

**WPA Notice of Intent &  
Wayland Wetlands and Water Resources Bylaw  
Applications**

**Aquatic Management Program  
Dudley Pond  
Wayland, MA**

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POND AND LAKE MANAGEMENT SPECIALISTS

## **PROPOSED AQUATIC MANAGEMENT PROGRAM**

A multiple-year approval is requested for the implementation of an Aquatic Management Program at Dudley Pond. The program will concentrate on the long-term control of Eurasian watermilfoil and secondly curly-leaf pondweed through the prudent use of USEPA / MA DAR registered aquatic herbicides, diligent aquatic plant monitoring and extensive diver hand-pulling.

The multi-faceted management program detailed below has been developed specifically to meet the goals of the DPA and WSWQC. The interdisciplinary program aims to control and maintain the Eurasian watermilfoil in Dudley Pond, while reducing the need for herbicidal dependence in the future.

Nuisance aquatic vegetation and algae management projects are typically filed under the Limited Project status [310 CMR 10.53(4)]. The objective of this project is to control non-native and invasive species, treatment with USEPA / MA DAR registered aquatic herbicides. A basis for EPA registration is that these chemicals do not pose an unreasonable adverse risk to human health or the environment when applied by professionals in accordance with the label directions. Based on the chemistry of the particular herbicide used, along with the chemical dose, timing and method of application, these herbicides can be reasonably selective for the targeted plant species.

Controlling invasive species will typically not adversely affect wildlife habitat and will not negatively impact other interests of the Massachusetts Wetlands Protection Act. No significant alteration to wetland resources areas will occur as a result of the proposed management program; instead the resource areas will be enhanced by controlling the invasive species growth. The proposed management activities are consistent with the guidelines in the following documents:

- Final Generic Environmental Impact Report: Eutrophication and Aquatic Plant Management in Massachusetts (June 2004)
- Guidance for Aquatic Plant Management in Lakes and Ponds: As it Relates to the Wetlands Protection Act (April 2004 – DEP Policy/SOP/Guideline # BRP/DWM/WW/G04-1).

Proposed chemical applications will be performed by Aquatic Control's Licensed Aquatic Applicators after the receipt of an approved DEP- Office of Watershed Management (OWM) License to Apply Chemicals. A copy of the approved DEP License will be provided to the Commission before the chemical application proceeds.

## **RECOMMENDED MILFOIL TREATMENT PROGRAM**

Due to the current expansive milfoil infestation in Dudley Pond, a management program utilizing a combination of chemical and non-chemical in-lake management techniques is needed to achieve extended control of invasive plants like milfoil. Although the management program will initially rely on the use of aquatic herbicides, namely Sonar (fluridone), the WSWQC and DPA are committed to the long-term management and control of Eurasian watermilfoil through the use of non-chemical diver hand-pulling, thereby limiting herbicide use over time. Renovate OTF is recommended for "spot-treatment" of areas where milfoil regrowth is in excess of what can "reasonably" be hand-pulled. We are confident that if follow-up milfoil maintenance is

conducted as diligently as outlined, that this program will prolong the benefits gained from the proposed whole-lake Sonar treatment and reduce the need / dependence on whole-pond chemical treatments in the future.

Although similar treatment programs have been performed at Dudley Pond in the past, important modifications to this program have been made to best suit the long-term objectives and commitment of the DPA and WSWQC. A number of these changes have been made based on the growing knowledge of milfoil control within the scientific and lake management community and the exhaustive research efforts by the WSWQC, which included reviews of existing milfoil control literature and personal interviews with a variety of experts in the field of pond and lake management. A detailed summary of the WSWQC findings can be found in the PS4 section of this application below.

Notable changes the proposed management program and Sonar projects performed in the past include:

- The use of both liquid Sonar AS and pellet Sonar PR/Q formulations (previously only Sonar AS and an earlier version pellet formulation were utilized)
- An extended Sonar contact time of at least 100 days (previously 45-60 days)
- A firm commitment from the WSWQC for follow-up plant monitoring and diver hand-pulling
- Follow-up “spot-treatments” with Renovate OTF (Triclopyr) to control milfoil regrowth where densities exceed what is considered “reasonable” for hand-pulling

### **FLURIDONE HERBICIDE TREATMENT – 2008**

Fluridone (trade name Sonar) is the most effective herbicide to use during the initial year of this program. Sonar is a systemic herbicide that is applied to numerous ponds and lakes throughout Massachusetts annually for control of nuisance aquatic vegetation; and has been applied to thousands of waterbodies nationwide since its EPA registration in 1986.

The USEPA has approved a maximum limit of 150 ppb (parts per billion) to be allowed in water used for drinking, which is also the maximum application rate for waterbodies 10 acres and larger. Further, the use of fluridone is specifically permitted for drinking water supplies, and application within a Zone II recharge area in Massachusetts. Fluridone has no temporary water use restrictions other than 1.) No application within one-quarter mile of a potable water intake and 2.) No use of treated water for irrigation purposes within 30 days of treatment or until the Sonar concentration falls below established reuse levels listed on the product label. Prudent pesticide practice, however, dictates that the pond be closed to swimming, boating, fishing and other uses on the day(s) of treatment.

Based on the results of prior treatments at Dudley Pond and the most up-to-date recommendations for control of Eurasian watermilfoil we are proposing the following treatment protocol be followed:

- Sonar Concentration and Exposure Time – An initial in-lake fluridone concentration of 12 ppb. will be targeted. Subsequent “booster” applications will be performed once FasTEST samples show in-lake concentrations near or approaching ~ 7 ppb. A contact time of at least 100 days will be targeted wherein concentrations above approximately 7 ppb will be maintained.

If plant conditions and timeframes allow, live plant samples will be gathered during the winter of 2008 and submitted to SePRO for a "PlanTEST" evaluation. This test entails the laboratory propagation of the milfoil samples and treatment with different levels of fluridone. The PlanTEST provides a check that the planned concentrations of fluridone application will be effective. The purpose of the test is to set the minimum concentration of fluridone required to be effective, and to verify that the planned application level of 8 to 12 ppb is correct. An important factor is approval of the NOI for fluridone application in time to allow for this test to be undertaken.

- Herbicide Formulation – Sonar AS liquid will be used to establish and maintain the targeted whole-lake concentration. Sonar PR/Q pellet formulations will be applied to areas with large mature plants, soft bottom sediments and groundwater inflow that have been challenging to control in prior years, namely the outlet area and the cove within the vicinity of the “Chateau and Rocky Point” and possibly some additional areas. The objective of using pellets in these areas will be to extend herbicide contact time and to allow for any root uptake that may be occurring in the interstitial area at the sediment and water interface.
- Herbicide Dosing – Quantities of herbicide needed for the Sonar treatment program will be calculated using the morphometric data available for the pond along with Aquatic Control’s prior treatment records. Post-treatment Sonar (fluridone) residues in the pond have been consistent with targeted concentrations during Aquatic Control’s previous Sonar applications at Dudley Pond.
- Treatment Timing – The initial treatment will be scheduled once active milfoil plant growth is observed and outflow from the pond has subsided; this is expected to occur in early May. Booster treatments will be performed as required and determined by the results of FasTEST analyses. It is expected that three or possibly four applications in total will be required to maintain the targeted Sonar concentrations for 100+ days.
- Application Methodology - Gerald Smith, President of Aquatic Control, will be present to oversee the initial herbicide application. Follow-up booster applications will be performed by Gerry or Marc Bellaud, Aquatic Control's Senior Biologist. Gerry and Marc have performed all of Aquatic Control’s previous treatments at Dudley Pond and between them have nearly 50 years of professional pond/lake management experience. They both hold the Supervisory-level Commercial Certification for Aquatic Applicators in Massachusetts. This will insure senior-level oversight of all treatments performed at Dudley Pond and continuity with past management efforts.

Using GIS mapping technology, Dudley Pond will be divided into distinct treatment basins. Water volume and herbicide quantities will be calculated for each basin. The basin map for Dudley Pond will be loaded into a Differential GPS unit (accuracy plus/minus one meter) that will be used on-board the spray craft to provide real-time,

sub-meter accuracy for navigation during the treatment to insure even application of the herbicide. Aquatic Control is unique in New England with this precise/accurate approach to pond/lake treatments. The chemical will be applied from one of our Classic (Panther) Airboats that can operate in just "inches" of water. The liquid Sonar herbicide is first diluted with pond water in a mixing tank on-board airboat. This diluted herbicide solution is then injected subsurface from weighted hoses to avoid any aerial drift of the herbicide. Pellet formulations will be evenly distributed using a calibrated cyclone spreader. The airboat will enter Dudley Pond from Mansion Beach. Each treatment should be completed easily in one workday.

- Posting/Notifications - According to the product label, there is no restriction on swimming, boating or fishing following a Sonar application. As a precaution, however, a one-day (day of treatment) closure following the initial application is proposed. Use of pond water for irrigation will be restricted. This restriction will extend throughout the required contact-time of the herbicide, which is estimated at 120 days or until Sonar concentrations fall below 5 ppb.

Pre-treatment notifications will be drafted and submitted to the WSWQC for distribution to the local media outlets. Aquatic Control will provide the WSWQC with pre-printed, brightly colored signs that warn of the pending treatment and the associated temporary water use restrictions. The WSWQC will be responsible for posting the signs around the entire perimeter of the pond, prior to each application.

- Treatment Program Monitoring – In addition to the PlanTEST we will utilize two complementary analytical procedures offered by SePRO (the manufacturer of Sonar) to monitor the effectiveness of the treatment and to guide the timing of booster applications. FasTEST immunoassays will be used to monitor in-lake fluridone concentrations during the course of the treatment. Four sample locations will be established throughout the pond and 5 sample rounds will be collected from each site (minimum of 20 samples total) during the Sonar treatment program. Sample rounds will be collected approximately 14-21 days apart, following the initial treatment. FasTEST results will be used to guide the timing and dose of booster applications and will be used to insure that the targeted concentrations are maintained for a period of 100+ days. During each sampling round, the milfoil will be inspected visually to note the response and symptoms of injury to the Sonar herbicide.

Additionally an EffecTEST may be used to determine the response of milfoil plants during the treatment program. The EffecTEST is a patented test wherein collected plant samples are sent to and analyzed by SePRO to determine whether the plants have received enough herbicide to kill them or if a higher dose and/or longer exposure time is needed.

- Pre-Treatment and Post-Treatment Inspections and Project Completion Report - Comprehensive pre and post-treatment inspections (tentatively late April and mid/late September, respectively) will also be performed to produce a distribution map of the milfoil and secondary species in the pond. This will be completed by inspecting the littoral zone of the pond and recording the plant type, coverage and biomass (height through the water column). Plants will be surveyed visually from a boat. A throw-rake will be used to collect submersed species and an Aqua-Vu Underwater camera system will be used to confirm the plant coverage. Digital photographs of the pre-treatment

conditions will be taken for presentation in the project completion report. The field survey data will be used to create a computer based map of the pre-treatment plant distribution in a Geographic Information System (GIS) format and both digital and hard copies of the maps will be provided in the Year-End Report. Temperature and dissolved oxygen profiles will also be recorded at the deep-hole location to determine where the thermocline is located.

A year-end report will be prepared that documents the entire treatment program in 2008. Findings from the pre and post-treatment inspections will be presented, along with a detailed description of the treatment project. The report will include the pre and post-treatment GIS maps, FasTEST monitoring data and digital pictures taken over the course of the project. This year-end report will be submitted to the Commission by December 15, 2008.

### **FOLLOW-UP MILFOIL MANAGEMENT – 2009 and Beyond**

While we expect that more complete and longer-lasting milfoil control will be achieved following this recommended treatment program in comparison to previous Sonar treatments performed at Dudley Pond, permanent eradication of milfoil is rarely (if ever) achieved. Presently, none of the herbicides registered for use in aquatic applications can completely exhaust the starch reserves of milfoil (contained in the plant's root crowns), so typically some regrowth is expected to occur within 1-2 years following treatment. Aggressively managing milfoil regrowth will be paramount to seeking long-term eradication of milfoil from Dudley Pond.

Although specific thresholds for triggering follow-up milfoil management strategies have not been finalized, we would suggest the following criteria as a general guideline. While the criteria below are helpful to use as guidance, these criteria are not a substitute for field inspections and professional judgment to make such final recommendations as to which strategy should be used for milfoil management in a given area.

- Between 1 and 5% milfoil cover (<500 -1,000 stems per acre) – removal by SCUBA diver hand-pulling
- Greater than 5% milfoil cover over a contiguous acre – spot-treatment with Renovate OTF herbicide

SCUBA Diver Hand-Pulling – In the years following the initial Sonar application a SCUBA diver hand-pulling team, to be utilized at the mutual discretion of Aquatic Control and the WSWQC, will be deployed to remove areas of scattered milfoil regrowth. The diver hand-pulling crew will likely consist of two SCUBA divers, a support boat and a Field Technician to drive the boat, collect plant fragments and handle the disposal of milfoil for the divers. All diver hand-pulling work would be performed in direct consultation with WSWQC. ACT has performed considerable diver hand-pulling of milfoil for a number of different clients, including work at Wachusett Reservoir for MWRA and other work for MA DCR.

Renovate Spot-Treatments – Spot-treatments with Renovate (triclopyr) OTF (On Target Flake) will be used to control areas of milfoil regrowth where densities are in excess of what can be "reasonably" removed through hand-pulling. Although Renovate 3 (liquid) formulation has been available for use in Massachusetts several years, the OTF formulation of Renovate just registered

for use during the summer of 2007. ACT used this product with good success to control Eurasian watermilfoil at three large public lakes in Vermont during the 2006 and 2007 season. Like Sonar, Renovate is a systemic-acting herbicide that controls the entire plant and usually provides multiple year control of milfoil. Renovate OTF is the first available aquatic herbicide with a favorable toxicology similar to that of Sonar that can be used effectively to “spot-treat” areas of milfoil regrowth. Renovate differs from Sonar in that it has a short contact time requirement (48-72 hours). Unlike the liquid formulation of Renovate the OTF flake is designed to treat only the lower portion (bottom 4 feet) of the water column reducing herbicide dosing. This is achieved by the clay carrier which is designed to carry the herbicide to the lake bottom before it is released. This clay carrier system helps reduce dilution and allow for more effective spot-treatments.

Contingency follow-up “spot-treatments” with Renovate OTF will help the WSWQC to achieve long-term milfoil control in the years following the whole-lake Sonar treatment. Timely re-treatment of milfoil growth (that exceeds hand-pulling) thresholds, should further stress the remaining root structures and further exhaust their starch reserves.

Renovate OTF will be applied in accordance with recommended label rates. Minimum treatment areas of 2-5 acres based on location and configuration should be anticipated to insure effectiveness.

Contingency Treatment – 2009 and Beyond – A potential consequence of milfoil control with fluridone is a resultant increase in other aquatic plants and in the case of Dudley Pond an increase in curlyleaf pondweed (*P. crispus*) may be seen. Curly-leaf pondweed is already present in Dudley Pond. It is not anticipated that supplemental spot treatment for curly-leaf pondweed would be necessary before 2009, at the earliest. However, SWQC requests ConCom's conditional authorization for spot treatment of pondweed for 2009, or later, under the order of conditions, and the SWQC would make a written request to the Commission for timely consideration and authorization and proceed through whatever review the Commission might require prior to the use of herbicide for pondweed control.

The following table shows the relative susceptibility of various target and non-target plants in Dudley Pond to both herbicides. In this table, S=susceptible, I=intermediately susceptible or partial control (often dependent on dose), T=tolerant. The plants marked with an asterisk are considered non-native.

**Susceptibility of Common Plants in Dudley Pond to Proposed Herbicides**

Plant	Sonar (fluridone)	Renovate (triclopyr)
Eurasian watermilfoil*	S	S
Common Naiad	I	T
Bladderwort	I	T
White/pink waterlily	S	I
Nitella	T	T
Curly-leaf pondweed*	S	T

\* Data based on SePRO literature and Aquatic Control's records and experience