

NHDES WETLANDS BUREAU APPLICATION

**DREDGE OF MILL POND
DURHAM, NH
TAX MAP 5, Lot 7-0
DURHAM, NEW HAMPSHIRE**

Prepared For:

Michael Lynch
Director of Public Works
100 Stone Quarry Drive
Durham, NH

Prepared By:

NHSC Soil
Consultants, Inc.

One Simons Lane, Newmarket, NH 03857
Phone: 603-659-3559 Fax: 603-659-7750
Email: nhsc@nhsc.net Web: www.nhsc.net

In Conjunction With:

Town of Durham
Public Works Department

October, 2004

NHSC Job No. 02-0066

October 25, 2004

NHDES Wetlands Bureau
P.O. Box 95
6 Hazen Drive
Concord, NH 03302

Re: Mill Pond Dredge Project
Mill Pond Road
Durham, New Hampshire
ACOE Project # 2003-02628

Dear Wetlands Inspector:

This letter is being written in support of a Dredge and Fill Application to request dredging of 89,222 square feet (11,030 cubic yards) within Mill Pond located along Mill Pond Road in Durham, New Hampshire (Figure 1). Durham's Mill Pond was created in the early 1900's by the construction of Mill Pond Dam. Mill Pond is actively used for recreation purposes in all seasons: winter ice-skating; summer canoe paddling, and wildlife observation. Picnic tables and park benches are located along the shores for scenic enjoyment of residents and non-residents alike (Figure 2). Overtime Mill Pond has become very shallow and overgrown with dense herbaceous and woody vegetation. Mill Pond still has some areas of open water; however, these areas were left un-maintained and emergent and shrub vegetation has become well established in much of the Mill Pond Impoundment. Vegetation in Mill Pond Impoundment has historically been maintained a number of times.

Sections of Mill Pond Impoundment were hydro raked in 1980 and 1994 (See Biological Survey Results and Management Recommendations for Nuisance Aquatic Weed Control at Mill Pond – 1994, Aquatic Control Technology, Inc. for locations and description of methodology). Various vegetation control methods such as "Aquascreen panels" and a number of pond draw-downs have been employed to reduce vegetation in the pond. However, all attempts to maintain open water in the pond have had limited success. The Town of Durham now proposes to dredge a section of the Mill Pond freshwater impoundment to historic depths (see Figure 3). This methodology will allow for a long-term solution, restoring open water habitat once associated with this impoundment. The proposed sediment and vegetation removal is estimated at 89,222 square feet (2.04 AC). The volume of material to be removed is approximately 11,030 cu/yards.

Based on input from New Hampshire Fish and Game (NHF&G), the schedule for work is proposed between September 1 and October 31. NHF&G would like to perform work involving the Oyster River fish ladder when the pond is drained. According to the NHF&G, the October 31

end date was selected so that the fish ladder can be opened to allow fish displaced by draining the pond opportunity to return upstream.

Edge of wetlands occurs generally along the abrupt bank at the edge of Mill Pond. Wetlands are generally classified as Lacustrine Limnetic Unconsolidated Bottom Permanently Flooded Diked/impounded (L1UBHh). Mill Pond is a freshwater impoundment of the Oyster River, which flows into Mill Pond from the west.

A Risk Characterization and Sediment Sampling Analysis was performed in accordance with NHDES Solid Waste Rule (Env-Wm 2603) to determine proper disposal and use of the dredge materials. A Risk Characterization and Sediment Sampling Results report was submitted to Chief Engineer, Michael Sills, PhD, P.E. of NHDES Waste Management Bureau (NHDES-WMB). NHDES-WMB concurred with the conclusions and recommendations for upland reuse stated within the report (see attached Risk Characterization and Sediment Sampling Results prepared by NH Soil Consultants, Inc.). The Town of Durham is currently working with the University of New Hampshire, to determine an upland reuse area to deposit dredge materials.

Dredge work and trucking of material is currently scheduled to be performed as a community service project, by the United States Army Reserve 368th Engineers Combat Battalion Heavy, based in Rochester, New Hampshire. The Reserve group will provide equipment and man power to the town of Durham. The Town of Durham will only be responsible for fuel costs. The project oversight will be responsibility of Michael Lynch, Durham Public Works Director.

Lori Sommer of NHDES indicated that the proposed project would be classified as a pond restoration, and therefore believed that the standard application fee would be waived for the town of Durham.

Proposed Impacts:

NHDES Wetlands Bureau Rule Wt 302.04(a):

The following are responses to Section 302.04(a) of the NH Code of Administrative Rules:

1. ***Need for the proposed impact:*** The proposed project is needed to dredge sediment and vegetation within Mill Pond to restore historic water depth, water quality, wildlife values and recreational, visual/aesthetics values related to the use of Mill Pond as a community resource.
2. ***Alternative with the least impact to wetlands:*** The proposed project involves dredging within the Mill Pond Impoundment. The area to be dredged was designed to increase water depths and water circulation within Mill Pond while avoiding the channel of the Oyster River within the pond. Increased water depth and circulation will improve overall health of Mill Pond. The dredge area has been designed to avoid protected species (*see Protected Species Report and Natural Resource Management Plan*) and timed to avoid

impacts to wildlife species such as fish and turtles. The proposed dredge area has been minimized to maintain a no disturbance buffer along the edge of the pond to provide protection to sensitive plant species. Proper engineering and sediment and erosion controls have been incorporated into the project design to aid in minimizing impacts (see site plans and dredge procedures).

3. ***Type/classification of the wetlands involved:*** The establishment of the dam impounds water within the Mill Pond (Oyster River) flowing towards the Great Bay. The Mill Pond dam forms the break between freshwater and tidal waters. Wetlands within Mill Pond are dominated by Lacustrine Unconsolidated Bottom (L1UBHh). Lacustrine wetlands are the dominant type found within the pond, however emergent and shrub/scrub wetland types are also found along pond edges and within the "island" areas. Mill Pond also has areas that have emergent and submerged vegetation.
4. ***Relationship of the proposed impact areas to nearby wetlands and surface waters:*** Mill Pond is a freshwater impoundment of the Oyster River. Mill Pond receives flow from the Oyster River, College Brook, Hamel Brook, Longmarsh Brook, Beaudette Brook and Badford Brook.
5. ***Rarity of the wetland area:*** The wetlands within Mill Pond have been created by the impoundment of the Oyster River. The Mill Pond area forms a lacustrine ponded area. Lacustrine ponds are not rare; found throughout New Hampshire, most are artificially impounded such as Mill Pond.
6. ***Surface area of the wetland to be impacted:*** The proposed dredge is estimated to be 89,222 square feet (2.04 AC). Impacts will occur within the northern side, north of the existing channel within the pond (see attached site plan).
7. ***Impact on plants, fish and wildlife:*** As addressed in item 13 below, surface water quality will be protected by using best management practices when dealing with dredge spoils and silt fence will be placed around dredge spoils within an upland dewatering area. Protected species have been avoided to the extent practicable through dredge design. In the past, protected species have remained viable in Mill Pond following draw down of the pond and vegetation management within the pond. Draw down of the pond will occur over a two weeks, and be performed to reduce sediment mobilization down river. Please (see protected species report and natural resource management plan) included with this application for more information.
8. ***Impact on public commerce, navigation and recreation:*** The town of Durham oversees public use related to Mill Pond. There is no public commerce related to this project and navigation is limited to recreational use. The proposed dredge will limit recreation within the northern side of the pond during draw down for a period of approximately 2-3 weeks. This project will provide increased recreation value after the dredge.
9. ***Impact to aesthetic interests of the general public:*** The proposed dredging will be in the

interest of the general public. The proposed project is the result of many studies related to the health and aesthetic values of the pond for residents of the town of Durham and the general public. Mill Pond has reduced water depth, water quality and wildlife values choked by aquatic vegetation. With the addition of open water habitat, Mill Pond is expected to provide increased wildlife values and water quality. Increased water depths should provide additional habitat for fish and wildlife. Impacts to aesthetic interests of the general public will be minor during excavation of sediment and vegetation, and will be offset by increased overall aesthetic values with the completion of the project. These impacts should be offset by increase aesthetic values and long term health of Mill Pond.

10. ***Interferes with or obstructs public rights of passage or access:*** This project should not significantly interfere with or obstruct public rights of passage or access. Public access within Mill Pond during draw down and dredge area will be restricted due to public safety concerns.
11. ***Impact on abutting owners:*** Indirect impacts to abutting properties will be minimized through the use of best management practices. Once dredging is complete, abutting property owners will benefit from increased overall aquatic function and values.
12. ***Benefit to public health, safety and well being of the general public:*** Mill Pond currently has experienced reduced water quality, recreational and aesthetic values. This project will provide a positive value for the general public. Increased water depths, and the removal of sediment and invasive species will provide a positive value to public health, safety and well being of the general public.
13. ***Impact on quantity or quality of surface and ground water:*** The proposed project will not reduce the quantity of surface water but redirect surface water for a temporary period (approx. 3-4 weeks), during the draw down and removal of vegetation and sedimentation within Mill Pond. The proposed project will provide increase surface water quality with increased circulation within Mill Pond. There are no impacts on the quantity or quality of groundwater as a result of this project.
14. ***Potential to cause or increase flooding, erosion or sedimentation:*** The proposed project should not cause significant flooding, erosion or sedimentation problems. Mill Pond impoundment is proposed to be drawn down slowly over a period of 1-2 weeks prior to dredging to minimize the effect of erosion and/or sedimentation over the dam into the Oyster River. The proposed project is not within flood hazard zone as designated by FIRM FEMA Maps as adopted by the town of Durham.
15. ***Extent project redirects current or wave energy:*** The proposed project should not effect current or wave energy. The project is located within a freshwater impoundment and not subject to tidal current energy. Increased pond depth may actually reduce the potential for damaging wave activity.
16. ***Cumulative impacts if all parties altered the wetland:*** The proposed impact areas occur along a previously altered ponded area. The proposed project should increase water

quality, wildlife habitat, visual aesthetic values and recreation. If other parties proposed similar positive restoration and improvements within wetlands, the cumulative positive effect could be very substantial. Restoration project such as these presented by a community could provide an overall increases in the state's ecosystems health, quality and protection.

17. ***Impact to values and functions of the total wetland:*** The proposed dredge area is approximately 89,222 square feet (2.04 AC), and thus represents a relatively small percentage of the total habitat associated with Mill Pond (~8 AC). The overall project is expected to have a positive effect on values and functions of the Mill Pond and the environment as a whole. The effect of the dredge on wetland functions and values should be considered minor relative to the overall benefits of the project.

The functions and values of Mill Pond were assessed using the U.S. Army Corps of Engineers' Highway Methodology Workbook Supplement (ACOE, September 1999). Thirteen functions/values were assessed for this system including: groundwater recharge/discharge, floodflow alteration, fish/shellfish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, wildlife habitat, endangered species habitat, visual quality/aesthetics, educational/scientific value, recreation, and uniqueness/heritage. Functions are deemed "principal" if they are determined to be an important component of a wetland ecosystem; values are also "principal" if they are determined to be of special value to society, from a local, regional, or national perspective. The tree layer of Mill Pond Wetland System consists of scattered trees along the banks of Mill Pond. It is comprised of red maple (*Acer rubrum*), red oak (*Quercus rubra*), American elm (*Ulmus americana*), black cherry (*Prunus serotina*), and white ash (*Fraxinus americana*). Plant species found in various densities in the shrub layer include speckled alder (*Alnus rugosa*), Red-Osier dogwood (*Cornus stolonifera*), Northern arrowwood (*Viburnum dentatum*), and honeysuckle (*Lonicera* spp.). The dense herbaceous layer located in the emergent portions of the pond includes broad-leaved cattail (*Typha latifolia*), purple loostrike (*Lythrum salicaria*), Common reed (*Phragmites australis*), white water lily (*Nymphaea odorata*), duckweed (*Spirodela polyrhiza*), jewelweed (*Impatiens capensis*), water-marigold (*Megalodonta beckii*), large bur-reed (*Sparganium eurycarpum*), and Star duckweed (*Lemna trisulea*).

This wetland system provides floodflow alteration, sediment/toxicant retention, nutrient removal, production export, wildlife habitat, uniqueness/heritage, and visual quality/aesthetics as principle functions and values. Wildlife habitat is principle due to edge effect from a combination of a perennial stream, open water and wetland system habitats. This area also exhibits prolonged water retention time as a result of a man made dam, aiding sediment toxicant retention, nutrient removal, and production export as principle functions. Ground water recharge/discharge, fish and shellfish habitat, sediment/shoreline stabilization, recreation, and educational/scientific value were deemed suitable but not principal.

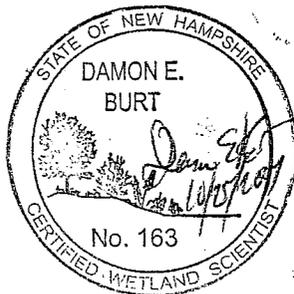
18. **Impact on National Register of Natural Landmark sites:** A letter of "No Historic Properties Affected" was received for Mill Pond (see enclosed letter from NH Division of Historic Resources dated December 20, 2002).
19. **Impact to nationally designated areas:** Not applicable (none present).
20. **Degree to which project redirects water from one watershed to another:** This project does not redirect water from one watershed to another.

This project will not adversely affect the functions of on-site or adjacent wetlands and surface waters or wildlife and will not be detrimental to groundwater quality or quantity. Proposed impact to wetlands provide for enhancement of water depth, water quality, scenic and recreation values. Therefore, we respectfully request that a wetland permit be issued for this project. Please feel free to call with any questions or concerns regarding this project.

Sincerely,



Damon E. Burt
Project Manager



Attachments

- Cc: Michael Lynch, Town of Durham Public Works (1 copy)
Town of Durham Conservation Commission (1 copy)
Frank DelGuidice, ACOE (1 copy)
Town of Durham (5 copies)



New Hampshire Fish and Game Department

11 Hazen Drive, Concord, NH 03301-6500
Headquarters: (603) 271-3421
Web site: www.wildlife.state.nh.us

TDD Access: Relay NH 1-800-735-2964
Fax (603) 271-1438
E-mail: info@wildlife.state.nh.us

Lee E. Perry
Executive Director

Tracy Tarr
NH Soil Consultants
PO Box 430 Main St.
Alton NH 03809

RE: F&G 2004-0249, Mill Pond Dredge

Dear Ms. Tarr:

The New Hampshire Fish and Game Department has reviewed the letter provided by you regarding the Mill Pond Dredge project in Durham. After an additional review of relevant materials and consultation with NHFG Ecologist Bill Ingham and NHFG Marine Division Biologists Doug Grout and Cheri Patterson, we suggest October 1 as an appropriate starting date for draining Mill Pond. This date was selected because turtles would not have begun hibernation and can be removed from the dredge area by the appropriate environmental consultant. Also, the majority of young of the year river herring will have moved downstream of the Oyster River dam by that date.

We request that all species of turtles encountered be moved to a safe area for the duration of the project. Painted, musk, and snapping turtles should be moved to appropriate wetlands within close proximity to the dredge area, preferably upstream where they can disperse back to the pond as it fills. The individual monitoring the pond during the initial draining phase should be comfortable identifying, handling, and moving a variety of aquatic organisms, including large snapping turtles. If Blanding's turtles, spotted turtles, or other rare species are encountered, please contact me at 603-271-3016.

Please contact me if you require any further assistance.

Sincerely,

Michael Marchand
Nongame & Endangered Wildlife Program



NEW HAMPSHIRE DIVISION OF HISTORICAL RESOURCES

State of New Hampshire, Department of Cultural Resources
19 Pillsbury Street, P. O. Box 2043, Concord NH 03302-2043
Voice/TTY RELAY ACCESS 1-800-735-2964
<http://www.state.nh.us/nhdhr>

603-271-3483
603-271-3558
FAX 603-271-3433
preservation@nhdhr.state.nh.us

December 20, 2002

Damon E. Burt, CWS
Wetland Scientist
NH Soil Consultatn, Inc.
One Simons Lane
Newmarket, NH 03857

RE: Mill Pond Dredge, Mill Pond Road, Durham, NH

Dear Mr. Burt:

In accordance with the National Historic Preservation Act of 1966 (P.L. 89-655), as amended, and as implemented by regulations of the Federal Advisory Council on Historic Preservation ("36 CFR Part 800: Protection of Historic Properties"), the New Hampshire Division of Historical Resources/State Historic Preservation Office has reviewed the undertaking referenced above to identify potential effects on properties listed, or potentially eligible for listing, in the National Register of Historic Places.

Based upon the information currently available, it has been determined that there are no known properties of architectural, historical, archaeological, engineering, or cultural significance within the area of the undertaking's potential impact and no identification or evaluative studies are recommended.

If any other resources are discovered or affected as a result of project planning or implementation, the Division of Historical Resources is to be consulted on the need for appropriate evaluative studies, determinations of National Register eligibility, and mitigative measures (redesign, resource protection, or data recovery) as required by federal law and regulations.

For the purpose of compliance with the Advisory Council on Historic Preservation procedures (36 CFR 800), I request that this determination be construed as a finding of "No Historic Properties Affected".

Sincerely,

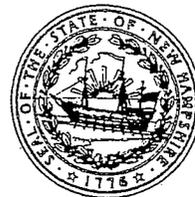
James McConaha
State Historic Preservation Officer

JM:EF:dg



State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

64 No. Main Street, P.O. Box 2008, Concord, NH 03302-2008
(603) 271-3406 FAX (603) 271-7894



January 11, 1999

Mr. Skip Grady
Town of Durham
Public Works Dept.
100 Stone Quarry Drive
Durham, NH 03824

Dear Mr. Grady,

On December 29, 1998 I visited the Oyster River Dam site with Mike Lynch, of your office, to inspect the dam during the drawdown of the impoundment referred to as Mill Pond. The inspection was made coincident with the low tide. In response to your concerns regarding the impact of the drawdown on the dam, I offer the following comments:

The practice of lowering the pond level in the winter months (from Columbus Day to mid March) is a common practice in most of the state-owned dams for the purpose of providing spring runoff storage and weed control, as well as for providing an opportunity for lakeshore abutters to perform beach and dock maintenance. Many of the state-owned dams are concrete structures similar to the Oyster River Dam. These structures have weathered annual drawdowns with no obvious adverse impacts. If anything, this drawdown has lessened damage from the rise and fall of the ice pack against the concrete structure. Also, from a structural point of view, with the elimination of the head of water and ice on the upstream face of the dam, fewer detrimental forces are acting on the concrete structure.

The downstream face of the dam is subject to the normal fluctuation of tidal waters (approximately 2 feet). Any effect on the dam from a tidal surge, which might occur during a storm event, would have to enter Great Bay and then travel approximately 2.8 miles upstream through the Oyster River reach from Little Bay. It is likely that a tidal surge would be attenuated in this reach before being further downgraded substantially by the Route 108 box culvert. As such, we do not consider the threat of excessive downstream tidal influences as a potential problem for the structure.

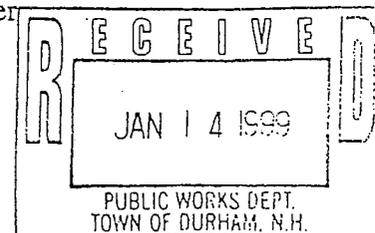
After reviewing the site conditions, it is my opinion that the drawdown of the Mill Pond for six weeks during the winter months does not pose a threat to the structural integrity of the dam. If you have any comments or questions regarding this issue, please contact me at 271-3406. You may also contact me by writing to the NHDES Water Division address listed above.

Sincerely,

Grace Levergood
Grace Levergood, P.E.
Dam Safety Engineer

GEL/h:\dam\letter\071-03.ltr

CC - TERESA WALKER - Cons. Comm
LARRY SHAFER, TA, PW STAFF.
RLG



DREDGE PROCEDURES

The dredging of Mill Pond is being undertaken by the Town of Durham Public Works. Dredge work and trucking of material is currently scheduled to be performed as community service project, by the United States Army Reserve 368th Engineers Combat Battalion Heavy, based in Rochester, New Hampshire. The Reserve group will provide equipment and man power to the town of Durham. The Town of Durham will only be responsible for fuel costs. The pond is owned by the Town and has been proposed by the Durham Conservation Commission to be restored.

Approximately 89,222 square feet (2.04 AC) square feet of pond area will be dredged, from an estimated current average depth of 1-3 feet to a proposed depth of 4-6 feet. The proposed dredge depths were estimated from depth probes, to estimated historic water depths. This requires the removal of approximately 11,030 cubic yards of material from the pond. The work is proposed between September 1 and October 31, 2005. The Mill Pond Dam will be lowered for a period of approximately 2 weeks prior to dredging. The sequence and specifics for the implementation of this project are as follows:

1. The pond will be drained as much as possible through the Mill Pond Dam; any remaining water will be pumped out and filtered prior to release downstream.
2. Incoming flows from the Oyster River will be diverted to the southern portion of the pond and released at the dam.
3. The pond will be allowed to dry for as long as feasible to limit the amount of dewatering necessary for the dredged material.
4. A stabilized construction access and staging area for refueling and loading materials will be located in an upland area immediately adjacent to the pond along Mill Pond Road.
5. Daily upkeep of the roadways as a result of sediment tracking from the project will be overseen and implemented as needed by Durham Public Works.
6. The pond will be excavated and the material will be dewatered, as necessary, in and adjacent to the project site; silt fencing and other appropriate protective measures will be established for sediment control.
7. The dewatered material will be hauled to an approved disposal site.
8. Upon completion of work, the dam will be restored and the pond will be allowed to refill naturally.
9. If the pond water becomes highly turbid when the natural flow is reintroduced, filtering will be provided for the outflow until the turbidity is reduced to acceptable levels.
10. All naturally vegetated areas that are disturbed by the project will be restored and replanted/reseeded to stabilize.
11. Once the flow of water is free of sediment and all areas are stabilized, temporary erosion controls must be removed and disposed of properly.

PROTECTED SPECIES REPORT

INTRODUCTION

The site is located in Durham, New Hampshire within Mill Pond bound to the north by Mill Pond Road and by N.H. Route 108 to the east. The south side of Mill Pond is mainly undeveloped. Mill Pond was created over a hundred years ago by the instillation of the dam near N.H. Route 108. The Oyster River flows from the east into Mill Pond and is tidally influenced below the dam. Above the dam Mill Pond and the Oyster River are freshwater with no tidal influence.

The New Hampshire Natural Heritage Inventory (NHNHI) identified the presence of 4 plant species and one turtle species within the project area (see letter dated February 28, 2002, Appendix A). These species and their state status are as follows (See appendix B for species specific information):

- Water-Marigold (*Megalodonta beckii*). Water-Marigold is an aquatic member of the sunflower family. The underwater portions of this perennial plant have opposite, finely divided fan-like leaves, and the above water portions have toothed leaves. The water marigold's yellow daisy-like flower heads make the plant easy to distinguish. Water-Marigold is rare or uncommon in New Hampshire, but is not state or federally listed as threatened or endangered.
- Large-spored Quillwort (*Isoetes macrospora*). Quillwort is a lake-bottom relative of the fern. Leaves are bipolar grasslike elongated, up to 30 in number, up to 8" long. Large-spored Quillwort listed as Threatened in NH (i.e. imperiled due to rarity or vulnerability statewide), though it does not have a Federal listing for rarity (i.e. demonstrably widespread, abundant and secure nationwide).
- Large bur-reed (*Sparganium eurycarpum*). Large bur-reed is a stout perennial plant that grows to four feet tall and is typically found in non-tidal marshes or river margins, in muddy shores or shallow water up to one foot in depth. The leaves on these plants are stiff and flat, and have a keeled midrib. The flowering period occurs in July and August, and the fruits are bur-like balls on short or long stalks that grow from the axils between the stem and leaves. Species found in association with this plant include reed canary grass (*Phalaris arundinacea*), lesser bur-reed (*Sparganium americanum*), pickerelweed (*Pontedaria cordata*), softstem bulrush (*Scirpus validus*), purple loosestrife (*Lythrum salicaria*), three-way sedge (*Dulichium arundinaceum*), spike rush (*Eleocharis palustris*), inflated sedge (*Carex vesicaria*), and wool grass (*Scirpus cyperinus*). Large bur-reed is listed as Threatened in NH (i.e. imperiled due to rarity or vulnerability statewide), though it does not have a Federal listing for rarity (i.e. demonstrably widespread, abundant and secure nationwide).

- Star Duckweed (*Lemna trisulea*). Star duckweed is found in freshwater, often in the shade of trees, shrubs, and marsh plants. Star duckweed is found under the surface of the water attached to each other or other aquatics. Star Duckweed is rare or uncommon in New Hampshire, but is not state or federally listed as endangered or threatened.
- Blanding's Turtle (*Emydoidea blandingii*). Blanding's Turtle is semi-aquatic, and prefers grassy marshes containing shallow water, but will forage in adjacent uplands or bask in the sun. Blanding's Turtle is rare or uncommon in New Hampshire, but is not state or federally listed as threatened or endangered.

The purpose of this report is to document the presence or absence of these target species and to make recommendations with respect to any potential impacts dredging the pond may have on these species.

METHODS AND RESULTS

To assess the current status of target species and to gain familiarity with local habitat characteristics within Mill Pond, a protected species investigation was performed by NHSC during July and August 2002. Information was researched on each species and the locations of NHHNH observations were reviewed. This data was utilized to perform methodical field searches in the project area. Results of the survey are listed below and shown on the attached "PROTECTED SPECIES" plan:

- Water-Marigold was observed during this survey within the northwestern cove of Mill Pond along Mill Pond Road, as shown on the Protected Species plan. This stand of Water-Marigold appears to be the only one in the pond.
- Large-spored Quillwort was observed within Mill Pond in 1978. In 1995, a search by Garrett Crow of UNH, failed to relocate this species. He speculated that aquascreens may have extirpated the population within this area (Crow, 1995). NHSC staff did not observe Large-spored Quillwort during the protected species field review.
- Large bur-reed was observed within Mill Pond during this survey. Large bur-reed is locally common and found within a number of locations throughout Mill Pond as shown on the Protected Species plan. The largest stand is found along the "shrub island", and other patches are scattered around the edge of the pond.
- Star Duckweed was observed during this survey along the northwestern cove of Mill Pond as shown on the Protected Species plan.
- Blanding's Turtle was not observed during this survey. No recorded observations of Blanding's Turtle have been recorded since 1966 in Mill Pond.

CONCLUSION AND RECOMENDATIONS

The NHNHI has identified the presence of 5 sensitive species within the general project vicinity. Of the 5 species cited by NHNHI, 3 plant species were observed. These are Water-Marigold, Large Bur-reed, and Star Duckweed. No Blanding's turtles were observed.

Water Marigold was observed within the northwestern cove of Mill Pond. This is the only area in which it was observed. It is recommended that the proposed dredging avoid this area in which the Water Marigold was observed. Water Marigold is generally very vigorous in growth and can readily spread by vegetative reproduction (Crow, 1995). It is anticipated that dredging will provide suitable habitat for Water Marigold propagation.

Large Bur-reed was observed in scattered areas throughout Mill Pond. The largest stand of Large Bur-reed occurs at the tip of the peninsula on the Mill Pond Road side of the shrub island. Dredging may impact areas of Large Bur-reed. Bur-reed may be replanted along the shore in suitable habitat as mitigation for any impacts from dredging.

Star Duckweed was observed along the shore of the northwestern cove and also seen near the "shrub island". Star Duckweed is a plant which can be very vigorous in vegetative reproduction and can easily spread (Crow, 1995). Overall impact of dredging should not significantly affect Star Duckweed. Improvements to water depth and removal of dense vegetation may provide additional habitat suitable to Star Duckweed.

Blanding's Turtle was not identified within Mill Pond during the protected species review. Suitable Blanding's Turtle habitat may potentially be found on the southern side of Mill Pond. Seasonal considerations for dredging could avoid affecting Blanding's Turtle if the species is present. Improvements to water depth and removal of dense vegetation may provide additional habitat suitable to Blanding's Turtle.

REFERENCES

- Richard DeGraaf and Mariko Yamasaki, 2001. *New England Wildlife*. University Press of New England.
- Garrett Crow and Barre Hellquist 2000. *Aquatic and Wetland Plants of Northeastern North America, Volume 1 and 2*. University of Wisconsin Press, Pages 1-25, 1-381, 2-83, 2-299.
- Magee, D.W. and H.E. Ahles, 1999. *Flora of the Northeast; A Manual of the Vascular Flora of New England and Adjacent New York*. The University of Massachusetts Press, Amherst, MA.
- Dr. Garrett E. Crow, July 10, 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*.