonstrate your understanding of the lake's plant ecology and set management objectives. It will be the most individualized part of the plan and will be the most difficult to "cookbook." This will be the part that your APM coordinators will look at most closely when reviewing the finished plan. It should show how the need for any control action was determined. The analysis can begin by determining the impact of a "do nothing" scenario. Go back to your original goal statements and compare them to the findings of the inventory. Map and overlay the information collected in the inventory and interpret the results.

- Summarize your findings using data and maps generated from the inventory.
- Identify the management objectives needed to maintain the beneficial uses of the aquatic ecosystem and recreational needs.
- Keep your results and summary so that you may refer to it in the future. Submit all results (data survey and all electronically generated maps) electronically to the DNR (Jennifer.Hauxwell@dnr.state.wi.us)

Recommendations and Implementation (when there will be no manipulation)

You have now gathered substantial information on the lake. You know the history of the lake, all about the plant community and are ready to tend your "garden", vigilant for "weeds" and other danger signs of declining lake health. Now, write up your recommendations to ensure your lake stays healthy, including:

- Your analysis from the previous section.
- Hold a meeting to inform stakeholders of findings, discuss recommendations and implementation details.
- Even activities that do not require a permit, such as the 30' riparian manual removal zone, need to be considered as part of total removal of plants.
 - Remind property owners they don't have to remove aquatic plants and when they do, it should conform to the guidelines allowed in the plan.
 - Note that if 100 riparian owners each pull out 30' of plants that is 3000' of no plants!
- Develop a Citizen Lake Monitoring Network to monitor for invasive species and develop strategies including education and monitoring activities (<http://www.uwsp.edu/cnr/uwexlakes/clmn>).

- Implement a “Clean Boats, Clean Waters” (<http://www.uwsp.edu/cnr/uwexlakes/CBCW>) program as a component of the aquatic plant management plan. This program actively informs lake front property owners and public boat landing users of the need to prevent the spread of aquatic invasive species.
- If you do find an exotic species, please see the *Contingency Plans for Newly-found Populations of an Aquatic Invasive Species* on page ??.
- In general, a quantitative evaluation (survey) of the lake plant community should be performed at least every five years (see *Plant Community* on page 33). Watch for changes in species diversity or changes in abundance of native species, and not just for the presence or absence of exotics. A decrease in diversity or an increase of one particular species may be an early-warning sign of changing water quality. Track parameters such as the Floristic Quality Index, these can be extremely useful over time (see *Appendix D*).
- Involve the public in keeping the lake healthy by finding ways to decrease harmful watershed inputs:
 - Get help from the DNR and county Land and Water Conservation Departments (LCD).
 - Encourage lake front property owners to leave wide, naturally vegetated buffers between their homes and the lake.
 - Discourage the use of fertilizers on lake front property.
 - Remind shoreline owners not to remove plants, except according to the plan

The rest of this document is relevant for those plans in which there will likely be some sort of manipulation.

Analysis and Alternative Treatments (when manipulation is planned)

If manipulation is necessary, it’s hard to conduct an analysis without simultaneously considering alternative management techniques. However, it is important that the need for control and the level of control be established independent of choosing the control method. The amount of discussion on alternatives will correspond with the level of control proposed.

- Plans should include measures to protect the valuable elements of the aquatic plant community and plants that enhance habitat for fish and aquatic life.
- Discuss why a manipulation is necessary. Sometimes no action is best, even if there is a small population of an invasive species (see Chapter 4).
- Discuss the most common aquatic plant control techniques appropriate for your situation that are specifically applicable in your lake (see *Chapter IV, Appendix ???-Management Table*). Do not simply give a list of treatments. Each technique should be listed along with a brief analysis or statement summarizing why it is (or is not) appropriate for the particular management need. Discuss all options with interested lake users and appropriate agencies.

- Remember that different techniques may be suitable in different parts of the lake.
 - For example, Chemical treatment may be best in a bay heavily infested with EWM but a lightly infested walleye spawning area might be best handled by hand removal by SCUBA divers.
- Provide sufficient information for determining the feasibility of alternative control measures, including estimated costs, the relative permanence of the control achieved and the potential for long-term control of the causes of the problems.
- Discuss the potential adverse impacts that each technique (or the project as a whole) may have on non-targeted species, drinking water or other beneficial water body uses.

It is important that the need for control and the level of control be established independent of choosing the control method.

Recommendations of the Lake Group (when manipulation is planned)

This may be the part you have been waiting for, a chance to give your suggestions for plant management. This section considers the results from the **Analysis and Alternative Treatments** and other portions of the plan leading to the preferred management strategies for the lake. Please recognize that your lake group's recommendations, especially if they involve some sort of manipulation, must be reviewed, and approved by the DNR. For example, the DNR might recommend different timing for a chemical treatment or a different off-loading site for a harvester. You should be in close contact with your APM coordinator before assuming that your recommendations will be approved. In fulfilling all parts of this component, you will be ready to apply for a permit.

- Hold a meeting to inform stakeholders of findings, discuss recommendations and implementation details
- List any proposed manipulations.
- Identify the specific areas proposed for manipulation on a map (using GPS coordinates).

Sub-sampling in preparation for treatment evaluation

Once you have established your treatment polygons, you must lay the groundwork to perform an evaluation of the treatment (see Monitoring and Evaluation, below).

- Once you have pinpointed the areas (polygons) you are going to treat, you must do a refined plant community analysis on a sub-sample of these polygons. You will resample these areas after the treatment.
 - The sub-sampling must be done before any treatment is performed. Since chemical treatments are almost always done in the early spring, the sub-sampling should be done the summer prior to treatment.
 - The sub-sample analyses should be conducted by a neutral party that is independent of any contractor that will be doing control work.
- For a small scale project (less than 10 acres of treatment and less than 10% of the littoral zone), choose five polygons, or sub-sample five areas within one large

treatment area. For a large scale project (treatment of more than 10 acres or more than 10% of the littoral zone), survey 10 polygons.

- Within each of the five (or ten) areas, sample ten points 20m apart using the standard plant sampling with a rake outlined in Appendix C.
- These points must be identified by GPS coordinates. The same points will be used for the treatment evaluation.
 - If possible, choose at least one polygon in a protected bay and at least one in a more exposed site.

Other factors to include in your recommendations

- Know whether there are any Sensitive Areas (if a SAD assessment has been performed) or any conservancy areas recognized as having exceptionally good habitat for fish or waterfowl are within the manipulation area.
- Develop a Citizen Lake Monitoring Network to monitor for invasive species and develop strategies including education and monitoring activities (<http://www.uwsp.edu/cnr/uwexplakes/clmn>).
- Implement a “Clean Boats, Clean Waters” (<http://www.uwsp.edu/cnr/uwexplakes/CBCW>) program as a component of the aquatic plant management plan. This program actively informs lake front property owners and public boat landing users of the need to prevent the spread of aquatic invasive species.
- Education: Create an education plan for your lake group that will address some of these issues:
 - Include information on the value of a natural shoreline to protect the aquatic plant community and consider local ordinances to preserve or rehabilitate natural shorelines.
 - Consider measures designed to target sources of nutrients that contribute to extensive aquatic plant growth
 - Discuss and consider regulations designed to limit boating in sensitive areas or areas where there are communities of plants dominated by Eurasian water milfoil.
 - Investigate implementing controls on nonpoint sources.
 - Encourage lake shore owners not to remove vegetation except as in plan.
 - Involve the public in keeping the lake healthy by finding ways to decrease harmful watershed inputs:
 - Get help from the DNR and county Land and Water Conservation Departments (LCD).
 - Encourage lake front property owners to leave wide, naturally vegetated buffers between their homes and the lake.
 - Discourage the use of fertilizers on lake front property.
 - Remind lake shore property owners that just because some plant removal is allowed without a permit, it may better to leave near shore plants undisturbed.

Part 2. Implementing and Evaluating Your Plan

Implementing the Plan

This section is designed to help you implement your decision. Remember to include your local DNR aquatic plant manager in deciding on your best management strategy. In the end it is the actions you take that will determine success or less for your plant management program.

All plans must address in detail how the plan will be implemented. This section, along with the rest of your plan, will help you secure a permit for the proposed manipulation.

Before You Apply for a Permit

Decide how all the management recommendations will be implemented, including

- the methods
- timing and schedules
- operational cost estimates
- a consensus on the roles and responsibilities of the persons and/or organizations involved in the management process - who does what and when?
- a description of how the public will be involved.
- a budget and identification of funding sources, including plans for any grant applications.
- a description of the process by which the plan will be adopted, revised and coordinated, with DNR approval.

Begin the Permitting Process

- Be sure that the manipulation needing the permit is proposed and recommended in the plan.
- It is likely that the treatment recommendations will change after one or more years of implementation of the original plan, but this must be discussed in writing as part of the permit. If you are planning a treatment different from that recommended in your original plan, redo the sections above including:
 - Analysis and Alternative Treatments (when manipulation is planned)
 - Recommendations (when manipulation is planned)
 - For example, the original plan may have called for a large scale 2,4-D treatment of 30 acres or Eurasian water-milfoil. The following year, you may only need to apply for a permit for spot treatment of 2,4-D in certain locations.
- Decide on the firm that will carry out your manipulation.
- Have ready the name, address and other information (for example, the certification number, if chemical application is planned) of firm doing the treatment.
- Identify the target levels or intensity of manipulation low (fewer than 10 acres or less than 10% of the littoral zone in manipulation), or high levels of manipulation

needed to meet the stated use objectives, and identify these zones on a map. Verify whether the target levels coincide with the management objectives and a balanced aquatic ecosystem.

- Map areas proposed for manipulation such as harvesting.
 - Mapping coordinates should be recorded on a GIS map.

Treatment-Specific Requirements

- Harvesting
 - Identify plant offloading and disposal locations sites (using GPS coordinates or ¼¼ section of township, range and section designations).
 - Identify where and how you will obtain the needed equipment (harvesters, trucks, unloading equipment, etc.)
- Chemical Application
 - List the dates of chemical application. Remember that early season treatment of EWM and CLP is becoming a Best Management Practice for established infestations
 - List the chemicals to be used and method of application.
 - Specify the planned dose and if it will be verified by a water test analysis.
 - List the use restrictions that will be in effect after treatment (such as restrictions on swimming, fishing or garden use of lake water).
 - List the name, address, certification number and other relevant information of firm doing the treatment
 - If the treated area will be greater than 0.25 acres and/or a liquid chemical will be used, a certified applicator must apply the chemical. List the name, address, certification number and other relevant information of firm doing the treatment
 - Make a public notice of the proposed application and hold a public meeting. This notice has specific requirements:
 - Notice shall be given in 2 inch x 4 inch advertising format in the newspaper which has the largest circulation in the area affected by the application
 - The notice shall state the size of the proposed treatment, the approximate treatment dates, and that the public may request within 5 days of the notice that the applicant hold a public informational meeting on the proposed application.
 - The applicant will conduct a public informational meeting in a location near the water body when a combination of 5 or more individuals, organizations, special units of government, or local units of government request the meeting in writing to the applicant with a copy to the DNR within 5 days after the notice is made. The person or entity requesting the meeting shall state a specific agenda of topics including problems and alternatives to be discussed.
 - The meeting shall be given a minimum of one week advance notice, both in writing to the requestors, and advertised in the newspaper in the format described above.

- You must certify to the DNR that a copy of the permit application has been provided to any affected property owners' association, inland lake district, and, in the case of chemical applications for rooted aquatic plants, to any riparian property owners adjacent to and within the treatment area.
 - After receiving a permit, the permit holder shall notify the regional DNR APM office 4 working days in advance of each anticipated treatment with the date, time, location and proposed size of treatment.
 - The chemical application may be supervised by DNR personnel.
 - Be aware that as new information is developed, an annual permit may change to reflect current Best Management Practices.
- Drawdown: If a drawdown is proposed,
 - Produce a map showing exposed lakebed and affected plant communities.

On the Day of Chemical Treatment (or other Management Action)

The lake organizations that do best at plant management are those that take a "hands on" approach during implementation of the controls. Schedule with your contractor to have a representative from the lake present during the treatment. The first hand knowledge and any documentation you make will help everyone understand the outcome and results, and help to improve the plan and actions.

- Assign a person from the lake organization familiar with the plan to be present.
- Assure there is a copy of the Plan and necessary permits.
- Review permit and any special conditions Review what areas will be controlled, and what will be done in each area.
- Agree on the locations when you arrive at them, before starting work.
- Verify with the contractor that conditions are proper for the intended method - wind, water temperature, growth stage of target plants.
- Verify that pesticide notice signs are posted and that they contain correct information.
- Keep a log or notes of the day's actions, and note any unusual conditions that may affect the outcome, or give reason for complaints.
- As the end of a chemical treatment, ask for a copy of the Treatment Record Form to have in the lake records.
- Be inquisitive, ask the contractor when you have questions to learn and understand what is going on.
- Have a separate boat and maybe a camera to observe and record, and do not expose your self to pesticides on the applicator boat.

Monitoring and Evaluation

If there has been a plant manipulation, you must **evaluate** its success. If you are not specifically evaluating a treatment, you will want to continually **monitor** for any kind of change. Just as a plant survey must precede a plant treatment and subsequent evaluation, a formal aquatic plant survey must precede routine monitoring so you can

compare the current status to baseline conditions. Each aquatic plant management plan needs to outline a strategy for both evaluating treatments and monitoring the plant community in between formal surveys and treatments.

Evaluating a Treatment

When evaluating a treatment, you will want to answer the following questions: Did the implemented management plan meet the management objectives? If not, what is the next step? Did anything change (for example, were non-targeted plants harmed or was there significant oxygen depletion?) The specific requirements will vary depending on the technique selected, the scale of the treatment and individual lake conditions. The agency doing the evaluation must be independent of agency performing the treatment (and this may be the DNR).

This section of the plan should also include a statement of what steps will be taken:

- 1) if the management strategy is not meeting the objectives
- 2) when the management objectives are met.

Water Quality Evaluation Following Treatment

- Collect pH, dissolved oxygen concentration or other residue testing on the day(s) of treatment and several dates post-treatment.
- Measure standard water quality parameters at various locations in lake during the pre-treatment and post-treatment period (i.e., dissolved oxygen, total nitrogen and total phosphorus concentrations, and pH).
- For large scale treatments (greater than 10 acres or 10% of the littoral zone and where treatment depth is 10 feet or less, obtain dissolved oxygen concentration profiles weekly for four weeks following a manipulation that leaves aquatic plant biomass in the lake.
- Drawdown: Record lake levels weekly and note any abnormal conditions. Other monitoring may be required as a condition to the permit.
- After harvesting, evaluate turbidity .

Plant Community Evaluation Following Chemical Treatment

- Assess the effectiveness of the treatment within a time window such that it is long enough after the treatment that you would expect to see results but not so late that plants are senescing and dying because it is the end of their season.
- You must resample the polygons or subsamples (see **F. Recommendations**, above) you surveyed prior to treatment to determine the effectiveness of the treatment.
 - Sample the same GPS points.
 - Use the same reporting form (Appendix G) for reporting the before and after treatment plant survey results.

- Calculate the relative cost per area of nuisance control over the period of the treatment program to consider benefit/cost analysis. Annually examine areas with rare, endangered or sensitive aquatic plants, or species of special concern, within or adjacent to the treated area.
- Annually examine areas with rare, endangered or sensitive aquatic plants, or species of special concern, within or adjacent to the treated area.
- From the data, write a narrative, summarizing the effectiveness, including the cost-effectiveness of the treatment. Evaluate the effectiveness of treatment by determining if areas with target species are shrinking or growing.
- If the evaluation suggests the treatment was not effective, meet with the stakeholders, treatment firm and plan consultant firm to look at alternative treatment methods
- If the treatment was successful, Congratulations! Now proceed to monitor the lake for changes in the aquatic plant community according to the protocols referred to below.

Monitoring for Changes in the Community:

The goal of monitoring is to watch for ecosystem changes and so is distinct from the initial assessment of the plant community. Change may include: new populations of a known invasive species; reemerging populations of a previously treated population of an invasive species; a different invasive species; or changes in the native plant community.

The goal of monitoring is to watch for ecosystem changes.

Aside from plants, there may also be changes in physical and environmental parameters, or in other species, such as fish and macroinvertebrates.

Volunteers can do some of the monitoring. Like the initial plant survey, the time of the year that monitoring is conducted can be critical. Talk with your regional APM coordinator for timing as you plan your monitoring strategy. These methods are currently being finalized. They will include a protocol for lakes with and without known invasive populations. Please watch this website for the latest recommendations. (<http://www.uwsp.edu/cnr/uwexlakes/clmn>).

Part 3. Contingency Plan for Newly-found Populations of an Aquatic Invasive Species-Rapid Response

Each plan should have a strategy for dealing with any invasive aquatic plants if and when they are discovered. Such a strategy should include a plan for rapid intervention using the guidelines noted below. Aquatic plants designated as aquatic invasive species include curly-leaf pondweed, Eurasian water-milfoil and purple loosestrife.

As of early 2005, aquatic plants currently designated as aquatic invasive species are limited to curly-leaf pondweed and Eurasian water-milfoil.

Invasive plants can be removed (after confirmation of identification) without a permit under the following conditions:

- **Private ponds:** Manual removal or use of mechanical methods to control non-native or invasive aquatic plants from a body of water that is 10 acres or less and

is entirely confined on the property of one person, can be done with the permission of that property owner.

- **Public waters:** Manual removal of nonnative or invasive aquatic plants can be done as indicated in NR 109.07 when performed in a manner that does not harm the native aquatic plant community.

You must have a permit for other control options including chemical treatments, mechanical harvesting, placement of benthic barriers, dredging, etc.

To chemically treat pioneer infestations or reinfestations following a treatment or control project:

- Contact your local DNR aquatic plant manager in order to apply for a rapid response permit and grant.
- It is possible that the DNR will schedule personnel to do a rapid plant community evaluation prior to any treatment.
- If a chemical treatment seems the best alternative and if it is already summer, the DNR may rule that the chemical treatment must wait until the next spring to get the best effect.
- Authorize a person to act on behalf of the organization to apply for the required application.
- Set aside a contingency fund. Expect to pay all the cost for control up-front because grants operate on a reimbursement basis.

For more information on early detection and rapid response projects see NR 198.32 by going to the Wisconsin Legislature: Infobases at <http://folio.legis.state.wi.us/> and clicking on *Administrative Code*. Then find the specific rules under the *Natural Resources* heading. Non-chemical treatment costs are also grant eligible.

Part 4. Special Requirements for Treating Algae

Treating Nuisance Algae (planktonic and/or filamentous)

Chemical algae (algacides) treatments are generally very ineffective. Spot treatments are very temporary and entire lake treatments aren't practical. Algae quickly return and the danger from toxic copper build-up in the lake sediment is great. Long term nutrient reduction strategies are the only permanent solution. However, when they are permitted the following are required:

- Record the approximate boundaries of areas where nuisance algal growth occurs, using GPS where practicable, and track seasonal outbreaks, recording the observations using a GIS database. Update these records at least every 3 years. Update the map every year if the algae are treated.
- Record times when nuisance algae is present, when it is not, and for what duration control prevents a new recurrence of a nuisance condition.
- Identify the algae to be controlled. Is it planktonic or filamentous, and what species is it? Various species are associated with different water quality conditions and exhibit different behavior to consider in developing a control strategy. For example, *Oscillatoria* can auto regulate its depth position in the

water column. Treatment must be timed when the algal cells are at the water surface to affect control. Control of filamentous algae may be closely related to management of rooted plants.

- Consider adding quantification to identification of algal species. Various species of blue green algae produce various phytotoxins that are being linked to illnesses and deaths of wildlife, domestic animals, and in rare situations, people. Knowledge of specific species can be used for effective education and awareness for potential health advisories and can motivate property owners in the watershed to reduce nutrient runoff.
- Consider analysis for algal toxins pre- and post-treatment. Toxin production may occur during algal death, so a sudden large-scale algal death, brought on by deliberate control of algae may cause or trigger a toxic algae event. If safety is a concern, you will want to know if treatment is solving or adding to the problem.
- Monitor water quality (at every primary inflow, the primary outflow, and at one deep station per basin), weekly for the first month after treatment and then monthly throughout the summer season (May through August). Include the following parameters:
 - o secchi disk depth
 - o temperature and dissolved oxygen profiles
 - o total nitrogen concentration
 - o total phosphorus concentration
 - o chlorophyll *a* concentration
 - o pH
- Where herbicides have been applied, test for chemical residues as indicated by manufacturer's instructions.
- Where copper-based algaecides have been applied for many years, analyze the sediments for elemental copper (Cu) to test for copper accumulation in the sediments.

Strongly recommended actions for dealing with nuisance algae include:

- Study the watershed to identify sources of nutrients that support and sustain the algal blooms.
- Involve the public in keeping the lake healthy by finding and sharing ways to decrease harmful nutrient inputs from the watershed.
 - o Get help from the DNR and county Land and Water Conservation Departments (LCDs).
 - o Encourage lake front property owners to leave wide, naturally vegetated buffers between their homes and the lake.
 - o Discourage the use of fertilizers on lake front property.

See *Chapter IV* for detailed protocols on various plant manipulation techniques.

More intensive monitoring will be required if you are actively manipulating the plant community.