

Pond Committee Outlines its Strategy in Response to Post Editorial

Last week, the Post raised a series of important questions about the strategy adopted by the Pond Committee two years ago for the protection and restoration of Bare Hill Pond. We welcome the opportunity to address the questions and advance community-wide understanding of our efforts. During the 1980s and 90s, as noted in the editorial, the Pond Committee and the State conducted several studies, but little was done to address the accelerating eutrophication in the Pond other than harvesting, weed pulls and divisive debates regarding herbicide use. Beginning in 2002, the Pond Committee concluded that the time had come to act on solutions that could be implemented. The financial cost, time and energy being spent on studies and political debate was sapping the available funds and volunteer resources. Additional studies, in light of the studies conducted elsewhere, would add limited incremental value.

We agree with several key points in the Post editorial. First, Bare Hill Pond has a serious eutrophication problem from non-native invasive aquatic species. Second, all of the alternatives need to be considered in addressing the problem. Third, the financial constraints faced by the Town need to be respected. Fourth, the community needs to be informed of our strategy.

We had hoped this fourth objective had been met by discussing and approving our plans at open meetings at the Hildreth House on the 4th Wednesday of each month. We have reported at least annually at Selectmen meetings and to the FinCom as well as provided reports for Annual Town Meeting and to the Conservation Commission. The feedback at these meetings has been positive, particularly with regard to our seeking and obtaining a substantial DEP/EPA grant for the Town to fund our activities. We have also posted on the Pond Committee page of the Town Website, copies of historical studies, our DEP/EPA grant proposal, and other documents that informed our strategy. These activities along with regular letters to the editor involving significant achievements may not be enough. If so, we offer this article to address this legitimate need.

The Nature of the Problem

Perhaps the most important fact that we have learned from all the studies to date is that eutrophication of Ponds is inevitable and that development of the watershed accelerates the process of nutrient and sediment accumulation. Bare Hill Pond is also a prime candidate for eutrophication because it has a very fertile bottom (former sheep meadow) with excessive levels of phosphorous, the prime cause of nuisance aquatic plant growth. Cycles of plant growth and death over 150 years resulted in considerable accumulation of peat (up to 5 feet) on the Pond bottom. Shallow depths also allow light to reach the bottom to promote plant growth.

Our most invasive weeds are milfoil and fanwort. The water chestnut are also potentially very aggressive, however, because they reproduce by seed and have limited coverage, weed pulls are a viable control solution. Water lilies are also prevalent.

The Studies Performed

In 1987, Whitman and Howard conducted a study of Bare Hill Pond under the Massachusetts Clean Lakes Program. This study found that excessive weed growth in the pond is due to both natural and development related nutrient enrichment from the pond's watershed as well as septic systems. In addition, the study recommended watershed management to control nutrients and sedimentation and also recommended water level manipulation and harvesting. In 1999, under the Federal Clean Water Act, the State issued a TMDL report on Bare Hill Pond, repeating the Whitman and Howard findings but also noting significant loading of nutrients (phosphorous) in the sediment bottom. It recommended active watershed management in addition to in-lake weed management to control the eutrophication problem.

Gene Marsh also prepared an excellent Chronology of management activities of the Pond from the 1800s through 2002. The Pond Committee funded several studies of the Pond by ENSR in 1998 and 2002 to survey the invasive species and evaluate the options for control that were referenced in the TDML. The primary recommendation of the ENSR reports were to begin systematic, managed drawdowns of Bare Hill Pond, to deepen the drawdowns beyond 3.5 feet to enable them to be more effective in deeper and wetter areas of the Pond, to continue harvesting, and to consider dredging. Herbicides were considered but due to their controversial political status and the public health questions raised, not recommended.

The Alternatives Considered

As noted in the Post editorial, numerous options are available for controlling eutrophication. They include: watershed management, drawdowns, harvesting and weed pulls, dredging, herbicides, dyes and sterile grass carp. All of these options have been carefully considered by the Pond Committee in light of the studies, published research, their cost, their politics and their likely efficacy. Many of them have been adopted and are underway. In addition, members of the Pond Committee have been active participants in annual educational programs sponsored by the Congress of Lakes and Ponds (COLAP) where studies and case reports are presented annually, and one can keep abreast these various techniques at other lakes and ponds throughout Massachusetts and the country.

Watershed management is the primary recommendation of the original Whitman and Howard report as well as the State TMDL report. It involves treating the problem of eutrophication at its source by working to remove the nutrients that feed weed growth and the filling of the Pond with sediment. The benefits of this approach are that they tend to restore the ecosystem and can help over the long term to reduce the need for using other alternatives. The downside of this approach is that if used alone it would have very

limited short term impact. Moreover, the level of phosphorous loading in the sediment within the Pond is so high that while watershed management may help prevent the nutrient load from worsening, it is not likely, when used alone, to restore the Pond. For this reason, we are working on watershed management in parallel with other control techniques. Over the course of the next year we will be working with volunteers and students on watershed management strategy, including a survey of the watershed to identify inflows to the Pond that could benefit from retention basins and educate watershed residents on actions they can take to reduce “fertilization” of the Pond.

Drawdowns have been chosen as a primary means for restoring control over the invasive aquatic species. This was a recommendation of the Whitman and Howard Report, and as noted in the 2002 ENSR Report (see pages 22-23), has been effective in many lakes and ponds. The Chronology prepared by Gene Marsh corrects a myth that there have been numerous drawdowns of the Pond and that they have failed. Prior to 2002, there were 5 drawdowns since the Dam was constructed in 1837 (1978-79, 1988-89, 1998-99, 1999-2000, 2001-02). The Marsh report indicates that four of these drawdowns all had a significant impact at depths of 4 feet or less (the limits of the current gravity drawdown). The 2001-02 drawdown had limited impact due to a mild winter. In each year where the drawdown was successful, there was significant algae growth on the milfoil that appeared to impair or preclude its growth during the next year. This suggests that to the extent drawdowns do not kill a plant, they may weaken the plant and subject it to natural biological control as well. The results in 2003-04 were consistent with these results.

Studies of other lakes show that drawdown effectiveness is dependent on several key variables. Studies also show that drawdowns do not kill all weeds, but do so incrementally over time if drawdowns are conducted on a regular basis. Killing of the weeds is *greatest* when the areas of invasive weed growth are dried and exposed to cold freezing weather. This does not occur every winter. This is consistent with the results of the few sporadic drawdowns to date on Bare Hill Pond. It also explains why deepening of the drawdowns appear to be necessary to dry out the areas behind the beach and to address depths greater than 4 feet.

Drawdowns also help to manage weeds by several other indirect factors. The extra flushing of the Pond is believed to help reduce the level of phosphorous and other nutrients, helping to reduce the rate of weed growth. The exposure of the shoreline results in the washing of the exposed peat sediment into deeper areas of the Pond exposing the former rocky shoreline and the glacial till in shallower areas. This is believed to also have several beneficial effects: (1) a decline in sediment in shallow areas that would otherwise fertilize and promote weed growth, and (2) a reduction in phosphorous loading in the water column. We have a very active Pond from both wind and recreational use. In the early morning hours the Pond is calm, but as wind and activity picks up, wave action and turbidity mixes with the shoreline silt, and adds nutrients to the watercolumn. By moving the sediment to deeper water, the research suggests fertilization and the rate of growth could also be slowed. With this in mind, we adopted a strategy of demonstrating the environmental safety and efficacy of drawdowns

at the 4 foot level with the goal of increasing the depth incrementally to achieve optimal control.

Harvesting and Weed Pulls have been and remain a key part of the strategy for controlling our invasive species. Hand pulling of water chestnut plants has been quite effective in containing significant growth to the inner part of the Clapp's Brook area, however, their seeds spread and vigilant efforts are continuously required to pull plants outside that area.

Harvesting of milfoil and fanwort does not control the problem but, like mowing a lawn, removes weeds from the beach, shore lines and other areas to facilitate recreational use. The harvester also can help at certain times of the year to remove seed bearing water chestnut plants. Harvesting is an excellent supportive activity but is not a solution by itself.

Dredging, according to the ENSR reports and the literature, is perhaps the most efficacious solution. If we could remove the 2-5 feet of peat from the bottom of the Pond, the invasive plants would not survive. The principal obstacle to consideration of dredging is cost. Current estimates are in the tens of millions of dollars to conduct traditional in-lake dredging operations. We have assumed that the town could not afford this expense. As part of our drawdown effort however we are testing the sediments and exploring alternative dredging options. As we proceed to deeper drawdowns, we will expose significant areas during the drawdown, and sediment could be removed through excavating techniques. This alternative approach could ultimately be far less expensive, could result in saleable topsoil and ultimately help to provide a more durable solution.

Herbicides have not been a primary focus for the Pond Committee following the negative Town Meeting vote. There is a diversity of views regarding the use herbicides on the Pond Committee and whether they pose a risk to human health and the environment.

There are several facts on which we agree. Their use is highly controversial within the Town. This would make any discussion extremely time consuming and distract us from achieving results through other means. Second, the herbicides used in the 1960s that cleared the Pond of weeds are no longer available. Silvex was used in the Pond in the 1960s and, like many herbicides of its day, is now banned for human or environmental health reasons. Today, few herbicides are available and their efficacy is much more limited. Repetitive annual treatments are required to achieve the results we would desire. More importantly, currently approved herbicides are not effective against fanwort (as shown in the literature) and as documented in Gene Marsh chronology. Thus, even if we were to control the milfoil, it would likely be replaced with fanwort and we could be no better off. Finally, and perhaps most compelling are the regulatory and financial considerations. The use of herbicides would require extensive environmental monitoring and permitting from the Conservation Commission which would be very costly and the outcome uncertain. The Town of Stow attempted to license the use of herbicides on Lake Boon 2 years ago and after two years in court, and significant expense, dropped the project. Even if we could get through the process, a ballpark estimate from Lee Lyman, a

leading contractor in this field was approximately \$750,000 for the initial application, and he indicated that we would need to plan on successive treatments over a period of years. These cost estimates, in light of our other management options and the highly controversial politics regarding safety, caused us to conclude that herbicides should only be considered after the other options are exhausted lest we do nothing but debate for the foreseeable future.

Dyes are a management technique used in many Ponds to curtail sunlight and reduce weed growth. Water clarity of the Pond already approaches that which would be achieved by dyes and ENSR advised it would not be an appropriate method.

Grass Carp are used in other states to control invasive species. They consume large volumes of weeds (native and non-native) and in theory are a viable control methodology. Sterilized fish are used so that they cannot reproduce and statistics exist for how many fish per acre are required. The downside is they grow quite large (up to four feet) and can be quite frightening to users of the Pond. The other downside is that Massachusetts prohibited their use several years ago and it would take a reversal of policy to adopt this approach. It was not recommended by ENSR.

The Regulatory Environment

The Pond Committee does not operate in a vacuum. All activities in the Pond are activities in a regulated wetland under the Wetlands Protection Act as administered by the Conservation Commission and the Mass. DEP. All of our drawdowns are subject to a carefully written Order Of Conditions, and requires the Town to conduct extensive monitoring of the downstream wetlands, the in-lake plant reduction, the animal life and the watershed. The Pond Committee reports on a regular basis to the Conservation Commission of the results of its work and does so largely through the efforts of dedicated volunteers. We have developed substantial experience among many volunteers over the past several years to carry on this work. The use of herbicides, dyes, and dredging would also be subject to permitting, and any change in direction must consider the regulatory and legal implications and the costs associated with making that change.

The Cost to the Town

The editorial in the Post suggests that the Pond Committee is not being frugal in its approach. We believe the facts show the opposite. Financial cost to the town has been at the forefront of every decision we have made and caused us to expend substantial effort to recruit volunteers and to obtain federal matching funding of \$195,000 under the DEP/EPA grant to finance our expansion of activities. The Town contribution to the grant is not new funding, but existing level Pond Committee funding of \$14,000, and the DPW budget for harvesting operations. More importantly, we make up the match portion for the Town through a credit for our volunteer time (at a rate of \$10-15 per hour). We consider this to be a model of frugality for funding town projects.

How were we able to do this? By doing what the Post editorial suggests we are not doing: acting on the recommendations of the prior study reports. Because of the findings of the State in the TMDL study of Bare Hill Pond, we are eligible for funding a project designed to implement the recommended control measures in the TMDL report: watershed management and water level manipulation. Both the DEP and the EPA, who extensively reviewed our project, agreed that deeper drawdowns offer Bare Hill Pond a real opportunity to address its needs. Our strategy was to integrate our Pond Committee activities into this approach so that we could leverage existing resources into an action plan that would not require additional Town resources at a time of fiscal hardship. If we do as the Post suggests, and renege on this grant agreement, we would lose this opportunity. Herbicide use is not within the scope of the grant, and far costlier to the Town than any of our proposals. Contrary to what the Post editorial suggested, there is no plan for the Town to spend more next year than this year in its operating budget. There is a plan to continue to collect data to confirm the value of proceeding with a deeper drawdown, harvesting, weed pulls and watershed management.

As we move forward with the engineering for the pumping solution, we have found that there may be unanticipated capital expenses associated with bringing electrical power to a pumping station. The state has informed us that we are eligible for additional funding, and to the extent there is a need for a Town contribution, we discussed with FinCom last fall and the CPC this summer, the possibility of obtaining Community Preservation Act funding as a match portion for these additional federal funds under our grant in future years. Our goal is to be fiscally responsible.

The Strategy

To summarize, our strategy for the protection of Bare Hill Pond takes an integrated approach. After years of sporadic action, and unproductive debate, we found a means to obtain financing, recruit volunteers and begin the first systematic program for controlling eutrophication. Bare Hill Pond is lucky to have a Dam that enables drawdowns and is unlucky that gravity limits the drawdowns to 3.5 feet. The results from this year's drawdown and 4 other historical drawdowns are consistent and show that they are effective in areas that dry and freeze. Based on the research to date we have embarked on an environmentally responsible path to conduct regular drawdowns, and to engineer and construct the capability to conduct deeper drawdowns. At the same time we will continue to harvest and conduct weed pulls while conducting outreach and education to improve our collective behavior within the watershed. We believe this is a sound and fiscally prudent approach. Many people have devoted countless hours to make this possible. We appreciate the opportunity to provide this update and encourage everyone to share their ideas with a Pond Committee member, and better yet to volunteer and help.

Bruce Leicher
Chair, Pond Committee