



February 7, 2011

Pembroke Watershed Association
c/o Mr. Ray Holman, President
P.O. Box 368
Pembroke, MA 02359

Re: 2011 Cost Quotation for the Implementation of a Nuisance Algae Monitoring and Control Program at Oldham Pond – Pembroke, MA

Dear Mr. Holman:

As you are aware we have received conditional approval from the Natural Heritage Endangered Species Program (NHESP), the Pembroke Conservation Commission, and the Hanson Conservation Commission for the implementation of an algae control program at Oldham Pond. If you remember, NHESP was concerned about the application of copper sulfate and the potential impacts it might have on the endangered mussel species (eastern pondmussel) found in the pond. As a result, the application of the peroxide based Phycomycin was proposed and approved as an alternative method of algae control at Oldham Pond. In addition to the required use of Phycomycin, NHESP has required additional monitoring and survey work to comply with permit conditions. The following Proposal reflects the services required as part of the approved NHESP algae control program.

In addition to the approvals received from NHESP and the respective Conservation Commissions, the application of the algaecide will require permits from MA DEP and the US EPA. As a result of a recent US Circuit Court ruling aquatic pesticide applications are now subject to the Clean Water Act as well as standard pesticide laws. Therefore, this project will be required to file for a federal National Pollutant Discharge Elimination System (NPDES) permit. Because this permit can be complicated and onerous to obtain, EPA and many states are developing a general permit, which will fortunately preclude the need to file individual site specific applications. This general permit will, however, require that a general set of conditions be followed in order to comply with the permit. At this point in the development of these new regulations we are uncertain as to what the additional conditions/requirements will entail, as the final set of regulations is not required to be in place until April 9, 2011. Based on the draft regulations that we have seen, we anticipate that a modest amount of additional permitting, survey work and regulatory reporting will be necessary in order to legally complete the Phycomycin treatment program as proposed. Once the regulations are finalized we will contact you to let you know the extent of the additional work required and the associated costs.

SCOPE OF SERVICES

Permitting

Aquatic Control staff will prepare and file for the required NPDES and MA DEP permits as soon as regulation standards and requirements are finalized by the state and EPA.

Algae Monitoring

Aquatic Control has secured Dr. Kenneth Wagner of Water Resource Services to perform the species identification and enumeration work on the weekly algae samples as well as assist in the evaluation of the algae data with respect to treatment timing, treatment effectiveness, etc. Dr. Wagner is an expert in microscopic algae growth dynamics and does have first hand familiarity with

Oldham Pond having been involved with the BayState Diagnostic/Feasibility study back in the 1980's.

An Aquatic Control Biologist will plan to perform a brief inspection of Oldham Pond in early May to identify specific sample collection sites. Also at the time of the site visit a meeting with PWA members will be scheduled so that the algae sampling sites and the methods and protocol for collecting water samples for microscopic algae identification and counts can be reviewed with Association volunteers. A single water sample from three separate stations is to be collected weekly by PWA members between May and September (three samples/round approx. 66 samples total), along with measuring Secchi depth at each of the sample collection sites (ACT, Inc. will provide sample bottles). The collected samples are to be refrigerated and shipped via overnight mail (either on the day of collection (preferable) or the next day) to Dr. Wagner's offices in Wilbraham, MA.

If and/or when the initial algae bloom develops an Aquatic Control Biologist will inspect the bloom conditions and collect two samples for algae toxin testing. This analysis will be performed by an independent certified laboratory.

Once the samples are received, Aquatic Control staff will preserve the samples and perform microscopic algae species identification and cell counts by enumeration. This data along with the reported water clarity readings will be used as a basis to determine the need for and/or timing of Phycomycin treatments in Oldham Pond.

Water quality Monitoring

In keeping with the approved Oldham Pond Algae Control Plan, the PWA will be required to increase their current monthly water quality sampling at Oldham Pond to twice a month. Parameters to be tested will focus on those that are apt to be most affected by the application of Phycomycin. These parameters will include turbidity, pH, alkalinity, temperature, dissolved oxygen, and Secchi depth.

In addition to this routine water quality monitoring to be performed by the Association, Aquatic Control will collect Secchi depth, temperature and dissolved oxygen profiles immediately prior to any Phycomycin treatments. The pH will also be monitored within the treatment area throughout the application process (pre, mid, and post-treatment).

Algae Control/Treatment

As outlined in the NHESP approved Algae Management Plan, the need for treatment will be dictated by the ongoing algae sampling. Phycomycin treatment will be performed when the total blue-green algae count exceeds 10,000 cells/ml or more than doubles from the previous sample count. Treatment will also be conducted when the overall cell density increases to within 30,000-35,000 cells/ml or more than doubles from the previous sample count.

In the event that the treatment thresholds are reached a treatment area of roughly 1/3 of the pond area will be designated, based on sampling results, for Phycomycin treatment. As indicated by the Algal Challenge Test performed by the manufacturer, a Phycomycin dose of approximately 40-60lbs/ac-ft. will be applied over the designated treatment area. The algaecide will be applied using either an airboat or a shallow draft jon boat equipped with GPS to aid in the even application of the product over the designated treatment area. The phycomycin will be diluted on board the spray boat with pond water and then sprayed through fan nozzles over the surface of the treatment area. This treatment methodology will aid in the rapid dissolution of the Phycomycin granule once applied to the pond.

Mussel Monitoring

Similar to the mussel survey work that was conducted during the permitting process, the NHESP is requiring that a qualified mussel biologist (Biodrawiversity) survey in and adjacent to identified

treatment areas for state listed mussels. Areas supporting state listed mussels will have to be marked so that Biodiversity can monitor the mussels following a Phycomycin treatment. The selected and approved biologist will also have to obtain a *Scientific Collection Permit* for this work.

Aquatic Control is not staffed to be able to perform this work; therefore, it would be the responsibility of the Association to select and retain the services of a suitable biologist for this work. Aquatic Control can help coordinate these required survey activities, but will not be responsible for the selection or payment of any other firms or contractors.

As we have discussed, Phycomycin is a new algaecide to the market, receiving its MA registration only just last year. Although the product has been used elsewhere in the country with favorable results, Aquatic Control has no direct experience with the product nor is there case study information for similar New England waterbodies available. For this reason, Aquatic Control cannot guarantee the extent or duration of nuisance algae control in Oldham Pond following treatment with Phycomycin.

TENTATIVE SCHEDULE OF PERFORMANCE

- ◆ Permitting..... March-April
- ◆ Pre-treatment inspection..... early May
- ◆ Algal monitoring May - September
- ◆ Algal treatment..... July –September (as required)
- ◆ Year-End Report.....November

INSURANCE

Aquatic Control carries workmen’s compensation, property damage and liability insurance which will remain in effect throughout the duration of this Agreement (December 31, 2011). A “certificate of insurance” will be provided to the Association upon request.

CLIENT RESPONSIBILITIES

- Full compliance with the Pembroke and Hanson Conservation Commission’s, Order of Conditions (OOC) permit for this project, NPDES permit requirements, and DEP pesticide use permit unless otherwise agreed to in writing by ACT.
- Collection of weekly surface grab algae samples and other water quality monitoring data at Oldham Pond and prompt overnight shipping of samples to ACT office.
- All pre-treatment notifications of pending chemical treatments. ACT to provide a written “notice of treatment” for distribution to local media outlets, if desired. Posting of pond shoreline in advance of scheduled treatments, ACT to provide posters.
- Selecting and contracting a qualified mussel biologist to perform required NHESP mussel surveys.
- Full agreement from any cranberry bog owners to cease their use of pond water for irrigation and other purposes on the day of algaecide treatment.
- Posting of pre-printed signs around the entire Furnace Pond shoreline prior to copper sulfate treatments. ACT to provide the signs and posting instructions.
- Compliance/enforcement (to the extent possible) of the temporary water use restrictions to be imposed post-treatment.

COST BREAKDOWN

Permitting (ESTIMATE)	
▪ Prepare and file required permits for MA DEP and NPDES approval	\$500-\$1,000
Permitting Total	
	\$500-\$1,000

Algae Monitoring	
▪ ID species and cell count of weekly algae samples (66 samples @ \$115/sample)	\$7,590
▪ Toxic algae testing (sample collection & analysis – two samples @ \$500/sample)	\$1,000
Algae Monitoring Total	
	\$10,900

Mussel Monitoring (ESTIMATE)¹	
▪ Pre-Treatment identification of rare mussel species within and near treatment areas	\$4,000-\$6,000
▪ Post-treatment monitoring of rare mussels within designated areas	\$4,000-\$6,000
Algae Monitoring Total	
	\$8,000-\$12,000¹

In-Pond Algae Control	
▪ Treatment of a maximum of 1/3 of the pond (~70 acres) with Phycomycin algaecide (cost includes all materials, labor, and equipment for treatment)	\$15,240/treatment
In-Pond Algae Control Total	
	\$30,480

Project Reporting	
▪ Algae sample data tabulation, interpretation, and reporting	\$3,000
▪ Final project completion report	\$1,500
Algae Monitoring Total	
	\$4,500

TOTAL MONITORING & CONTROL PROGRAM COST	\$54,380-\$56,880
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¹ – To be handled by Biodiversity or other suitable mussel biologist selected and contracted directly with the Town and/or Pembroke Watershed Association.

In the event the Association and/or Town of Pembroke are interested in moving forward with the project and able to secure the necessary funding, a more formal Proposal/Agreement will be developed for signature at that time.

If you have any questions or need additional information regarding this project please do not hesitate to contact our office.

Sincerely,

Aquatic Control Technology, Inc.



Keith Gazaille
Senior Biologist