

RECOMMENDATIONS FOR DREDGING DURHAM'S

MILL POND SCENIC AND RECREATIONAL AREA

FEBRUARY 6, 2003

Prepared by the Mill Pond Task Group
For the Durham Conservation Commission

INTRODUCTION

The Durham Conservation Commission (DCC) formed the Mill Pond Task Group in the fall of 2002 to provide citizen input to the DCC regarding restoration of the Mill Pond Recreational Area. This Area comprises the pond itself as well as a section of the Oyster River that has been flooded by the Mill Pond Dam. The Group, composed of 22 individuals (Appendix 1), met 4 times during the fall and winter of 2002 and 2003 to get people's thoughts on what actions, if any, should be taken to restore the pond to conditions that existed as recently as 10 years ago. The report was submitted to the DCC on February 6, 2003.

The Mill Pond and its headwaters have filled progressively in recent years with organic and inorganic sediment and is now choked with aquatic vegetation. In addition, the northern shoreline (toward the Town) is being overgrown with woody shrubs and trees. The shallowness of the pond today, the rank plant growth both in the pond and on the shore and the deadfalls that have fallen into the Oyster River upstream from the pond have greatly reduced the recreational and scenic benefits of this area to the Town.

BENEFITS IN ACTING TO RESTORE AND MAINTAIN MILL POND

Scenic

It is widely agreed that a body of open water, free of choking aquatic growth, is an important natural resource to a community. Mill Pond in Durham has been such a visually attractive place in the past, but today has become so shallow and filled with plant growth such as Yellow Waterlily (*Nuphar variegata*), Floating Pondweed (*Potamogeton natans*) and Pickerel Weed (*Pontederia cordata*) (Crow, G.E., 1995) that it no longer serves as a very appealing place for citizens to gather (Figure 1)

Figure 1. Mill Pond in late summer showing lush aquatic plant growth choking the waterway.

Recreational Uses

The pond and its backwaters have been used in the past for ice-skating, boating, fishing, bird watching, or simply sitting and relaxing (Figure 2). But deposition of organic and inorganic sediments and the inflow of high concentration of plant nutrients (particularly phosphorus) has created a very shallow pond choked with submergent and emergent vegetation. No longer is it possible to easily paddle a boat across its surface or to find uninterrupted stretches of ice upon which to skate. In addition, visual and even actual access to the pond is difficult because of the growth of woody riparian shrubs such as speckled alder and red maple.

Figure 2. Mill Pond in the summer of 1987 showing significantly less aquatic growth than today.

Natural Resource Benefits

The pond and its shoreline have provided a diverse ecosystem for a myriad of plants and animals that call it home. These include many birds, such as ducks, swans, geese, and warblers; mammals, such as muskrat and beaver; reptiles, such as turtles and snakes; for amphibians, such as salamanders and frogs; and several species of fish. In addition to the common aquatic plants found in the pond, three sensitive or uncommon plant species have been recognized. These are the Water-Marigold (*Megalodonta Beckii*), Large Bur-Reed (*Sparganium eurycarpum*) and the Star Duckweed (*Lemna trisulea*) (NH Soil Consultants, Inc., 2003). The Blanding's turtle was sighted here years ago, although this species has not been reported recently. The pond is now, however, being converted rapidly into a swamp and as this happens, it is losing the wide variety of ecological niches that previously existed when there was a significantly greater area of open water.

Historical Benefits

The pond is a very real tie to and reminder of Durham's past. As early as 1610, textbooks mention the Durham Falls or the Falls at Oyster River. The first mill to make use of this falling water was a sawmill built around 1650; a gristmill followed soon after. It is believed that the first dam was constructed by the early 1800s and was made of wood. The book Durham: A Century in Photographs shows that what appears to be a concrete dam had been constructed by 1897 to provide greater hydraulic head and thus more water

power. Figure 3 provides a good feeling for the dam and accompanying mill buildings but the date the picture was taken is unknown.

Figure 3. Old mill building at dam on Mill Pond (date unknown).

Clearly, therefore, the pond and dam served a vitally important economic function during Durham's early history. To lose this historic pond because of sediment deposition and plant growth would be a tragic loss.

Economic Perspective

All the benefits mentioned above lead to a more vital and attractive town and a more economically thriving community by bringing people to enjoy its ambiance and to shop. In addition, vistas across open water have been shown to increase riparian land values. With higher land values, property taxes may also conceivably increase.

PROJECT GOAL

To restore and maintain the Mill Pond for multiple benefits to the Town of Durham including: (1) scenic beauty; (2) recreation; (3) natural resource values; (4) historical continuity; and (5) overall town attractiveness as a place to live, work and/or visit.

OBJECTIVES

Short-Term Objectives (Restoration to a Scenic, Open Waterway)

Dredging of pond

1. Up to 3 acres should be dredged from the northern half of the pond to maximize the recreational activities and scenic vistas of open water that will be made available (see Appendix 2). This should include the entire "island" which is the product of particularly heavy sedimentation and on which a dense community of Spotted Alder (*Alnus rugosa*), Buttonbush (*Cephalanthus occidentalis*), Glossy Buckthorn (*Rhamnus frangula*), Common Cattail (*Typha latifolia*), Purple Loosestrife (*Lythrum salicaria* or *L. virgatum*) and other woody shrubs and herbaceous plants grow. Although this island has been used as a nesting site for a Mute Swan pair, there are several other locations on the pond where nesting can occur and where dredging will not take place.

The southern half of the pond should not be dredged because (1) it is already deeper and less choked by weeds, (2) it will provide unaltered habitat for wildlife and (3) the New Hampshire Department of Environmental Services (NHDES) objects to dredging this area.

Although the dredging of only 1 acre in the northern half of the pond might decrease the amount of paper work required to obtain the necessary permits, this in fact is uncertain. In addition, the deepening of 3 acres would maximize the time interval before similar sediment removal would have to be contemplated in the future.

Clearly, the removal of additional sediment from the channel of the Oyster River upstream from the pond would return this part of this aquatic ecosystem to a condition more closely resembling that which existed at an earlier time. But the Group recognizes that, given the limited dollars available from the Town of Durham and the restricted amount of time and equipment that the U. S. Army has to give at no cost to Durham, that removal of sediment from any more than the northern half of the pond itself is not possible.

2. Three uncommon species of aquatic plants have been identified in the pond by NH Soil consultants, Inc. (2003). They are the large burr-reed (*Sparganium eurycarpum*), the water marigold (*Megalodonta beckii*) and the star duckweed (*Lemna trisulca*). Dredging the three acres of pond would not interfere with the growth of the large burr-reed as it has established communities in several places along the shore that will not be dredged. The star duckweed is a floating aquatic plant whose existence will not be threatened by the dredging activity. Garrett Crow found healthy populations of Water Marigold upstream on the Oyster River in areas that will not be dredged. Since this species is "very vigorous in growth and can readily spread by vegetative reproduction", it is most probable that the plant will repopulate the area that is to be dredged (Crow, 1995).

3. Water levels in the pond should be drawn down slowly over a six to eight hour period in late summer and early fall to minimize rapid habitat changes that might affect aquatic animals. Dredging should be completed in time for the pond to fill again by late fall, when amphibians and reptiles will be hibernating in pond mud.

6. Assuming the spoil has no heavy or organic contaminants, we recommend that either the University or Town use the spoil as soil amendment for playing fields.

7. The pond should be dredged to a depth not to exceed the thickness of the predominately organic sediments that have filled the three-acre area. The steepness of the sides of the pond will have to be determined by engineers familiar with the stability of saturated slopes composed primarily of silt and clay-sized sediments. It is anticipated that, given the thickness of the organic sediment and the maximum steepness that the sides of the pond can maintain, the dredged portion of the pond will be no deeper than four to five feet. At these depths, rooted aquatic plants have difficulty establishing themselves.

Cutting Woody Vegetation Along Northern Shore

1. Rapid growing Speckled Alder (*Alnus rugosa*) and other water-loving woody shrubs and trees have grown up quite densely along the northern shore. Because such shrubs can resprout from their crowns, these bushes should be removed, preferably by digging/pulling them up by the roots. If these materials cannot be pulled up, then an herbicide could be applied to the cut stem/trunk. The large, healthy trees along the shore should be left to provide shade for those using the shore for recreation during summer months.

2. The portion of Town property along the northern shore closest to the dam should be left as it is and allowed to grow up with woody vegetation to provide habitat for birds and other wildlife.

Removal of Dead Falls in the Oyster River Upstream from Pond

1. To maximize the boating opportunities and increase flow velocities, we recommend that dead trees that have fallen into the river upstream from the pond be sawed up and removed from the waterway at the time the water level in the pond is drawn down. Not every tree should be removed, however, for some fish, such as large-mouth bass, prefer the presence of such cover for successful growth and reproduction. This tree removal could be done with volunteer labor on a weekend or two. The "sweat equity" of those who come out to help might form the nucleus of a group perhaps called "*Friends of Mill Pond*" which would act as caretakers into the future (See below).

Long-Term Objectives (Pond Maintenance)

Determining the Source(s) of Sediment and Nutrient Input

1. To maximize the amount of time before a similar dredging project has to be done again, it is imperative that major sources of sediment and nutrient input be identified. One obvious source is College Brook, but others need to be sought. We hope student teams from UNH or even the high school could help in this effort.

Controlling Sediment and Nutrient Input

1. Once the source(s) of sediment and nutrient loading is/are determined, then control measures need to be put in place. For example, if large amounts of sediment and phosphorus are found to be coming from the parking lot at the Durham mall, then best management practices (BMPs) could be installed at little cost to catch the sediment and phosphorus before they reach College Brook and the Oyster River. Such BMPs have been shown to be very effective in immobilizing sediment and phosphorus input from Route 16 before it gets into Chocorua Lake, New Hampshire.

Forming a Group to Care for the Pond

1. A group of citizens concerned about the health of Mill Pond Scenic and Recreation Area should be formed to periodically examine the pond and its shore to assure that it remains in a scenic and ecologically healthy state. This group might be called the "*Friends of Mill Pond*". The group would make recommendations and organize actions on issues such as when future dredging is needed, the pruning of shoreline/bank vegetation, the monitoring of sites where trees have fall into the river, planning for tree removal, and the monitoring of river and pond banks to locate sites where erosion is a problem.

An additional responsibility would be the organization of an ongoing series of town meetings/classes to educate the people about the fragility of our brooks, rivers, and lakes and the need for everyone's help to minimize negative impacts on these waterways. The Extension Service at UNH has offered to aid in this outreach effort. Included would be programs such as the Extension Service's very successful "Follow-the-Flow" field trips and the generation of brochures that provide information about problems associated with excessive application of pesticides and fertilizers to gardens and lawns. These brochures would be made available throughout town and perhaps sent along with other town mailings.

CONCLUSION

The Mill Pond Task Group is strongly supportive of the Town of Durham's proposal to dredge Mill Pond. By dredging up to 3 acres, the Town will ensure that area most affected by rapid sedimentation and by rank aquatic growth will be restored and the pond will once again have broad stretches of open water appropriate for boating and other water activities. In addition, a wider variety of ecological niches will be made available so the pond will support a wider diversity of plants and animals. In short, the pond will once again become an important recreational, economic, and natural resource that will help draw Durham citizens together for many years to come.

REFERENCES

Crow, G. E., 1995, An assessment of the impact on sensitive plant species relative to the proposed removal of submergent and floating-leaved vegetation in a portion of Mill Pond, Durham, New Hampshire: Unpublished paper.

NH Soil Consultants, Inc., 2003, Protected species report, Mill Pond, NH: Report prepared for the Durham Conservation Commission.

Ross, W. E., and House, T. M., 1996, Durham: A century in photographs: Arcadia Publishing, 127 p.

APPENDIX 1

Members of the Mill Pond Task Group

Lee Alexander (Ex officio)
Dwight Baldwin
Andrea Bodo
Steve Burns
Diane Freedman
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Tom and Heidi Hutchinson
Mitchell and Anne Kalter
Dennis Meadows and Suzanne McDonald
Jerry Olson
Frank Pilar
Julian Smith
Doug and Pam Worthen
Paul and Jerry Young

APPENDIX 2

See aerial photograph in back pocket.