

December 5, 2007

Mr. Stephen E. Cotton, President
Foster's Pond Corporation
19 Pomeroy Road
Andover, MA 01810

Re: 2007 Year-End Report for Herbicide Treatment of Foster's Pond – Andover, MA

Dear Steve:

The whole-lake Sonar herbicide treatment of Foster's Pond performed in 2005 provided excellent control of the invasive fanwort (*Cabomba caroliniana*) infestation throughout the balance of the 2005 season. Good carryover control was observed early in 2006, while fanwort and Brazilian elodea (*Egeria densa*) were spot-treated in the 4-acre Glenwood Road basin that was not included in the 2005 treatment program. By mid-summer in 2006 the Foster's Pond Corporation reported seeing fanwort regrowth in the wetland area, in the Channel and in the Outlet Cove – all located in the northern half of Foster's Pond. Fanwort regrowth was confirmed and documented during inspections performed by Aquatic Control in August and September 2006.

The rapid fanwort regrowth in these areas was attributed to the shallow water depths, extensive soft (unconsolidated) sediment accumulations, and the abundant growth in these locations prior to the 2005 treatment. Similar regrowth patterns have been observed in other water bodies with similar conditions. The most logical explanation is that the plants are unable to translocate enough fluridone (active ingredient of Sonar) to completely exhaust the starch reserves in plants that have large root structures (e.g. plants growing in areas with extensive soft sediment accumulations).

A partial lake or spot-treatment program was recommended for 2007 to control fanwort in these locations and to hopefully slow reinfestation in other portions of the lake. Sonar herbicide continues to be the only currently registered aquatic herbicide that controls fanwort. Sonar is slow acting, requiring 60-90 days of contact time with targeted plants. In order to overcome the effects of dilution, treatment with time-release pellet formulations of Sonar was recommended along with the temporary installation of water impermeable barriers/curtains where the two main channels to the northern portions of the lake join with the Main Pond. The following report details the results of the 2007 treatment program and provides recommendations for ongoing invasive weed management at Foster's Pond.

Chronological Summary of 2007 Management Activities

- Secured approval from Andover Conservation Commission (FPC) February
- Prepared and submitted License to Apply Chemicals with MA DEP February 28th
- Received approved LTAC from MA DEP April 6th
- Pre-treatment inspection May 23rd
- Initial Sonar herbicide treatment June 1st
- Second Sonar herbicide treatment June 25th
- FasTEST sample collection June 25th
- FasTEST sample collection July 23rd
- Third Sonar herbicide treatment July 27th
- Final post-treatment inspection of Foster's Pond October 3rd

Summary of 2007 Program

The 2007 Sonar treatment targeted control of fanwort regrowth in approximately 18 acres located in the northeast channel to Mill Reservoir, the Channel and the Outlet Cove. In order to reduce dilution of the herbicide into untreated portions of the lake, water impermeable barriers/curtains were installed at the southern extent of the fanwort growth in the two primary channels (location shown in yellow on the map below) and left in place for the duration of the treatment program.

The initial treatment was scheduled and performed on June 1st. Approximately 50 ppb of Sonar Q (Quick Release pellet formulation) were applied. The concentration applied were higher than what was used during the whole lake application in 2005 because usually only 20-30% of the applied Sonar is released from the pellets and is available for uptake.

The second application was performed on June 25th. Approximately 40 ppb of Sonar Q and 20 ppb of Sonar AS (liquid) was applied to the target areas. The liquid used because it is immediately available for uptake and outflow from the lake had subsided.



Immediately prior to the second Sonar application, water samples were collected for FasTEST analysis of Sonar residues. An average concentration of 24 ppb was detected. Approximately one-month later on July 23rd a second round of FasTEST samples revealed that the Sonar concentration had dropped to approximately 11 ppb. A third and final Sonar application was scheduled and performed on July 27th. An additional 20 ppb of Sonar Q pellets were applied during the third treatment. Prior to treatment, you reported additional fanwort growth was reported immediately south of the barrier in the channel that leads to Mill Reservoir. We relocated the barrier prior to the second treatment to try and expose this fanwort to the treatment.

Chlorosis (bleaching/whitening attributed to Sonar uptake) was evident on the targeted fanwort plants at the time of the second application on June 25th. By July 27th, the date of the third Sonar application, chlorosis was highly advanced throughout the targeted treatment area. Based on the condition of the plants and the residual Sonar concentrations it was determined that no further treatment was required.

A final post-treatment inspection was performed on October 3rd. By that time, no fanwort was found in the treatment areas. The impermeable barriers/curtains were removed following the October 3rd inspection. It is hoped that the extended Sonar contact time achieved by using the pellet formulation and use of the

barriers will provide carryover control of fanwort in these areas through the 2008 season and possibly longer.

As was seen during the 2005 treatment program, some impacts to non-target native plants were noted in the treatment area. White waterlilies (*Nymphaea odorata*) were most heavily impacted. The barriers provide good containment of Sonar in the treatment area, as evidenced by the lack of chlorosis noted on waterlilies located immediately south of the barrier on the main Channel.



Barrier at Main Channel – photo courtesy of Steve Cotton 6/25/07

Other non-target plants in the treatment area during the post-treatment inspection included ribbonleaf pondweed (*Potamogeton epihydrus*), bladderwort (*Utricularia sp.*), stonewort (*Nitella sp.*), spatterdock or yellow waterlily (*Nuphar sp.*) and white waterlily. Impacts from the treatment were visible on the waterlily species, but not on the submersed species. All of these species have been documented during previous surveys of Foster’s Pond. No impact to non-target species was noted outside of the treatment areas.

Main Pond Survey Findings and Future Management Recommendations

Due to the regrowth of fanwort in the Main Pond reported by FPC members and observed during the July 27th treatment, we toured the littoral zone of the Main Pond with you on October 3rd. Actively growing, rooted fanwort growth was found in several locations along the western, southern and southeastern shorelines. Most of the fanwort growth was found adjacent to dense waterlily beds. These areas also had significant accumulations of soft sediment. The extent and distribution of this fanwort regrowth suggests that it is regrowing from stem and/or root tissue that was not completely controlled following the 2005 treatment. The purple points shown on the adjacent map represent GPS locations of fanwort growth recorded during the October 3rd survey.



The two areas outlined in blue on the adjacent map depict the minimum areas that could be spot-treated with Sonar pellets. Even though fanwort was only distributed over about a

one-acre area in both locations, a minimum of 5-acres would need to be treated at each site to try and maintain Sonar concentrations sufficient to control fanwort. Neither site is well configured to utilize impermeable barriers to contain the treatment. We do not believe that extending barriers to the edge of the dense waterlily beds would provide suitable containment of Sonar, and even doing that would still require the installation of several hundred linear feet of barrier at each site that would add considerably to the treatment cost. Treating the open-water areas would necessitate application of the maximum permissible label rate of 150 ppb and would likely require three or four separate applications. The estimated treatment cost to target these two 5-acre blocks in 2008 would be in the \$17,000-\$18,000 range.

We do not believe that attempting to treat these small, 5-acre blocks in the Main Pond would be a cost-effective approach. The partial-lake treatment performed in 2007 was much easier to contain given the configuration of the lake and the use of the impermeable barriers. Our experiences treating small portions of large, open-water basins with Sonar pellets at other lakes have been largely disappointing. Furthermore, we are hesitant to recommend additional spot-treatments that carry a high per-acre unit cost until we see how much carryover fanwort control is achieved in the northern portions of the lake that were treated in 2007. We are optimistic that good carryover fanwort control will be seen.

For the 2008 season we would recommend monitoring the fanwort growth in the Main Pond; and educating FPC members, lake residents and lake users to avoid excessive disturbance in areas of heavy fanwort growth (to the extent that is practical) to help minimize fragmentation. A late summer survey of the lake should be performed to evaluate the level of carryover fanwort control in areas that were treated in 2007 and how much the fanwort distribution has increased in the Main Pond.

If there is good carryover control in the northern end and fanwort has reached or is threatening to reach problematic densities in the Main Pond, then a partial lake treatment of the Main Pond can be evaluated for the 2009 season. Treatment of the Main Pond would likely be a combination of Sonar liquid and Sonar pellets placed on areas of heavy fanwort growth. The estimated cost for this type of treatment program would be in the \$30,000-\$32,500 range, assuming that chemical prices will increase at the rate they have been annually for the past several years.

If fanwort regrowth is found in the northern portions of the lake that were treated in 2007, then a whole-lake treatment will probably be more cost-effective treatment alternative for the next several years. The whole-lake treatment approach would differ from what was performed in 2005 by applying pellet formulations of Sonar over areas of abundant fanwort growth to increase contact time and hopefully provide more complete and longer duration control. The estimated cost for this modified whole-lake treatment approach in 2009 would be in the \$47,500-\$50,000 range. However, if the areas of problematic fanwort remain fairly localized next year, then the whole-lake treatment could be delayed until the 2010 season.

Fanwort will continue to try and recolonize Foster's Pond. Until a new approach or technology is identified, treatment with Sonar herbicide continues to be the most cost-effective and selective means of managing invasive fanwort growth in Foster's Pond. We trust that this report will assist FPC with your ongoing lake management efforts. Please feel free to contact us if you have any questions.

Sincerely,
AQUATIC CONTROL TECHNOLOGY, INC.



Marc Bellaud
Senior Biologist