Aquatic Plant Management
Rule Development
Public Comments and Questions
April 2021

Introduction

The Aquatic Plant Management (APM) program is undergoing rule revisions for both NR 107 and NR 109, Wis. Adm. Code, related to chemical and mechanical/manual management of aquatic plants, respectively. The department drafted nine White Papers for public review in fall 2020, to summarize specific aspects of the APM program and propose preliminary policies.

The department solicited comments that provided an alternative policy suggestion or modifications with evidence to support why that approach is preferable to the one proposed by the department, comments that state a positive aspect or impact of a policy proposal, or clarifying questions that highlight potential changes or impacts as a result of a policy proposal.

The department asked for public comments and questions on the policy proposals through January 15th, 2021. 25 individuals and organizations supplied feedback. Over 400 relevant questions and comments were received. Thank you to these individuals and organizations for contributing to the rule development process:

Amber White
Aquatic Biologists
Aquatic Ecosystem Restoration Foundation (AERF)
Balsam Lake PRD
Bone Lake Management District
Cedar Lake
Church Pine, Round and Big Lake PRD
DNR Forestry
DNR Groundwater
DNR Natural Heritage Conservation (NHC)
Eric Rudzinski
Great Lakes Indian Fish and Wildlife Commission (GLIFWC)
Josh Ginzyl
Long Lake Protection and Rehabilitation District
Midwest Aquatic Plant Management Society (MAPMS)
North & South Twin Lakes PRD
Onterra
The Nature Conservancy (TNC)
United Phosphorous Ltd. (UPL)
Wisconsin Lake and Pond Resources
Wisconsin Lake and Pond Solutions
Wisconsin Lakes
Wisconsin Manufacturers and Commerce (WMC)
Wisconsin Wetlands Association (WWA)

How the Response was Compiled

If multiple individuals gave the same comment or question, the department combined and summarized them to one comment or question. Because most comments were repeated as questions, only questions have responses. Some questions are grouped together with one response. The department did not fact check any comments provided.

Comments or questions that were unrelated to the policy proposals presented in the White Papers are not in the summary below. Questions about current practice or rules were not addressed unless in specific reference to a proposed policy. However, the department has read and considered all comments and questions received.

Finally, the White Papers were intended to solicit input on a new or modified regulatory framework. They were purposefully broad and written in non-technical language as much as possible. Hypothetical questions about how the rule would apply in situationally specific conditions were not directly addressed but rather were "scaled up" under a broader response considering the context in which they were framed in the White Papers.

Table of Contents

Permit Processing Questions

Why is the permit expiration date set to 10/1 and not the end of the calendar year?

- In northern temperate waters, most aquatic plants senesce by mid-late fall. There is no reason to treat submerged aquatic plants beyond that time.

The new response time for the department for large-scale permits is proposed to be extended to 30 days. What necessitates the requirement for more time to review a permit for the new rule revision versus now?

- Staff and the public have reported that the current 10-15 working days does not allow enough time for thorough review of permits, especially for large projects. Management strategies have become more sophisticated and the scale of projects has increased since the rule was written in 1989.

Is it 30 days or 30 working days?

- The intent was to suggest a month's time may be necessary to adequately process some permits. The proposed rule will be specific.

How will the department communicate if a permit is not complete and is on "Hold"?

- The department staff will send an email outlining the missing or incomplete information necessary to continue reviewing the permit.

With a 5-year chemical permit would a new permit be needed if the permit holder wanted to add a new product or would it just be an amendment to the existing permit?

- Options were presented in the white papers, specific criteria will be outlined in the first draft of the rule. The department agrees amendments may need to be considered.

Are adverse side effects to non-target organisms only including chemical application or does the removal of zooplankton and fish during mechanical harvesting and DASH also apply?

- The department evaluates the available information on potential non-target impacts to organisms in conjunction with all proposed aquatic plant management activities.

What criteria will be used to determine what methods can be used to control aquatic plants?

- The department approved management plan will scenario plan for all available methods of aquatic plant control. In a specific permitting decision or plan approval, department staff would review the standards set out in the rule and use relevant peer reviewed research or other scientific data, if available, waterbody management history and characteristics, stated management goals in the approved plan, stakeholder viewpoints and proposed permit activities to determine in their professional judgment if the proposed method was appropriate. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

Who decides an application has been ineffective?

- The department approved management plan should have clear criteria for what the lake group/consultant and department collectively view as an effective treatment, and thus this

determination will be based on the criteria within their plan. In a specific permitting decision or plan approval, department staff would review the standards set out in the rule and use relevant peer reviewed research or other scientific data, if available, waterbody management history and characteristics, stated management goals in the approved plan, and proposed permit activities to determine in their professional judgment if the proposed application was or will be ineffective. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

What constitutes an ineffective treatment?

- An ineffective treatment does not meet the objectives identified within a management plan and/or causes significant adverse non-target impacts.

Will the Department supply guidelines to define and determine "efficacy"?

- The department will develop guidelines to frame conversations around efficacy and how to generate baseline criteria for management strategies. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

What are unreasonable restrictions regarding nuisance relief?

- The department believes this is obsolete terminology and instead is considering material obstruction to navigation, detrimental impacts to public recreational interests, or detrimental impacts to existing private uses of water.

Will the departments' ability to stop or limit chemical applications due to being ineffective be bolstered via evidence or scientific studies and not merely opinion?

- In a specific permitting decision, department staff would review the standards set out in the rule and use specific waterbody data and peer reviewed or other scientific evidence, if available, to determine in their professional judgment if the treatment would be ineffective. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

The white paper states that an application requirement would be "acknowledging permit complies with department approved management plan". Why would an exclusion of a management technique in the five-year management plan be grounds to dismiss a permit or technique over that term?

- The planning process should replace some of the annual permitting requirements. The planning process as proposed supplies the opportunity for waterbody groups, individuals, the department, and the contractor to scenario plan. Permits should be consistent with an approved in the plan. However, 5 years is the proposed maximum time between plan updates. If a new technique became available during that time, the individual responsible for the plan could propose an amendment or update sooner.

What "rights of riparian owners" would either non-chemical or chemical management interfere with?

- This provision is found throughout a variety of water regulations. A proposed activity that involves devices or mechanisms could physically infringe on a riparian's reasonable access to or use of the water. A chemical treatment could interfere with a riparian's right to reasonably direct or consume water for domestic, agricultural or industrial purposes. Additionally, on rivers and streams, the riparian generally

owns the bed of the stream and any "fruits of the bed", which may be impacted by aquatic plant management.

How will the Department determine "significant adverse effects" from proposed activities to fish/wildlife, water quality, habitat? Is this in the form of peer reviewed evidence?

- The department will attempt to clarify outcomes that meet "significant adverse effects" in the administrative rule. In a specific permitting decision, department staff would review the standards set out in the rule and use specific waterbody data and peer reviewed or other scientific evidence, if available, to determine in their professional judgment if the threshold of significant adverse effects was exceeded. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

Who will shoulder the cost/burden of proving that "the cumulative impacts of previously approved applications on the waterbody have not caused significant adverse effects over time"?

- The department proposes a permit applicant should supply data on the aquatic plant community as part of the management plan. Reviewing the management history and changes in the plant community over time can help permit applicants and department staff determine if past management choices have adversely impacted waters of the state. This knowledge benefits all stakeholders.

Who determines if there will be an effect on wild rice?

- The department will make the determination after review of the proposed treatment site for proximity to wild rice, considerations in the planning process, and based on input from the Ojibwe tribes in the Ceded Territory.

What is an effect on wild rice?

- Activities that kill or damage the plant and would result in decreased abundance at critical life stages.

Are both strains of wild rice (Z. aquatica – southern wild rice, Z. palustris – northern wild rice) included? Current NR code (NR107.08 (4)) only names Z. aquatica.

- The Department considers *Z. aquatica* and *Z.palustris* as valued native aquatic species. *Z. palustris* is of concern in the Ceded Territory. This will be clarified in the rule.

What will a review of fish farm criteria by the department include?

- The APM program is reviewing fish farm criteria with other department staff to clarify cross-program requirements. The department will seek to add clarity in repealed and revised NR 107 to the regulation of fish farms that is consistent with established law.

What happens if a permit application is not back within the allotted time frame? Does the proposed permit get approved as submitted?

- No, the permit would not be approved as submitted if the permit is not issued within the standard issuance dates. However, staff will be accountable to meeting this standard in their annual performance review.

Permit Processing Comments

When re-applying for a permit, the application fees should be refundable

We support the proposed permit issuance window of 'within 45 days' for permits affecting wild rice waters and rice habitat because it allows for Voigt Intertribal Task Force notification and involvement as per the stipulation for the wild rice trial.

A threshold of efficacy or treatment success should be set in the beginning. If all permit criteria are met, the WIDNR must issue a permit. If control is unlikely or shown not to be progressing, WIDNR should work with the permit applicant to find a treatment or control plan that will be effective.

Recommends the WDNR be as specific as possible in definition as it applies permit issuance and permit conditions. These conditions have not been universally interpreted by WDNR region.

- "remedy the water use impairments caused by aquatic plants" is subjective.
- "activity will not cause significant adverse impacts." Is open ended
- "cumulative impacts of previously approved applications on the waterbody have not caused significant adverse effects over time to…" These actions may or may not have any relation to the permit applicant or the management plan being proposed.
- "any other conditions necessary to reduce or avoid impacts which would otherwise result in denial of a permit application" is unlawfully vague

Permits should expire 11/15 which is a better estimate for season end or 12/31.

Why is non-chemical management renewed in 5-year intervals (with the APM Plan) while chemical management is renewed annually? There is a proposed exception to allow for a 5-year permit but there can be no changes in products, treatment areas, and it must agree with the APM Plan. Again, this is not consistent between non-chemical and chemical.

Treatment Scale and Timing Questions

What defines the terms small-scale and large-scale?

- Small-scale treatments are those where the herbicide product will be applied at a concentration rate and scale where dissipation of the herbicide is not anticipated to result in significant lake wide concentrations, and effects to the plant community are anticipated to occur on a localized scale. In contrast, large-scale treatments are those in which the herbicide will be applied at a concentration rate and scale where dissipation will result in significant lake wide concentrations, and effects to the plant community are anticipated to occur on a lake wide scale.

What specific criteria are used to conclude that large-scale impacts could occur?

- Determining whether a treatment may reach herbicide concentrations levels capable of having large-scale impacts can generally be calculated by dividing the volume of water being treated by the volume of water within the lake. In deeper lakes which thermally stratify, the volume of water above the thermocline should be used rather than the volume of the whole lake. Specific herbicide rates which may be capable of lake wide impacts to plants will be identified from laboratory concentration exposure time (CET) studies, operational field studies, and herbicide product labels.

What is the scientific justification that 5% constitutes a whole lake treatment?

- The intent of the calculation is to allow for each individual treatment scenario to be evaluated for its potential whole lake effects, instead of a hard threshold in rule as is used currently. The proposed policy states that any permit proposal to treat more than 5% of the lake surface area will calculate the hypothetical lake wide concentration rate following dissipation and movement off targeted treatment sites. Treating >5% of the lake surface area may or may not result in a lake wide concentration high enough to affect plants. Whether such a treatment results in lake wide effects depends on the active ingredient, application rate, and lake surface area to volume ratio. If the calculation determines the proposed treatment will not have whole lake effects, then the proposed treatment would not be required to conduct associated regulatory requirements for whole lake treatments, whether that treatment was greater than 5% surface area or not.

- The department does not believe all treatments exceeding 5% surface area will have whole lake effects, or that all treatments under 5% surface area will not have whole lake effects. The department ran several hypothetical scenarios with multiple lake sizes, depths, treatment sizes and herbicides to determine whether the 5% threshold captured most treatments which would have whole lake effects. However, we found that the 5% surface area threshold is not protective in all situations.

Who makes the decision on if the calculated whole lake rate will have non-target impacts?

- The permit applicant would provide the calculation as part of the permit application to determine if their proposed treatment would have whole lake impacts. Department staff would review. The department agrees some form of reference guide which summarizes the current science for commonly used herbicides would be necessary, this guidance would be a living document which updated as new studies and data become available.

What is a scientific reason for not allowing consecutive large-scale treatments? Is it the intent to limit large scale treatments to once every two years? Does this mean that large lakes or marinas with annual large scale navigation issues would not be able to manage their invasive populations every other year? What if different strategies and techniques were applied in consecutive years?

- The intent was to consider limiting management with *whole lake impacts* to a maximum of once every two years to minimize non-target effects and decrease the likelihood of herbicide resistance in the target species and/or create lake ecosystems dominated by herbicide tolerant species. While research on long-term effects is lacking, evidence for short-term non-target effects of large-scale treatments, including decreased water clarity, decreased species frequency, and altered community composition are clear [1, 2, 3, 4, 5, 6]. Observed effects can be large and may be cumulative. Case studies do not rule out cumulative effects, though they stop short of proving them. Allowing for a recovery year is proposed to mitigate potential disturbance associated with whole lake population management.
- Aquatic Plant Management Society (APMS), Aquatic Ecosystem Restoration Foundation (AERF), government agencies and other stakeholders recognize the repeated use of herbicides with similar modes of action has often been associated with a shift to aquatic plant community compositions that are herbicide tolerant. Herbicide tolerance is defined as "the inherent ability of a species to survive and reproduce after herbicide treatment." A documented example of this includes a shift from the more susceptible Eurasian watermilfoil (Myriophyllum spicatum) to hybrid watermilfoils which have shown increased tolerance to fluridone as well as 2,4-D and triclopyr (auxin mimics). [7, 8, 9, 10, 11, 12, 13]. More research is needed to understand herbicide resistance and tolerance in aquatic environments. However, a recovery year is proposed as one method to mitigate herbicide tolerance and/or resistance as result of multiple whole lake treatments with the same mode of action.
- For more information on hybrid watermilfoil and herbicide resistance, please refer to the APM Strategic Analysis, page 76.

The White Paper discusses when many individual property owners apply for individual small-scale permits. Does this suggest that the WDNR will continue to issue individual riparian herbicide treatment permits?

- The white paper described how multiple small-scale treatments conducted by one or multiple individuals could result in whole lake impacts. If a waterbody has a lake association and/or a management plan, the plan should include appropriate management scenarios that meet the needs of individual riparian owners on the waterbody. The department is considering the generation of a BMP specific to the situation where a waterbody did not have an existing management plan, or lake association/district, but one or multiple property owners wished to manage the aquatic vegetation around their docks to create navigation lanes to open water.

Why create the BMPs if a permit applicant is not required to follow them? How do BMPs differ from recommendations in a department approved plan? What if the BMPs differ from a department approved plan?

- Best Management Practices would be designed to capture the available or appropriate management options for specific scenarios. They are a way for industry partners, department staff, permit applicants and other stakeholders to discuss and frame management activities which are broadly appropriate and provide consistency for consumers. If the department approves a BMP, and the BMP is appropriate for a specific scenario, then less time is required developing and reviewing a proposed plan or permit. If a

proposed activity does not have a department approved BMP, or the activity differs from a BMP, but the proposed activity meets the minimum standards set in the administrative rule, the activity could be approved as part of the management plan and/or permit.

How will the acceptance/denial of a treatment late in the season be decided? What will define it as effective/ineffective, will there be a scale?

- In a specific permitting decision, department staff would review the standards set out in the rule and use specific waterbody data and peer reviewed or other scientific evidence, if available, to determine in their professional judgment if the treatment would be allowed. The department agrees conversations with all stakeholders are needed to address how these determinations are made.

Treatment Scale and Timing Comments

I think the new method for determining "whole-lake vs small scale treatment" is great. In my research I have seen 2,4-D move through a water body very quickly, i.e. a water body can have a homogenous 2,4-D concentration within 24 hours of application, and have seen significant drift away from treatment sites that functionally changes the "small scale" treatment to a potentially "whole-lake" treatment

The definition of large-scale needs to be better defined, offering the following divisions for consideration. Small-scale: the sum of herbicide from all treatment sites adds up to whole-lake concentrations that are below levels that would have whole-lake implications for any plant species. Large-scale: the sum of herbicide from all treatment sites adds up to whole-lake concentrations that are below levels that would have whole-lake implications for target invasive plants but at levels that may impact less-durable, sensitive native plants. Whole-lake Scale: the sum of herbicide from all treatment sites adds up whole-lake concentrations that are sufficient to cause impacts to target invasive plants and native plants. Most often these would be purposeful whole-lake treatments

Requiring whole-lake or AOPI herbicide concentration calculations when targeting 5% or greater than the surface area is acceptable. However, targeting 5% or greater of the surface area does not automatically mean that the treatment will have whole-lake impacts. The calculations can allow lake managers/regulators to consider if the treatment is a true-spot treatment or will have greater lake wide impacts.

The white paper also requires applicants seeking to treat more than 5% of a water body to calculate a whole lake treatment concentration. The paper does not provide any scientific justification for this requirement, and it appears that the 5% threshold is arbitrary.

Restricting the use of large-scale herbicide treatments in consecutive years removes a potential tool that can be effective in managing invasive aquatic plants as noted by Skogerboe et al.2 in 2008. Each site is different, and pest abundance and vigor often dictate what is necessary for control. To restrict the type and number of treatments allowed without accessing the site is certainly not IPM. Also, by not allowing consecutive year treatments on these lakes, another tool is removed. Many lake management plans are made based on consecutive large scale or lake-wide treatments to reduce the majority of the pest in an effort to "get ahead or reset" it and thereby reducing pest populations to smaller more manageable plots in the future, thereby increasing selectivity for management to target plants.

Consecutive, large-scale treatments are a necessary and accepted DNR protocol for control of large populations of curly-leaf pondweed (CLP), an AIS. Not allowing them would severely negatively impact lake health and use for waters with a dense CLP population, go directly against written and approved aquatic plant management plans, and be a significant financial burden for the lake district/association completing the action.

Not allowing large-scale treatments will economically impact many high-use, municipal marinas that currently do large-scale nuisance vegetation control annually. This includes multiple public and privately owned marinas in every port along Lake Michigan (Milwaukee, Sheboygan, Sturgeon Bay, Manitowoc, etc.) and private owned marinas on prominent inland waters like Lake Geneva and Lake Winnebago.

In support of the intent to avoid intentional whole-lake treatments occurring in consecutive years

If the DNR means "whole-lake" treatment such as a fluridone treatment, that may be more understandable but may need to be qualified as some fluridone treatment programs may include an intentional small bump treatments during the spring following ice-off.

Within Treatment Scale and Timing, there is much discussion about ineffective treatments, but the department's definition of "effective" may differ from the lake property owners. We request more definition on how the DNR deems a management action effective, as it potentially differs from industry standards.

The identification of Best Management Practices for Treatment Timing and Scale can be useful, caution may be needed to avoid creating statewide BPMs that are a one-size-fits-all approach. Not all lakes are the same, as the Guidance Proposal acknowledges.

Monitoring Questions

How does the proposal to require post-treatment evaluation in the same year as treatment consider the different modes of action of the different herbicides, for the longer CET needed for fluridone versus 2,4-D and ProcellaCOR?

- Currently, the department proposes a PI survey the year prior to and the year following treatment for treatments which will have whole-lake impacts. If a PI survey is conducted a full year after treatment, the varying residence times of the herbicide during the year of treatment are not relevant.

Will large-scale harvesters be required to perform pre- and post surveys?

- The department proposes all management activities are evaluated using similar scale-appropriate assessment methods. The department may define a large-scale harvesting threshold in the rule draft.

What is the predicted increase in costs with new monitoring and evaluation?

- The costs of rule implementation will be covered in the Economic Impact Statement when the final rule is proposed.

Who is responsible for paying for monitoring costs?

- The permit applicant will be responsible for paying for the monitoring costs in most situations. Competitive cost-sharing grants are available to qualified entities that can be used to gather data, plan and monitor projects that manage invasive aquatic plants.

Will a lakewide PI survey be necessary for small-scale herbicide management? Will a lakewide PI survey be necessary for small-scale harvesting operations, including DASH?

- The department does not propose a lake wide PI survey be conducted pre or post annual small-scale treatments, herbicide or mechanical. The department proposes a lake wide PI survey for all managed waters every five years with a management plan update in order to gather baseline data for decision-making.

Will appropriately scaled sub-PI work be necessary for all management activities in whole bays, marinas, or channels?

- No, the department does not propose a sub-PI if the proposed activity in a whole bay, marina or channel will not have large-scale impacts to aquatic habitat. The department proposes, in a natural lake, decisions be made considering the quality of habitat within the marina, bay or other enclosed area, relative to the available habitat refuge within the entire lake. The PI survey conducted during planning process should identify if there is a significant habitat refuge in the area.

In the case of marinas or channels, is there exemption based on the intent of the feature (i.e. it's a navigational feature only)?For large-scale management, are whole-lake PI surveys necessary in instance where control is for nuisance relief to targeted navigational lanes only?

- No, the department does not propose an exemption. When the proposed treatment is likely to have 'whole-lake effects', in a sheltered area or the entire waterbody, the department proposes a sub-PI or whole lake PI, respectively, to assess efficacy and non-target impacts.

Who determines if the "water exchange is low or the plant assemblage is primarily native aquatic species"?

- The department would review existing information provided by the applicant and make the determination.

The white paper background mentions using genetic monitoring before and after treatments as a way to determine whether repeated treatments are selecting for more hardy strains. Does the Department know what genetic strains are "more hardy" to make these type of conclusions?

- There have been several published studies which have identified specific watermilfoil strains which have documented resistance or tolerance to several commonly used herbicides [7, 8, 9, 12]. Collaborative research efforts are ongoing to determine the distribution of these tolerant strains in Wisconsin lakes, and progress is being made to help guide future management decision making.

How long is an herbicide considered "new"? Does "new" refer to active ingredient, new brand name with an established active ingredient (i.e. a new liquid 2,4-d), or both?

Is herbicide concentration (calculations or monitoring?) required for all active ingredients used?

How will herbicide concentration monitoring for an active ingredient that has no known lab or ability to be tested handled?

- When the treatment is grant funded, herbicide concentration monitoring is usually included for large-scale aquatic herbicide treatments.
- The department will encourage participation in evaluating new and existing herbicide active ingredients as well as commercially used formulations in non-grant funded herbicide treatments.
- Labs are needed for EPA approval of any pesticidal product, and the WI State Lab of Hygiene has expanded in recent years.

Who determines "an appropriate scaled sub-PI survey"?

- The department generates an official lake wide PI survey grid for each waterbody in the state. Guidance for creating appropriate scaled sub-PI surveys to be used during pre/post evaluations efforts can be found on the Department's APM Information, Tools, and Research website.

Drawdowns are used as a technique to manage aquatic plant growth in near shore areas, often providing indiscriminate control. Will drawdowns now be subjected to the same pre- and post-management scrutiny via plant surveys like herbicide management?

- The APM Program does not permit water level drawdowns; these actions are regulated by the Waterways Bureau Dam Safety Program.

What is a demonstrated water use impairment? What criteria will be established for a demonstrated use impairment it be evaluated equally by all department staff through all waterbodies?

- The department proposes a water use impairment is the condition of over-abundant aquatic plant growth that creates a material obstruction which limits an individuals' ability to reasonably navigate, swim, or fish and there are no reasonable alternatives to conduct these activities.
    - Note: Not an impairment if navigation is hindered but there is evidence the equipment being used is not scale appropriate for the waterbody or there are alternate routes. Not an impairment if there is an expectation that the entire perimeter of the lake or any portion thereof will be suitable for swimming. Particularly, if there is a public swimming area on the waterbody.
- A water use impairment may be demonstrated by photo evidence from the permit applicant, monitoring data or site visits from the department staff who issues the permit. The department agrees guidance may be needed to show acceptable examples for department staff and permit applicants.

Who determines what "scale appropriate" equipment is for a water body?

Where/what is the legal authority of the DNR determine what watercraft is scale appropriate for a waterbody?

- The department does not regulate the size or type of watercraft allowed in specific waterbodies. However, how and where the watercraft is operated is a factor in seeking aquatic plant management permits and making aquatic plant management decisions. The department has explicit statutory authority to specify the methods that may be used to manage aquatic plants.

PI surveys have some limitations on the data they can provide. Is there scientific data the Department can share that supports sub-PI surveys as an effective way to monitor small areas?

- The point-intercept (PI) survey method is a quantitative, replicable, and easy to implement survey technique that is used by resource managers in Wisconsin and other surrounding states. A review of aquatic plant monitoring and assessment methods found that point-intercept surveys are applicable to be used in both small plot assessments and at whole lake scales to establish plant community characteristics or assess management efficacy [14]. Preselecting points removes the subjectivity with respect to sample locations and surveys are developed to allow for rigorous statistical analysis of data over time. However, localized management, generally less than 0.25 acres, may limit sub-PI surveys, and other alternative monitoring techniques may need to be considered such as line transects or biomass collection. More research is needed to identify appropriate monitoring at very small scales.
- The size of an area that may be appropriately sampled with a sub-PI survey was determined using a power analysis to determine the minimum number of survey points required for an 80% probability of detecting a real 20% change in frequency of occurrence and declaring it significant with 95% confidence, assuming a minimum distance of 12 meters between points [15].

Monitoring Comments

I am in favor of required monitoring for new herbicides and new invasives and would be supportive of monitoring post any herbicide treatment. The value of "baseline" monitoring is often ignored and is an investment in the future because we cannot understand the full effect of any change/new stressor if we do not have a record of what the pre-change conditions were. This is especially important with the addition of herbicides, a chemical that is intended to be toxic. We currently have a limited understanding of the full effect of adding toxic agents to a system and monitoring before and after treatments can provide valuable information resource managers and/or the state need to know how these chemicals are altering our natural system.

On the incorporation of BMPs for the monitoring and treatment plans. I think this is essential to appropriate dosing of waterbodies and information generation. I have seen in my own work how stratification that is not accounted for can change the final concentrations in the lake versus what was listed in the permit. I would recommend that BMPs include sampling of epilimnion and hypolimnion if stratified or the bottom waters if not stratified throughout the whole treatment.

We support the Rule Proposal for monitoring and evaluation related to small-scale and large-scale lake treatments and recommends that the improved definitions of small-scale and large-scale previously suggested be linked to these specific monitoring and evaluation rule changes.

With limited budgets, I am concerned that the lake management groups will be greatly impacted by these new costs with the increase in required monitoring and surveys.

What type of pre- and post-surveys have been done to show the impacts of DASH to the ecosystem? Having a comparison and going through the same surveying process would be important information.

The inclusion of all recent science-based APM study findings and the need to require pre- and post-treatment monitoring will offer a needed historic reference to APM activities on state waters and ultimately treaty resources.

For small- and large-scale herbicide management, it is unclear to whom the burden of a lake wide PI survey, thermocline monitoring, or herbicide concentration monitoring would fall (the permit applicant or the Department). These surveys can be very time consuming and require a level of training or expertise to carry out.

Requiring lake wide PI survey for a newly introduced invasive species delays rapid response to an early detection species. Requirements for these should allow for entities to be nimble and responsive and should not create additional burden to their control.

We agree with the Department that understanding the effectiveness of a specific APM plan requires data, which can only come from monitoring. In addition, a regimen of monitoring will provide data on different management techniques in different situations, which will aid the state in evaluating those techniques, especially if they are new. In general, therefore, we support the requirement of monitoring. It needs to be noted, however, that this requirement is a departure from past practice and by some of our members could be viewed as a mandate forcing them to accomplish the Department's own research needs either without a clear funding source or with the potential to use up funding the lake organization might have been able to use for other purposes. We urge you to consider this issue both in how the rules are written and in how you promote them to the public when released for consideration. Without working out how a significant increase in workload on the part of the permit applicants might be paid for (a consideration made all the more acute in the short-term, given the difficult budgetary environment Wisconsin is facing right now) could result in opposition to the rule, and may create a situation where some lakes, especially small ones, might not choose to undertake needed management because of the cost.

Rule changes that increase the amount of point-intercept (PI) monitoring come with a significant cost to the riparian owners. These are extremely labor intensive and time consuming. To require these for small scale plots where WIDNR is also requiring an impairment to be shown is an unneeded cost.

We support different monitoring requirements depending on the scale of management.

Discussion of native plant control with herbicides is not included here, potentially suggesting that these activities do not require monitoring.

We recommend using the term sub-sample PI survey and not sub-PI survey. This will avoid instances where a sub-set of existing whole-lake point-intercept survey is used and subsequently sampled, which is called a sub-set PI survey.

The use of sub-PI evaluation for small sites, particularly when 5-acres or less, may not be applicable as insufficient sample points would be contained for meaningful evaluation if not pooled on an overall treatment effort.

In the table discussing "Large Scale Herbicide Management," we generally agree with this approach if it was titled "Whole-Lake Scale Herbicide Management" acknowledging it also applies to an area of potential impact (AOPI), such as a sub-basin or bay, that would function approximately like a whole lake treatment. We support PI surveys during the year prior and the year following whole-lake treatment. It is important to acknowledge that the majority of the scientific literature, including that cited in these white papers, is based upon whole-lake treatment impacts that compare year prior to treatment to year of treatment.

We recommend a specific monitoring requirement be established for Large-Scale Mechanical Harvesting, possibly an interval of whole-lake point-intercept surveys (i.e. every 3 years).

Requiring point-intercept (PI) surveys and lakebed mapping for large and small scale lakes is burdensome and unwarranted. Herbicide concentration monitoring is also unnecessarily redundant given that treatment applications necessarily involved EPA-approved chemicals applied consistent with label application rates. The scientific justification for imposing these costly and time-consuming requirements is unclear, as is any resulting environmental benefit.

Pre and post treatment PI surveys in the same season don't make a fair comparison of changes since natives can recover in subsequent years.

The rule proposal states that prior to small-scale herbicide management for an established invasive, applicants would need to "demonstrate water use impairment with a bed mapping survey or sub-PI and photo evidence". Demonstrating a water use impairment for invasives would likely not occur until later in the season; a time the Department has not allowed management due increasing water temps and native frequency. As written, the Department would be allowing invasive species to persist in a waterbody.

Stating that "management activities in whole bays, marinas, or channels may be considered a large-scale management activity if the area is designated as protected, the water exchange is low, or the plant assemblage is primarily native aquatic species" will now place these smaller treatments in the large-scale herbicide management category, thus requiring a PI survey the year prior to treatment.

It is stated the department will require a full or sub PI survey and additional monitoring for any treatments, regardless of scale, in special waters. These waters include Priority Navigable Waterways (PNW). All waters less than 50-acres are, by definition, a PNW (NR 1.07 (3)(c)). This a broad overreach and inclusion of many private lakes and ponds. A better wording could be "monitoring will be required for priority navigable waters as listed in

NR 1.07. Waters less than 50-acres in size and covered under NR 1.07 (3)(c) are exempt from this requirement unless they qualify as a PNW as listed in other sections of Nr 1.07 (3) or (4)”

Native Plant Protections Questions

This same White Paper, in the beginning of the Rule Proposal section recommends "explicitly expanding the habitat protections from Sensitive Areas to all designated protection areas as defined by the department. It will help lake organizations to have a better understanding of that proposal. Does that mean that if a lake has designated Sensitive Areas, that the "protections" are applied the whole lake, not just the Sensitive Area? Clarification will be helpful.

- Expanding habitat protections in aquatic plant management to include all department designated protected areas does not change the areas outlined under a specific designation. Protections only apply if the sensitive area is affected.

Are determinations of critical habitat, sensitive areas, and high value species subject to public comment and appeal?

- Yes, once the designation is made public comment is a part of the process. There are no associated appeal rights. The department does not consider these determinations to be final, they simply prompt additional scrutiny in the permit review process.

It's stated the department proposed to remove the list of high value species in NR107 and expand it. What is the department proposing to include or expand it to?

- The department proposes removing the high value species list and not replacing it. Identifying high value aquatic plant communities is dependent on waterbody specific criteria and goes beyond what can be enumerated in a species list.

Will management be allowed where native species are causing navigation issues?

- Yes, if incorporated in a department approved APM management plan.

The paper states "The Department can deny a permit if there are viable control alternatives that are less impactful to the aquatic habitat". Could the Department deny a permit and force a lake group into a financially burdensome form of management? Are these "viable control alternatives" going to consider the scale of the project?

- Viable alternatives are addressed in the planning phase. The department will work with permit applicants to protect sensitive and critical habitats but will not force a specific method.

The paper states that it is not considered an obstruction "…if there is an expectation that the entire perimeter of the lake or any portion thereof will be suitable for swimming…". Is this written to mean that no treatments for native plants, even in nuisance or invasive forms, can be treated in any swim area? What about public beaches? What about community beaches (not public but serving a large number of residents)?

- If there is a designated swimming beach or area, removal of aquatic plants would be allowed if all criteria under administrative rule are met. The department proposes it is unreasonable to expect an entire lake perimeter to be a suitable environment for swimming, particularly, if there is an existing swim area on the waterbody.

Can algae be added to the definition of water use obstructions?

- The definition of water use obstruction is aimed at the conditions which create an obstruction, not what species creates the obstruction.

Native Plant Protections Comments

The Background discussion states in the last paragraph of that section that "Treatment of areas containing these [high value] species must not result in long term or permanent changes to the plant community. We agree with the underlying premise; however, the rule proposal mentions nothing about the long-term duration over which treatment results should be assessed to determine if there is permanent change. The rule proposal states that the department will require permit applicants to demonstrate to the department's satisfaction that treatments will not alter the ecological character of the area. We suggest the DNR consider some time frame measure/consideration consistent with the discussion in the Background section of this White Paper.

The fact that several treaty resources share the same shallow-water niche, and have critical life phases during the most active APM treatment window, poses a myriad of potential threats. Thus, it is incumbent that comprehensive State codes be in place to ensure the protection of these aquatic environments

Management of invasive aquatic plants by conservation entities can be very different from management goals that other landowners may have (e.g. access or aesthetics). As a conservation organization that has protected and is managing some of Wisconsin's highest quality natural habitats, we are more likely than others to be working in the areas proposed for expanding habitat protections, including approved or proposed Critical Habitat - Sensitive Areas, Areas of Special Natural Resources Interest (ASNRI), and Outstanding and Exceptional Resource Waters. Our work on sites such as the Door Peninsula's coastal wetlands also intersects with Priority Navigable Waterways. Expanding this definition could result in less on-the-ground habitat enhancement and restoration work occurring in our highest quality aquatic systems. This could also greatly hinder our ability to respond quickly when a new invasive threat is identified within these areas.

We strongly support the expansion of habitat protection to designated protection areas.

Rule changes that expand and alter language from “sensitive areas” to all designated protection areas as determined by the department and labelling all native species as high value is also quite overreaching. As the department has stated ‘words matter/language used matters.’ While we acknowledge that the environment and the aquatic plants are highly valued ecosystems, the department must also acknowledge the uses and goals of these ecosystems, and that many have not been natural for a century due to development. As a result, some of these plants still may need to be managed.

We agree with replacing the list of high value species enumerated in current NR 107. Different aquatic plant species are susceptible to different forms of management, so more nuance to permit decisions based on species lists is recommended.

This expansive list will bring thousands of water bodies throughout Wisconsin into the universe of lakes where permit staff may categorically deny a permit, including thousands of small lakes that fall under the acreage definition of “priority navigable waterways.” Equally troubling is the inclusion of “public rights features,” which would allow staff to deny permits because a lake has a shoreline that is “predominantly natural in appearance.” This approach promotes regulatory uncertainty because it is anyone’s guess whether staff will choose to deny a permit simply because of the appearance of the shoreline.

Within Native Plant Protections and Management, we would like more and specific justification to the expansion of a long list of lake classifications that would now have special protections that were once limited to those considered “sensitive areas.” Using the DNR’s interactive mapping tool, most lakes in the northern half of the state would now have special protections, which would be a substantial change. It is unclear how all these lake classifications now warrant special protections.

Proposed protection areas (versus approved) should not be included in the list of habitat protections. These areas have not been vetted appropriately to limit management selection.

Areas of special natural resources interest (ASNRI) are often based on old, possibly outdated data. Like APM plans, ASNRI designations should "expire" after a given timeframe. Five years has been suggested as reasonable for aquatic plant management and may be an acceptable period for ASNRI reviews.

When removing "high value" species from the current NR107, care must be taken to provide consideration for management of plants listed in the new rule as "high value". Historical data must be considered. If history shows a given plant, in a specific area, is likely to become an obstruction or impediment, management should be allowed to control the problem before it reaches a state of true obstruction.

Within Native Plant Protections and Management, the statement '…to the satisfaction of the department…' is qualitative in nature and is not clear on the precise criteria that would be utilized to conclude that character is altered or value reduced. In particular relative to invasive aquatic plant management, it may be difficult to selectively remove invasive plants in a manner that fully satisfies this proposed management requirement for the wider range of habitat areas that are proposed here.

- Even the terms "ecological character" and "ecological value of the area" are subjective.

Excessive levels of aquatic plants can also have detrimental impacts to fish populations. Points like this need to be accounted for instead of solely listing the benefits.

If the defection of a priority navigable waterway from NR1.07 covers all other protected areas (ASNRI, PRF, etc) why are they duplicated in listing them individually? Wouldn't it be easier to simply state "as listed in NR1.07"?

The white paper only mentions NR109 as allowing native nuisance control. But, this can be done under NR107 as well.

Priority Navigable Waterways includes ASNRI, OERW, PRF, trout stream, lakes <50 ac, tributaries to and rivers connecting to inland lakes with natural sturgeon populations, navigable waters with self-sustaining walleye in ceded territory, waters were muskies naturally reproduce, tributaries to surface waters identified as trout streams. Exemptions for waters under 50-acres, which are included as a PNW under NR1.07, should be made.

The proposed rules changes, as read, do not seem to balance the protection of diverse and stable aquatic habitats proportionately with promoting the public rights and interests associated with water-based recreation. The proposed rules seem to favor the protection of native aquatic plants over all other factors. The DNR is encouraged to consider a more balanced approach to the public rights and interests, especially in areas where water-based recreation is the core of local economic activity.

Introduced Species Questions

What is considered an effective treatment for aquatic invasive species control in DNR standards?

- It depends on the waterbody, target species and management goals. The department believes Integrated Pest Management decision-making is the most effective way to frame management decisions about aquatic invasive species.

The paper states that non-native introductions may have less non-target impacts than aggressive management. What data does the department have to directly compare a lake before and after introduction of a non-native species in association to aquatic plant management?

- Pre-post invasion data is rarely available in invasion ecology [16]. Most pre-post invasion data exist by chance. We used data on the substantial number of lakes *without* EWM as space-for-time stand-ins to understand the pre-invasion state. While this approach is not perfect (comparing across systems can introduce error), it still supplies valuable information.

Introduced Species Comments

We do not believe that it is necessary to wait until AIS has developed sufficiently to impact the ecosystem or until AIS has creates nuisance conditions that impact the usability of the lake before management actions are taken. In our experience with AIS/EWM, NSTLD supports initiating management action when the data strongly indicates the AIS population is progressing in that direction.

We recommends the DNR consider clarification in the rules that helps DNR staff to consider the lowest-possible risk and not just the lowest (absolute) risk when working with lake organizations on AIS problems whether they be eradication, suppression or control.

We strongly supports the development of BMPs that could streamline and unburden the permit process for those doing conservation work on the ground, namely habitat enhancement and restoration through the management of invasive species. This could be implemented as a category of general permits that could be issued with fewer requirements, or without the permit applicant having an approved management plans, so long as the permit applicant follows approved BMPs for a defined project.

Adopting an IPM strategy often requires a variety of control measures. Managing invasive aquatic plants often requires repeated applications to control well-established populations. Single applications may be effective in some instances for an invasive like Eurasian Watermilfoil. Parsons et al.1 (2004) found that a single herbicide application reduced EWM populations resulting in increased species richness for 3 years after application.

We support when a lake group decides to postpone management of an established non-native plant management until nuisance conditions or ecosystem impacts are approaching. We do not necessarily agree that it is necessary to wait until the ecosystem is impacted or the nuisance conditions are manifested before management should occur. If the data strongly indicates that the population is progressing that direction, we believe that would be the time where management could be considered. We believe some established populations can be managed at an alternate lowered state. Some lake groups have effectively used a whole-lake scale management (i.e. water level drawdown, whole-lake herbicide) action with subsequent smaller scale activities to hold an AIS population at a low level for many years before another whole-lake scale management action is warranted.

The Department says, “Simply because a plant population is non-native may not necessarily make it a threat.”. This is contradictory to s. 23.24, Wis. Stats that specifically says Eurasian water milfoil, curly-leaf pondweed, and purple loosestrife should be listed as “invasive”. The Department’s website acknowledges s. 23.22, Wis Stat as defining invasive species as “nonindigenous species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.”.

The paper states that, “There are no studies examining whether control efforts that reduce AIS abundance reduce AIS spread between waterbodies.”. This is poor justification to move away from a specific control effort when eradication is not achieved. There are no studies (to my knowledge) showing that Clean Boats Clean Waters reduces AIS spread between waterbodies, but the Department remains vigilant with that program. In almost all cases, eradication is obviously the “desired outcome” but not the realistic outcome. The Department should not become focused on moving from strategies just because they can’t provide eradication.

We believe non-native plants take up the space of native plants (ie displace them), and therefore are equated to habitat loss.

Within Integrated Pest Management Decision-Making, several of the IPM activities for invasive plant control are questionable. We posit that many non-native infestations are not a symptom of excess nutrients or habitat disturbance. They are simply a non-native plant thriving in a situation without natural check mechanisms. We believe efforts should be focused on those activities that provide the greatest and most proven reductions in these plant populations.

Within the APM discussion, there is reference to department-approved BMPs. We request these BMPs be posted for public comment and consideration to help with interpretation

In the background discussion, the paper states “often using whole lake treatments” – these are a tool, but in the minority of actual AIS control applications each year.

Planning Questions

Developing APMP's can be streamlined using potentially developed WDNR templates and query tool to provide historical information and provide some uniformity between written plans. What is the timeline for general use?

- The department would like to have a draft version available for test use prior to rule promulgation so stakeholders and the department can discuss what may need editing/revising prior to a final version being ready for implementation.

Based upon the surface water grant guidance, a Plan can have a longer lifespan than 5 years if certain conditions are met. Will this apply to the definition of "Plan" included here?

- The intent of rule development is to make APM and SWG programs work together with consistent requirements, when possible. The department will clarify differences as needed.

How often must this plan be updated for APM?

- The department proposes plans be updated every 5 years. At minimum, the department proposes the applicant conducts a point intercept survey to confirm baseline conditions have not changed once every five years. At the five year mark, if baseline conditions have not changed and all proposed management activities are still viable options, the plan may be renewed for an additional five years.

Will a full management plan be necessary for small-scale herbicide management?

Will a full management plan be necessary for small-scale harvesting operations, including DASH?

When or for what type of circumstances (public/private/emergent/etc.) is an approved plan required?

- The department proposes all management activities regulated under repealed and revised NR 107 work under a management plan. This includes chemical, mechanical, manual and biological control in all waters except for private ponds. However, the detail and level of analysis required for small scale management activities, would be less than if a waterbody also proposed to do large scale or whole lake management.

Does IPM and adaptability allow for the use of a new management technique or product even if it is not specifically mentioned in an APM Plan?

- Integrated Pest Management decision-making encourages scenario planning to outline when, where, how and why specific management techniques could and should be used. This does not mean all the management techniques are going to be used, just that they may be appropriate under certain conditions. In the planning process, outlining herbicide choice by modes of action would allow for flexibility of the specific product based on the relevant conditions. A completely new technique could be addressed by an amendment to the plan.

How will the Department determine that there are no changes to a waterbody condition? Does the addition or removal of one plant species constitute a significant enough change?

- Baseline data gathered in the planning phase allows the permit applicant and department to assess waterbody condition over time. Statistically significant changes in baseline data may indicate a re-assessment of the planned implementation strategy.

Where is the baseline data collected from that the Department references? Is this solely Department collected data? Does it include citizen monitoring data or information collected from lake management companies?

- All data collected in SWIMS, Surface Water Data Viewer, and other department databases may contribute to baseline data. This data is collected by volunteers, partners, and the department.

In the Planning and Integrated Pest Management Decision Making – "encouraged, strongly encourages, and considers" are all used. How will those be enforced or evaluated?

- Legal requirements will be outlined in administrative rule. The department may outline other criteria which are not required by law but encouraged as best management practices.

Who will fund the increase in proposed planning?

- The permit applicant is responsible for all costs associated with Aquatic Plant Management. However, the department administers a Surface Water Grant Program funded with around $6M originating from the Water Resources account of the Conservation Fund. The Lake and AIS Education and Planning subprogram is available to support some activities related to aquatic plant education, planning and management.

What are the department approved BMPs listed?

- The department has not created or approved any BMP's at this time. There will be opportunity for public input from all partners in the process to create BMP's.

Planning Comments

As previously stated, we support the use of the Integrated Pest Management Decision-Making process. The proposed modules add clarity to the process and make it easier for the permit applicants to craft a plan for DNR approval....and all plans will have a consistent structure which should aid the DNR review and approval process. The Rule Proposal in this section is supported by us and we imagine that the modules will align with the DNR grant program requirements.

It is our opinion that within forested and emergent wetland habitats the requirements of these plans have not aligned with the habitat type and needs. If plans are now required for any permit, the onerous of these plans will fall to managers and landowners, likely resulting in new and undue burden to those managing conservation or natural areas and ultimately being a significant barrier to quality management of these lands. It is also unclear the potential scales at which these plans could be developed. A plan drafted and approved for a larger area (scale of a preserve or watershed) would be much less of a burden for managers than a small-scale management plan that would only cover a treatment site or individual wetland. We encourage the Department to explore APM plan exemptions for conservation entities or making other types of plans (i.e. State Natural Area plans) eligible to be approved for APM activities. We would also support the development of BMPs that if used would waive the need for an APM plan. The goals of an APM management plan make sense for organizations like Lake Associations or for work at a landscape or County scale, where coordination between many stakeholders, industries and departments may be necessary. However, these goals don't translate well to emergent or forested wetland systems where a conservation organization or entity is the sole landowner of the proposed treatment area and beyond. The depth and complexity of the steps 1-4 outlined in the planning process, and subsequent steps 5-8, could create a barrier to ultimately obtaining a permit and getting work accomplished in these systems. We would appreciate an outline of the support that would be provided by WDNR staff to navigate and understand the proposed planning process. We also believe that subsequent funding may be needed to support landowners/managers in the development of these plans, especially in emergent and forested wetland systems.

If a plan is required we would hope that these plans could be written at a scale appropriate to cover entire preserves and/or watersheds as opposed to an individual wetland or waterbody, or that existing management plans (i.e. State Natural Area management plans) could be utilized. Plans for individual wetlands or treatment areas would be a great barrier to implementing on-the-ground work, especially when rapidly responding to a new invasive plant species or infestation.

Incorporating all management techniques in one rule, and shifting management preference to an adaptive management approach based on planning and monitoring will, we believe, lead to better managed waterways and more effective accomplishment of APM goals. We strongly supports the move to more planning and planning over a longer period of time. We agree this will ultimately lead to better management decisions. The module approach is also commendable and should make the planning process less onerous for a lake organization and streamline the work. It is unclear whether the modules would be required, which could limit an innovative plan that doesn't completely fit within the modules provided. We also wonder whether the planning modules would be developed as guidance or be a part of the rule where they would be more difficult to modify as we learn more and they need revision.

Limiting or restricting effective applications will most likely result in a large percentage of failures if follow-up applications are needed for control of severe populations. IPM requires being able to access a variety of control methods along with good identification and follow-up surveys to determine effectiveness. WIDNR would do well to allow professional managers and applicators the ability to match the proper program with the target site.

We agree that IPM is an important aspect of aquatic plant management planning

We support Aquatic Plant Management planning activities. We believes the education, discussion, solicitation of riparian sentiment, etc. are all important products of a Planning Project, not just the written document that satisfies permit requirements.

If the WDNR allows a scaled-down APM Plan requirement for herbicide management, such as included here, We recommends it be given a sperate name/title – Aquatic Plant Control Plan, AIS Treatment Plan, Herbicide Treatment Plan, etc. We feels strongly that an APM Plan provides much more information and guidance than serving as a means to conduct herbicide management. The modules are a cookie cutter approach to planning that will not work for complex projects.

It seems overly optimistic to expect the majority of lake groups to be able to complete this process on their own without enlisting substantial assistance from WDNR or a consultant.

Requiring a department-approved treatment plan for every public waterbody is costly, time-consuming, and excessive. The Department has produced no scientific information demonstrating that such a requirement is necessary, or will accomplish more than adding cost and delay to the permitting process. We strongly encourage the Department to consider whether the additional costs associated with this item (and the many other new requirements being proposed by the white papers) is appropriate and justifiable, and whether it will lead to a meaningful and measureable benefit.

Cost must be considered when describing "appropriate management options". Cost assessments also need to be a consideration of Integrated Pest Management (IPM).

Are the 8 proposed modules in lieu of an APM Plan? If so, who provides the write-up? I anticipate confusion between data collected by a consultant, data collected and written by a lake group, and discussions with broader stakeholders or the Department that might not be fully shared with the person writing the summary. Under the modules portion it states that, "The group will set up a discussion with the Department, their consultant and other stakeholders to discuss Modules 1-4." I have a hard time getting timely Department input and approval on draft APM plans and am concerned with adding this step without any formal deadline for a Department response. For example: I have a draft APM Plan submitted in March that has still not received formal comment or approval from the Department (9 months).

I don't agree that the planning process will become more streamlined. I think it will become more convoluted as more people are given the ability to collect information and write portions of the APM Plan.

The Department's definition of private versus public currently means that ponds are included in the scope of this proposed regulation. For example, a pond with more than one owner without public access or outflow is considered public.

In general, we believe the industry needs more clarity on what constitutes an APM Plan. Several DNR definitions exist, including many pages of definition within the DNR's Surface Water Grants Guidance that appear differ greatly than what is included here.

The proposal for creation of a template for aquatic plant management plan development may be useful if initiated correctly and in consultation with interested parties outside the department.

While the past/current data-driven approach of the Department is commendable and the principles of IPM strategies should be implemented where technically feasible, there are conclusions around datasets related to management in Wisconsin that should be re-examined and the context of management outcomes better

communicated to encourage optimal future IPM, including aquatic herbicide use, for selective long-term control of invasive aquatic plants.

Mechanical-Manual-Physical Control Questions

Can the department provide evidence that cutting lanes in dense vegetation via harvester can improve fish growth?

- Previous case studies conducted on several lakes in southern and central Wisconsin found that cutting deep lanes in dense vegetation substantially increased growth rates of some age classes of both bluegill and largemouth bass in lakes which were mechanically harvested relative to unmanaged control lakes [17].

There is little or no data concerning DASH and its effects on invertebrates, the plant community outside a harvested area, or vertebrates (amphibians, reptiles, fish). Will the Department develop a plan to monitor and evaluate the effects of harvesting (DASH and mechanical) on non-target species?

- The department continues to work collaboratively with a variety of partners to better understand the potential non-target impacts of all types of management activities which are permitted.

Are adverse side effects to non-target organisms only including chemical application or does the removal of zooplankton and fish during mechanical harvesting and DASH also apply?

- The department considers non-target effects for all management activities.

In SE Wisconsin, some lakes harvest daily, Pewaukee, Okauchee for example. Should they be required to monitor their harvesting with GPS every time?

- The department proposes some form of GPS equipment be used to guide harvesting lanes and track where the equipment was used.

It states that harvesting lanes must be followed using a GPS device. Why is this not required for all management techniques (DASH, treatment, etc.)?

- The department is considering this option.

If density numbers decreased for an invasive spp. overall after a harvest, but the spread or the number of locations that the species were present in increased, what would that be considered effective or ineffective?

The Department recognizes that vegetative fragments not collected after cutting can potentially produce new localized populations in some species (EWM). In what cases is mechanical harvesting of EWM and the subsequent spread of fragments then allowable management technique?

- The response would depend upon the target species, the goals of management and the waterbody characteristics. These scenarios would be reviewed on a case by case basis. In general, harvesting is best suited for larger, longer established populations where additional opportunities for establishment are limited or less consequential.

The Department acknowledges how quickly aquatic plants can return to pre-cutting levels or change drastically year to year. Why would this technique not require more frequent monitoring?

- The department proposes minimal monitoring for both mechanical and chemical management that occurs on a small scale. The department proposes a whole lake PI survey be conducted every five years

as a part of the planning process to evaluate the plant populations over time, and pre and post - point intercept surveys for management activities which will have whole lake impacts.

Fish loss following herbicide treatment is an unacceptable outcome. Why is fish loss from mechanical harvesting, documented in white paper studies, acceptable? How much is acceptable?

- The department considers fish loss a non-target effect that should be avoided whenever possible, and this is not distinguished between management strategies. All management activities have some risk of fish loss, the question becomes what is an acceptable loss of fish considering the ecological costs and benefits of a specific management strategy.

Have there been any studies documenting turbidity during and following DASH?

- Because DASH is a relatively new management approach, there are fewer studies available than for some more established techniques. DASH activities may potentially result in increased turbidity, but these increases are anticipated to be short-term and localized to small areas where removal is actively taking place.

If DASH is being touted as a selective method of control, can the Department ensure that divers can even distinguish between species with turbidity created by this technique?

- As part of best management practices, DASH activities may need to temporarily be stopped in one location and efforts moved to another location in order to allow temporary turbid water conditions to clear prior to resuming removal activities. Department water regulation and WPDES staff have observed DASH treatments and determined that when operating appropriately DASH does not meet the minimum threshold for additional regulations. minimal temporary impacts.

How will alum and other water clarifying or nutrient reduction products be regulated under the proposed NR107?

- The department is developing a general permit with WPDES program for public waters, this will be used for APM approval and referenced in repealed and revised NR 107.

When it's stated "no harvesting in 3-feet of depth or less" is that specific only to mechanical or all methods of harvesting?

- Manual removal and DASH may be conducted in less than three feet of water if the activity follows all other criteria set in administrative rule. The department proposes mechanical harvesting equipment should not run in waters less than 3-feet deep.

Will "appropriate scale of the watercraft for the waterbody" as listed in prior white papers be used to determine if harvesting is allowed for navigational access?

- Harvesting equipment size and scale is currently a consideration under NR 109 during approval of a proposed permit and plan, and the department is not proposing any changes to this.

Mechanical-Manual-Physical Control Comments

It is unclear in these white papers if prescribed fire implementation is considered non-chemical management of emergent aquatic plants. In the past, this interpretation has been applied by some staff within the Department. TNC feels strongly that this should be exempted from required permits. It is a huge barrier to implementing this important management tool in Wisconsin.

We recommends outlining rules as it relates to DASH harvesting, such as GPS-guided navigation and reporting requirements (e.g. time spent, material removed by weight, species bi-catch, deadline).

We support GPS-guided navigation for mechanical harvesting operations and all other permitted management activities (i.e. herbicide treatment, DASH harvesting)

We believes that WDNR request for GPS tracks be reconsidered and perhaps limited to suspected violators of harvesting permits. Management of tracklog history would be rather complicated for an average association/district-lead harvesting program. Most mechanical harvesting permits also have a provision allowing floating mats of plants or algae to be removed outside of pre-determined harvesting lanes. Further, some harvesting programs use transport vessels, so the harvester's track log may not be as useful as intended

Integrated Pest Management must also pertain to projects that have historically used mechanical harvesting as their only plant control technique.

Requirements and acceptable non-target effects are vastly different for herbicides and mechanical means. It doesn't make sense to be hyper restrictive on non-target impacts for herbicides, requiring an abundance of data collection while mechanical means have very loose restrictions requiring little monitoring or assessment of non-target impacts.

It appears that the department assumes that non-target impacts are less from non-pesticide management approaches throughout the white papers even though there is peer reviewed data specific to mechanical removal that would suggest otherwise.

The white paper states "Because DASH is a relatively new management approach, less information is currently available about potential impacts" – but there are no known papers to support or deny it, yet the DNR is mostly all in on DASH and holds it to less scrutiny

Pond Control Questions

Why change pond permit issuance from 15 days to 30 days? Is that 30 business days?

- Private pond permits make up 60% of permit totals, staff have reported that the current 10-15 working days is not enough time to issue all pond permits on time due to the daily volume of incoming permits. The department proposes a maximum of 20 working days to review and issue pond permits.

Why is the expiration date 10/1 – especially for private ponds?

- In northern temperate waters, most aquatic plants senesce by mid-late fall. There is no reason to treat submerged aquatic plants beyond that time.

Does the management company need to put a contact or pond owners information on a permit or is the management companies information suitable?

- Permit application information is a permit form requirement, the department proposes this provision remain in repealed and revised NR 107.

How is the WDNR involved (other than regulation), or looking to be involved in developing management strategies using treatment records and permits for private ponds?

- The department does not propose any changes regarding this in the rule development. Specific management decisions for a waterbody are decided by the permit applicant. The department can provide and is interested in general pond management guidance for public use. However, it is a low priority.

What is the departments definition of a swimming pool?

- The department does not have a definition of a swimming pool and does not intend to create one.

Is there a definition of what is a lake vs what is a pond in current NR Code or WI statutes?

- No, Wisconsin law does not differentiate between a lake and a pond. Both are encompassed within the term "waters of the state."

If the following definition holds true (no uncontrolled outflow, man-made, owned by a single owner), why should a private pond be limited to water bodies less than 10 acres?

Why do the proposed new definitions for ponds have a 10-acre threshold?

- The department compiled the sizes of all private ponds regulated under current NR 107. 1% of permitted private ponds are over 10 acres in size, exactly 16 waterbodies. [Appendix 1]
- Additionally, the department reviewed neighboring states' approaches while considering options for rule development, the 10-acre size threshold is in line with requirements in Michigan's GP for ponds.

Does the public need to be notified based on the two owners around the pond?

- Public notification criteria are not yet identified for repealed and revised NR 107. Public input on public notification methods and criteria may be submitted to the department through May 16, 2021.

Application Requirement: Description of the plant community causing impairment. How will a managing entity know what will be causing impairment before it occurs?

- The permit applicant may discuss their specific concerns when asking for a management companies' services. The department does not propose any changes to this requirement as it relates to private ponds.

With the Multi-year permit for private ponds would we have the ability to easily make changes if needed?

- The department proposes the company or applicator conducting the treatment and the trade name of the herbicides to be used, may be amended per the request of the applicant.

What happens if a client decides to build a wildlife pond and plant wild rice….does this now mean a private pond has to follow wild rice management requirements?

- The department will clarify when APM regulations apply to wild rice in the first draft of the rule.

How does the proposed definition of public vs private waterbodies compare to or differ from that currently found in other law/DNR statues?

How does a pond with more than one private, riparian landowner and without access by the public qualify as a "public pond"?

Is a man-made, synthetically lined pond with no connection to any waters of the state considered a water of the state?

Wetlands are included in the referenced definition of waters of the state. Why are wetlands, often large, with multiple, non-public landowners classified as private while small ponds with multiple, non-public landowners "public" even though both are waters of the state?

- The APM program regulates "waters of the state" defined in s. 281.01(18).

Can the department provide a list of permits that were approved for private ponds vs. non-private ponds?

- Please see the appendices for a map of non-private and private ponds [Appendix 2].

Why are private ponds <50 acres not included as an exemption from additional requirements for PNW?

What does "any surface water connection with any public waters" mean?

How will waters with multiple landowners, but still no public access, be handled

What is the definition of "may have" public access?

Permit issuance on White Paper Group 3 for Private Ponds doesn't mention "or with a controlled discharge" after the wording of no surface water discharge. Please Advise.

For a waterbody to be considered a "public pond" is it a requirement that it be owned by a municipality or county?

Are ponds less than 10acres (private or public) going to be exempt from the large-scale treatment requirements?

- The preliminary proposals presented in the ponds white paper were intended as a starting point for discussion with stakeholders. Based on public feedback, the department will add more clarification to the proposed definitions and regulations that apply to specific pond types.

Pond Control Comments

The line between public and private should be clearly defined as there is too much gray area. A pond with only two property owners, no outflow, no easement, and no public access is labeled as public due to the sole fact of the "multiple" property owners.

If the land is privately owned and has no outflow or a controlled discharge the size of the lake should not matter.

There may be situations, such as groundwater flow-through ponds that may be hydraulically connected with an aquifer, where application of aquatic plant herbicides might impact groundwater quality. In a groundwater flow-through pond groundwater discharges into the pond in upgradient areas, and pond water recharges groundwater in downgradient areas. The use of chemical treatment for the management and control of aquatic plants in flow through ponds may result in elevated levels of substances in groundwater that may be of public health or welfare concern. APM might want to consider adding permit condition/requirement provisions to your rule to clarify that use of aquatic plant management chemicals must not cause state groundwater quality standards to be attained or exceeded.

Private ponds should not be restricted to single owners, or joint ownership among a business park or homeowners association. A private pond should be defined as any pond that does not have a surface water connection to a public surface water and which has no public access. The ownership status of the riparians is irrelevant to the public interest.

Private and public ponds should not be restricted based on size (e.g. 10 acres in the white paper). A pond that is privately owned, is not connected to a public water, and that has no public access is not “public” simply because its size is 10.1 acres. This arbitrary distinction should be removed.

The proposed five-year permit for ponds is helpful and appreciated. We encourage the Department to explore and also consider the Michigan EGLE approach that provides annual Certificate of Coverage (COC) for more than 2,000 ponds under a general permit. Both approaches to abbreviated and streamlined regulation of ponds are appropriate, and would be an improvement over current requirements in NR 107.

A multi-year permit for private ponds should be available OR, private pond permitting should be eliminated altogether. The DATCP already requires herbicide treatment record keeping and these records should be kept by all applicators when treating under a fish hatchery license. Permitting private ponds through the DNR is unnecessary.

The public trust doctrine and past case law have shown that public trust does not apply to artificial navigable lakes or ponds created by means other than modifying natural waters unless they are “directly and inseparably connected with natural navigable waters”. This is regardless of the number of private riparian owners adjacent to them.

The DNR should have no control over how a private pond owner chooses to manage their pond(s).

Annual, public notification should not be required for public ponds OR this requirement should be modified to include reasonable public notification methods.

How can a pond deemed public due to multiple owners be considered public and require public notice? The general public would receive trespassing tickets if they entered that property, it’s not public land. There should be another category for this besides public or private. I do agree all parties should be notified in this situation

I'm concerned about where "public ponds" fall under the proposed new rule since it lists these permit requirements as being for public waterbodies. Is the Department's definition of public vs private changing? Does this inherently include "public ponds"?

I believe that the definition of private pond needs to be altered. Constant surface water discharge or permitted access by the public should constitute public but multiple owners should not be a trigger for a public pond. Additionally, a pond owned by a public entity like a city or county should not automatically be designated public if that entity posts that the pond cannot be recreated in (ie no swimming, fishing, etc).

Stormwater ponds have a completely different function than other types of ponds. In fact many have stormwater agreements that require treatment of nuisance algae and vegetation so as not to reduce the function of the waterbody. The expiration on permits to 10/1 annually strongly restricts complying with Stormwater maintenance agreements set by municipalities and DNR code. Many municipal Stormwater agreements require treatment of nuisance algae and vegetation as it relates to potential harm to structures and sedimentation of the basin. These ponds are typically engineered as "freeze out" ponds not designed for aquatic habitat

I would not be in favor of increased regulation in private ponds. This would lead to an increased cost to the consumer, additional regulatory burden on management companies, and a potential loss of business as more pond owners turn to self-management to avoid burdensome regulation.

The 10/1 end date should really be changed to 11/15 or even 12/31 to ensure it is beyond a treatment window.

The paper talks about criteria the Department will use to approve a permit. Many of these criteria do not consider the function of the waterbody (irrigation, stormwater, aesthetic) or a client's intent for the waterbody (fishing, swimming, flood relief, or wildlife).

Why is it up to the Department to limit activities that are ineffective or producing unreasonable restrictions in ponds or plants that are not causing an impairment in the water? What is unreasonable and how can the Department decide what is acceptable for a pond owner? For a pond owner who irrigates, maybe it's a certain irrigation restriction but they want no growth around their intake. For a pond owner who swims, maybe it's a swimming restriction and desire to have no plants. For a pond owner who fishes, maybe it's a balance between beneficial vegetation and aesthetics. The point is that should be up for the owner and consultant to discuss and determine.

Current definition of a private pond: "a waterbody located entirely on the land of an application, with no surface water discharge, and without access by the public" "…entirely on the land…" – This implies that it's an artificial water. Beds of natural lakes (rivers/impoundments excluded) are owned by the state. Should probably state "within".

Just because a pond is owned by a municipality does not guarantee it has public access.

Instead of listing "private ponds" a better wording would be "private waters".

Emergent Species Management Questions

Under Functional Improvements it says “The department proposes county-wide non-native AIS treatments require more information..”. Question: What information would be needed?

- The department proposes continued conversations with stakeholders to determine what information may be appropriate. Large, county-wide, or regional AIS treatments may have broad impacts on Wisconsin habitats, in contrast to localized and targeted AIS management on one wetland.

What happens when a pond site needs both aquatic and emergent management? Is this now two permits and two separate fees? It seems very burdensome to require that on the same waterbody.

- The proposed activities surrounding a private pond would all be under the same permit; the department does not intend to change this practice with the rule revision.

Why does chemical management require public notice while non-chemical management does not?

- Public notice was discussed during the April 15th, 2021 public meeting. Public comments on that white paper are due to the department by May 16th, 2021.

Immediate shoreline emergent control is often done for private and public waters. Why does an emergent application permit expire later than other permits?

Why is the permit end date different from the rest of the proposed permits?

- Management of emergent species in wetlands, riparian corridors, right of ways etc. can all occur throughout the calendar year. The current expiration date does not adequately meet the management needs in wetland management.

How long is a permit on hold when Wild Rice is in the management area?

- The department does not intend to place holds for wild rice, the department proposes permits with wild rice be issued within a longer timeframe to give the department time to review an application’s potential impacts to wild rice.

What are the criteria for determining if a “significant resource value” is present on the proposed site? Why would one present directly next to the site be a factor in eliminating the waiver?

- If there is a water discharge herbicide may move off site and have non-target effects.

Why is a public notice required for emergent control on private lands?

- If there is a water discharge herbicide may move off site and/or have non-target effects.

What is the reason for choosing 0.5 acres as the cutoff for a large-scale treatment?

- The ½ acre proposal was a starting point for discussions with stakeholders. The ½ acre was in relation to the effort by individuals to control anything over ½ an acre by foot on the ground. The department is considering raising the threshold based on conversations with field practitioners.

WWI data is primarily not field verified. Is a wetland delineation required to determine if a control area is wetland or not for permitting requirements?

- The department proposes the continuation of the “wet sock” test. If an individual’s stocking feet would be wetted from contact with the soil while walking through a planned treatment site, the area would be considered an aquatic environment subject to regulation.

APM plans are currently solely written for lake environments. Why is an APM plan necessary for non-riparian wetlands?

- Aquatic plant management occurs in wetland environments, and management plans are commonly used for wetland management. Aquatic invasive species control, habitat management and access restraints all require careful planning and consideration.

Does an invasive emergent species on shoreline have to cause a use impairment before it can be managed?

- Not in all situations, proposed activities to remove emergent species along the shoreline will continue to be reviewed on a case by case basis.

Emergent Species Management Comments

The existing requirement to remove cut material has been very challenging. In some cases, it is impractical to remove cut vegetation/woody material from a site and that material presents little or no risk for reestablishment if left in place. Methods for cutting and treating stems of non-native and hybrid cattail for example involve leaving materials lay in a wetland. We need flexibility to leave material lay when appropriate and practical to do so.

It is of concern that the proposed permit procedures and requirements in this white paper are for non-riparian wetlands only. It would be helpful to have clarity on the department would define non-riparian wetlands (especially in complex, or large, contiguous wetland systems that are ultimately connected to rivers/lakes). This creates huge barriers to work in riparian wetlands if they will fall under non-emergent guidance.

While AMP activities initiated by the department, conservation groups, and other partners for AIS control or restoration work must be approved through the appropriate permit process, we believe that process could be simplified through the use of general permits/approved BMPs for common invasive plant species and accepted management techniques. We also encourage the Department to consider exemptions for conservation entities and/or for State Natural Areas where there is already an approved SNA management plan.

We also have concerns over the determination that treatments over 1/2 acre in size be considered "large". This is a huge reduction in what is currently considered small-scale and would very likely result in increased costs for conservation entities to do what is now routine work/treatments. In the end, this would either mean less on-the-ground work occurring, or potentially the work being broken down into smaller treatments as to not overburden land stewards and managers with the permitting process

We feels either the APM NR107 permitting needs to be streamlined to cater to aspects of forestry or they need to create a whole new NR107 subcategory such as emergent/ephemeral/lowland /bottomland forests & fields and write some rules and an application based on those unique conditions. Our sites are more terrestrial in nature and don't fall under many of the criteria for chemical management drafted by APM.

Table 2, planning, and monitoring seem to be written for lakes and don't take into account the small and sometimes private nature of ponds. General criteria lumping lakes, private ponds, and public ponds into one group should be avoided.

Table 3 lists that there would be a waiver for stormwater ponds. Why would this not be extended to all ponds? Isn't non-chemical management already exempted from reporting for ponds…why are we getting more restrictive in reporting requirements for this subset?

Additional planning and monitoring will be a significant financial burden on permit applicants.

Preliminary feedback from practitioners we have consulted indicates that a well-crafted subsection related to management activities in wetlands and riparian areas could help advance cost-effective wetland management practices. However, concerns exist about increased regulations and costs of requiring an APM plan, re-defining "large" treatment areas, and potentially cumbersome monitoring and reporting requirements. The unintended consequences of increased costs and logistics for large and small projects alike are that less people manage species posing problems in wetlands and riparian areas or do so outside of the permit process. This would reduce rather than enhance wetland management in Wisconsin.

In many areas of the state, degraded hydrology has facilitated invasive plants to take hold and flourish. In other cases, infestations have changed the hydrology of streams and wetlands, affecting habitat conditions, water quality, and flows. Creating incentives for and removing barriers to wetland management activities will help

restoring hydrologic connections, conditions, and functions and will help Wisconsin address water management problems. Encouraging such restoration is one our policy priorities and we look forward to working with the department towards this goal.

General Questions

What other states recently reviewed and updated their aquatic plant management literature? Any within the past 10 years? 5 years?

- The department supposes most states review all peer reviewed scientific literature as it is released annually. The Aquatic Plant Management Program Strategic Analysis, finalized in 2019, cited over 600 sources (peer reviewed journals, articles, agency reports, surveys) to describe and inform an analysis of the entire program as well as the conceptual policy proposals shared in the white papers.
- Michigan updated their administrative rule regarding Aquatic Nuisance Control in 2003.
- Minnesota's Aquatic Plants and Nuisances rule was published in 2009 and 2015. The 'Standards for Aquatic Plant Management Permit Issuance' was published in 2015.
- Most recent edits to Iowa's administrative code on Restrictions on Introduction and Removal of Plant Life were in 2020.
- Illinois' administrative code on Fox Chain O'Lakes Aquatic Plant Management and their administrative code on Lake Michigan Aquatic Plant Management was adopted in 2001.

Why is the department undergoing rule revisions for NR 107 and NR 109?

Where does the departments authority for rule development come from?

What authority does the department have to undergo rule development?

- Please review the department's scope statement, which outlines the rationale and authority for rule development.

How will permit costs be calculated?

- The department will review the costs needed to administer the program and will create fee schedule which reasonably supports staff time to review and approve permits. The public may comment on the fee schedule after a draft of the rule is released.

General Comments

“There are several aspects of the white papers presented at the DNR-lead virtual public forums in November 2020 that merit acknowledgement. Statements such as “New NR 107 applications will be reviewed with consideration given to the cumulative effect of applications already approved for the body of water” is good to see and bodes well for science being incorporated into the soon-to-be revised NR 107.”

“It will be important for the new NR 107 to be as complete as possible and adequately address and define key terminology (such as significant adverse impacts) to ensure that the code affords full protective measures.”

“The department isn't using good science, or isn't providing information about where the science/data is”

“The proposed rule changes seem likely to result in the need for greater capacity within the department for program implementation. If the fees are designed to cover operational costs, then it could be anticipated that fees would also increase. Higher fees may be a barrier to quality work being implemented on the ground by landowners and conservation entities.”

“As to the proposed changes to aquatic plant management permitting and regulation in Wisconsin encompassed by this rule revision, we applaud the Department for proposing a more efficient regulatory scheme that treats chemical and non-chemical treatment as choices within a continuum of best management practices, rather than separate, either/or choices as in the current split in NR107 and NR109.”

“Management, especially integrated pest management, must always take in consideration the use of the lake and the goals for management. With changes to the NR 107 rule, the WIDNR appears to make it abundantly clear the goal is for less management by particular methods in the lakes.”

“Through nature, the goal of every lake is succession (i.e., lake to land). While it is understood that lake biology can vary by geographic region, WIDNR also must acknowledge that lake use also changes, and that many of these lakes are taking on very unnatural nutrient loading, uses, and pressures. This often means they need outside influence to protect and preserve them as lakes for present and future generations.”

“The management and control of invasive and nuisance aquatic plants are critical to protecting human health, safety, navigation and property all while sustaining a vibrant tourism economy.”

References

[1] R. D. Valley, W. Crowell, C. H. Welling and N. Proulx, "Effects of a low-dose fluridone treatment on submersed aquatic vegetation in a eutrophic Minnesota lake dominated by Eurasian watermilfoil and coontail.," *Journal of Aquatic Plant Management,* vol. 44, pp. 19-25, 2006.

[2] W. J. Crowell, N. A. Proulx and C. H. Welling, "Effects of repeated fluridone treatments over nine years to control Eurasian watermilfoil in a mesotrophic lake.," *Journal of Aquatic Plant Management,* vol. 44, pp. 133-136.

[3] A. Mikulyuk, E. R. Kujawa, M. E. Nault, S. Van Egeren, K. I. Wagner, M. Barton, J. Hauxwell and M. J. Vander Zanden, "Is the cure worse than the disease? Comparing the ecological effects of an invasive aquatic plant and the herbicide treatments used to control it," vol. 5, no. 1, pp. 353-366, 2020.

[4] M. Nault, M. Netherland, A. Mikulyuk, J. Skogerboe, T. Asplund, J. Hauxwell and P. Toshner, "Efficacy, selectivity, and herbicide concentrations following a whole-lake 2,4-D application targeting Eurasian watermilfoil in two adjacent northern Wisconsin lakes.," *Lake and Reservoir Management,* vol. 35, no. 1, pp. 1-10, 2014.

[5] K. M. O'Dell, J. VanArman, B. H. Welch and S. D. Hill, "Changes in water chemistry in a macrophytedominated lake before and after herbicide treatment," *Lake and Reservoir Management,* no. 11, pp. 311-316, 1995.

[6] K. I. Wagner, J. Hauxwell, P. W. Rasmussen, F. Koshere, P. Toshner, K. Aron, D. R. Helsel and S. Toshner, "Whole-lake herbicide treatments for Eurasian watermilfoil in four Wisconsin lakes: effects on vegetation and water clarity.," *Lake and Reservoir Management,* vol. 23, no. 1, pp. 83-94, 2007.

[7] G. M. Chorak and R. A. Thum, "Identification of resistant clones of Eurasian (Myriophyllum spicatum) and hybrid (Myriophyllum spicatum x Myriophyllum sibiricum) watermilfoil to an operational rate of fluridone.," *Invasive Plant Science and Management,* vol. 13, no. 4, pp. 247-251, 2020.

[8] S. T. Berger, M. D. Netherland and G. E. MacDonald, "Laboratory documentation of multiple-herbicide tolearnce to fluridone, norflurazon, and topramazone in a hybrid watermilfoil (Myriophyllum spicatum x sibiricum) population.," *Weed Science,* vol. 63, pp. 235-241, 2015.

[9] R. A. Thum, M. A. Heilman, P. J. Hausler, L. E. Huberty, P. Tyning, D. J. Weisel, M. P. Zuelling, S. T. Berger, L. M. Glomski and M. D. Netherland, "Field and laoratory documentation of reduced fluridone sensitivity of a hybrid watermilfoil biotype (Myriophyllum spicatum x Myriophyllum sibiricum).," *Journal of Aquatic Plant Management,* vol. 50, pp. 151-146, 2012.

[10] E. M. Z. M. N. M. H. R. T. LaRue, "Hybrid watermilfoil lineages are more invasive and less sensitive to a commonly used herbicide than their exotic parent (Eurasian watermilfoil)," *Evolutionary Applications,* vol. 6, no. 3, pp. 462-471, 2013.

[11] E. LaRue, "Hybridization facilitates the rapid evolution of reduced herbicide sensitivity in the widely-managed invasive aquatic plant, Eurasian watermilfoil Master's Thesis," Grand Valey State University, Allendale, MI, 2012.

[12] The Aquatic Plant Management Society, Inc., "White Paper: Herbicide Resistance Stewardship in Aquatic Plant Management".

[13] Aquatic Ecosystem Restoration Foundation, "Biology and Control of Aquatic Plants - A Best Management Practices Handbook," 2020, pp. 179-185.

[14] J. &. R. W. Madsen, "A Review of Aquatic Plant Monitoring and Assessment Methods," *JAPM,* vol. 55, pp. 1-12, 2017.

[15] A. M. Mikulyuk, J. A. Hauxwell, P. Rasmussen, S. Knight, K. I. Wagner, M. E. Nault and D. Ridgely, "Testing a methodology for assessing plant communities in temperate," *Lake and Reservoir Management,* vol. 21, no. 1, pp. 54-62, 2010.

[16] D. Strayer, "Recording the evolution of an invasion: An interview with Dr. David Strayer," Cary Institute of Ecosystem Studies, 2005.

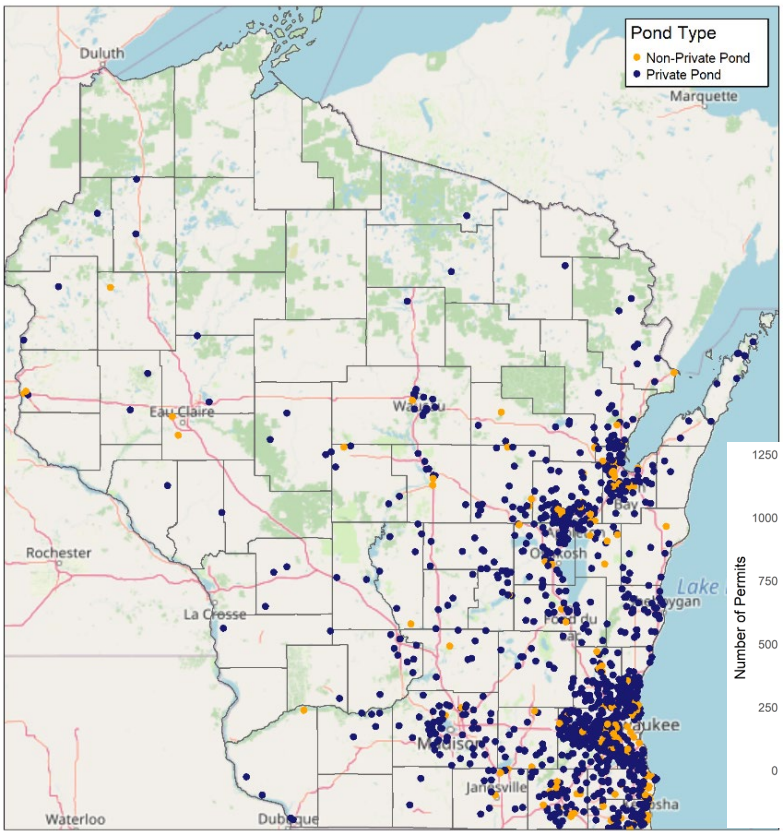
[17] M. H. Olson, S. R. Carpenter, P. . Cunningham, S. Gafny, B. R. Herwig, N. P. Nibbelink, T. Pellett, C. Storlie, A. S. Trebitz and K. A. Wilson, "Managing Macrophytes to Improve Fish Growth: A Multi-lake Experiment," *Fisheries Magazine,* vol. 23, no. 2, pp. 6-12, 2011.

Appendix

[1]

Private Pond Sizes Under Current NR 107		
Acreage Range	Number of Ponds	% of Total
0 - 1	1376	75%
1 - 2	269	15%
2 - 3	79	4%
3 - 4	43	2%
4 - 5	24	1%
5 - 6	10	1%
6 - 7	8	1%
7 - 8	7	1%
8 - 9	2	1%
9 - 10	2	1%
>10	16	<1%
Sum	1836	

[2]



NR 107.11(3)(a) : a private pond is a waterbody on the land of one individual, with no surface water discharge or a discharge that can be controlled to prevent chemical loss and no public access.

Here, non-private ponds are waterbodies identified as a pond on the permit form 3200-004 during 2019.