TOPIC: Mechanical and Manual Removal

White Paper Group 3

BACKGROUND

The purpose of the aquatic plant management (APM) program is to regulate the management of aquatic plants in order to protect diverse and stable aquatic habitats as well as to protect and promote the public rights and interests associated with water-based recreation and the ecological health of Wisconsin's waterbodies. Aquatic plant communities are a vital and necessary foundation of healthy aquatic ecosystems. All management actions within and surrounding Wisconsin waterbodies to address water use impairments caused by aquatic plants have varying levels of risk to human health and the environment.

Starting in the 1950's, mechanical harvesting became a popular management tool for nuisance aquatic plant control. As the number of management methods has increased, there has been a recognition of the benefits of integrating multiple control methods to achieve management goals. In addition to mechanical harvesters, other non-chemical management approaches include benthic barriers, dredging, and unsupervised mechanical weed rollers.

Ch. NR 109, Wis. Admin. Code ("Aquatic Plants: Introduction, Manual Removal and Mechanical Control Regulations") regulates non-chemical management activities, including: introduction of aquatic plants, manual removal, burning, and use of mechanical control or plant inhibitors. It has the same general purpose as Ch. NR 107 recognizing the value of native aquatic plants to a healthy ecosystem, and that management will be conducted in "a manner consistent with sound ecosystem management, shall consider cumulative impacts, and shall minimize the loss of ecological values in the body of water." Chapter NR 109 also requires the applicant to submit an aquatic plant management plan as part of the permit application and identifies the required plan elements. Chapter NR 109 was created in 2003 and has not been revised since.

Today, harvesting is a commonly used method for aquatic plant management and involves removing part of or the entire aquatic plant. Common methods include manual cutting, mechanical cutting, hand-pulling, and diver-assisted suction harvesting (DASH).

Manual and Mechanical Cutting

Manual and mechanical cutting involves slicing off a portion of the target plants and removing the cut portion from the waterbody. In addition to actively removing parts of the target plants, cutting vegetative material may help prevent further plant growth by decreasing photosynthetic uptake, and impacting the formation of rhizomes, tubers, and other reproductive structures. These approaches can be quick to allow recreational and navigational use of a waterbody and mechanical harvesting often serves to provide short-term relief.

The amount of time for aquatic plants to return to pre-cutting levels can vary between waterbodies and with the dominant plant species present. In some cases, plant biomass can remain low the year after cutting while others see regrowth within the same growing season. Depending on regrowth rate and management goals, multiple harvests per growing season may be necessary for some waterbodies, while annual or biannual cutting is adequate for others. Higher frequency of cutting, rather than the amount of plant that is cut, can potentially result in larger reductions to reproductive propagules such as

turions. For species dependent on vegetative propagules, control methods should be taken before the propagules are formed. In some species, vegetative fragments not collected after cutting can potentially produce new localized populations, which may lead to increases in a species distribution. Manual cutting and physical removal tend to be less expensive but require more effort than benthic barriers, so these approaches may be best used for small populations or where non-native and native species inhabit the same stand.

Manual and mechanical cutting can have both negative and positive effects on the aquatic community. The cutting and harvesting of aquatic plants can potentially lead to declines in zooplankton, invertebrate, native plant, and fish populations. However, cutting lanes through dense beds of aquatic plants can also improve some fish growth rates. Additionally, leaving some vegetated areas undisturbed may reduce the potential negative effects of cutting on fish and other aquatic organisms. Cutting can also temporarily increase algal production and turbidity if sediments are disturbed. A careful plan that maintains refuges of aquatic plants for fish habitat, avoids shallow areas to prevent suspending excessive amount of sediment, and collects and removes cut plant fragments can help provide large-scale navigational access while minimizing ecosystem impacts.

Hand-pulling and DASH

Hand-pulling can be used on submerged plant species, emergent plant species, free floating plants and algae and diver-assisted suction harvesting (DASH) can be used to remove rooted plants from the bottom sediment of the waterbody,. The entire plant is typically removed and disposed of elsewhere. Hand-pulling is typically done at shallower depths whereas DASH, in which SCUBA divers do the pulling, may be better suited for deeper aquatic plant beds. Efforts should be made to preserve water clarity because turbid conditions can reduce visibility for divers, slowing the removal process and potentially making species identification difficult. When operated with the intent to distinguish between species and minimize disturbance to desirable vegetation, DASH can be selective.

However, hand harvesting or DASH may require a large time or economic investment for aquatic vegetation control on a large-scale. Lake type, water clarity, sediment composition, underwater obstacles and presence of dense native plants may slow DASH efforts or even prohibit the ability to utilize DASH. Physical removal of turions from sediments, when applicable, may greatly reduce plant abundance for multiple subsequent growing seasons, though this has not been implemented in Wisconsin due to the significant effort it requires. If implemented, a Ch. NR 30 permit review would be required.

Hand-pulling and DASH have several potential ecological impacts. Because divers are physically uprooting plants from the lakebed, benthic organisms may be disturbed. Additionally, DASH may also result in some accidental capture of small aquatic organisms, small amounts of sediment removal, or temporarily increased turbidity. It is possible that equipment modifications could help minimize some of these unintended effects. Because DASH is a relatively new management approach, less information is currently available about potential impacts than for some more established techniques like large-scale mechanical harvesting. While DASH is slower than mechanical harvesting using a traditional cutting machine, DASH has the advantage of allowing selective removal of plants when within lake conditions allow for in.

RULE PROPOSAL – SUBMERGED AQUATIC PLANTS ON PUBLIC/NATURAL WATERBODIES

The department proposes minimal changes to NR 109 language, with exception of emergent aquatic vegetation management, updated planning requirements and a few technological advancement requirements. NR 107 and NR 109 will be merged into one rule. Please refer to White Papers on permit issuance, monitoring, treatment timing and scale, planning and emergent species management for more information.

Proposed changes to NR 109:

- Harvesting lanes must be followed using a GPS device to ensure accuracy to pre-determined lanes agreed to between the department and the permittee. Records of the GPS tracks should be submitted with annual reporting requirements to confirm compliance.
- Update planning requirements (see planning white paper)

FORM UPDATES – SUBMERGED AQUATIC PLANTS ON PUBLIC/NATURAL WATERBODIES

Reporting requirements will be standardized and tailored to specific management activities. DASH and mechanical harvesting will be developed separately.