Elizabeth Bratter
159 McDonough ST
Property Owner

Conservation Commission
RE: 105 Bartlett St
November 4, 2020

Dear Members of the Conservation Commission,

Most of the design plans presented do not show actual measurements of the entire buildings. Building C is presently shown as 184.58' long, however, as presented on March 19, 2020 it was 185'. Drive width past the Building C was 46' and 68' now its 52' and 72' respectively. The building length of Building B was 196' and the parking lot was 86' wide, those are still the same. Building A is shown 197, it was 196' (<u>see design plan comparisons below</u>). It looks like a corner was taken off of Building C and lines were moved on paper but building lengths and widths remained the same, actually the area at the ends of those buildings are even wider now. **This begs the question how far from the 50' wetland buffer were Buildings B and C really moved, since areas of land use actually increased. It also begs the question since it is constantly suggested only a small amount of structures are in the 100' Wetland Buffer; why not move them out? The majority of residents along the North Mill Pond must adhere to no structures in the 100' buffer if they move an original footprint, this development should too.** This is not chess; this is the protection of wetlands for future generations to enjoy as we have! Wetlands and their ecosystems need to be protected! Why even put it on the design plan? Why even consider it? The only thing special about this piece of property is enough grade was added and cake will be served and eaten too!

I don't understand hydrology on the level I would like to but when I do basic math on the pre and post numbers I notice a significant increase in the amount of fresh water which will be poured into the North Mill Pond by this development, <u>many increases are almost double the volumes of the pre-construction amounts</u>. One has to think about how much fresh water the developments along the Hodgson Brook on Cate St and the West End Yards are adding, much less the City of Portsmouth, all ending in the North Mill Pond. This is a tidal estuary and realistically it can only handle a certain amount of fresh water**. It's ironic we cleaned it up of trash and debris and it's improved tremendously, yet fresh water could be what kills the North Mill Pond!**

It is nice the water coming off the parking lot will be cooled; somehow **MORE water needs to be absorbed on this site prior to allowing it to run into the North Mill Pond**. 53 spaced out trees do NOT make up for the absorption of a small forest, inland wetland and lots of brush. The hill, formed by the 15' to 20' of grade being added, where the "park" and the rain garden are shown, could be <u>changed.</u> **The hill could be terraced, IT and the area adjacent to the Greenway could be covered with <u>LOTS of trees, shrubs and wildflower mix</u>,** instead of white granite steps and grass, <u>which would likely cost less to do and maintain</u>!! This would slow the flow and absorb a LOT of water. It would provide nesting and winter cover for the many song birds and water fowl and a beautiful green space for all residents to enjoy! The rain garden-which still shows- an **over 240 FOOT long pipe** *that will have to be dug into the ground* **could be moved closer to the Salem St outfall** and could be shaped irregularly to add interest and offset all the rectangles. **Why not ask more trees, shrubs and wildflowers be restored after they are destroyed for "progress"?**

It should be recognized the parking lot was partially moved out of the 100' wetland buffer, <u>however the buildings were not!!</u> The parking lot does seem to be lacking in natural protections from the building lights, lot lights and car lights along the RR track side which abuts the existing neighborhood.

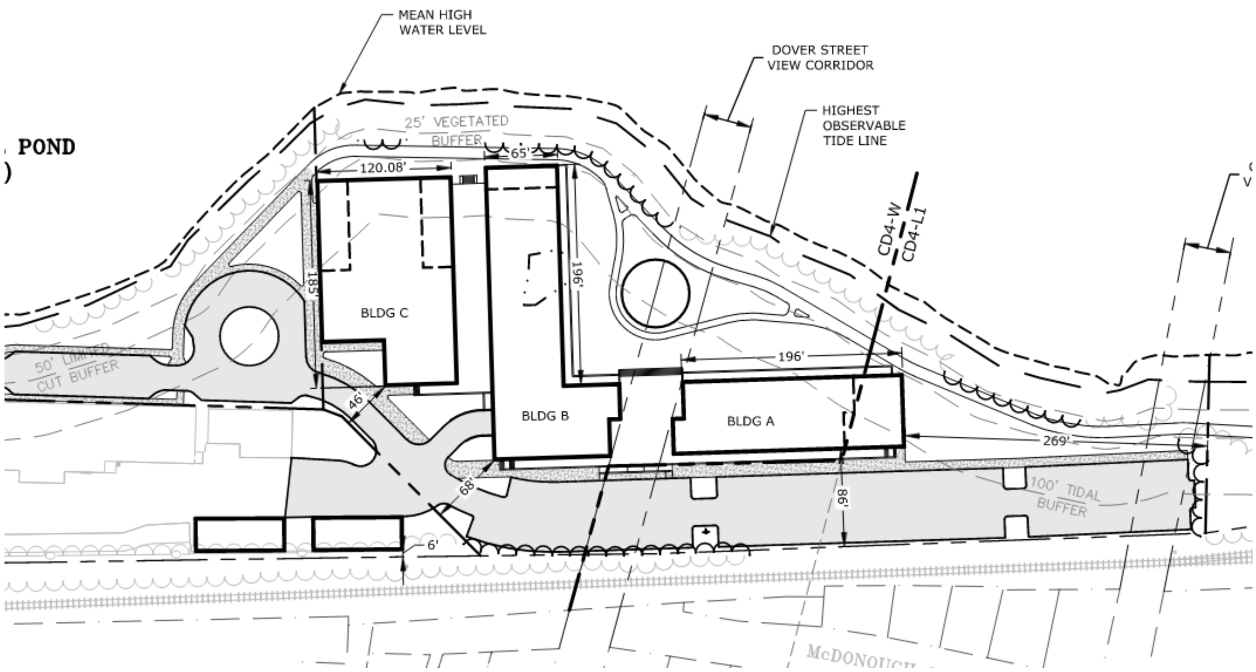
Please ask this development be completely out of the 100' Wetland Buffer and stand for why it was created to begin with. Please ask this development to work a little harder at absorbing more water on site then piping most of it into the North Mill Pond. Please ask this development to actually restore the trees, shrubs and wildflowers that will be destroyed during the construction of this project. Please ask the rain garden be moved closer to the outfall.

I'm sure everyone on this committee is fully aware of the hardships the North Mill Pond has endured and how has been actually moving in a positive direction from years of misuse and abuse. Please do NOT let this and other projects along the North Mill Pond be allowed to move that needle backwards by infringing on the 100' Wetland Buffer, much less oversizing any paths in the 25' to 50' buffer for any reason!

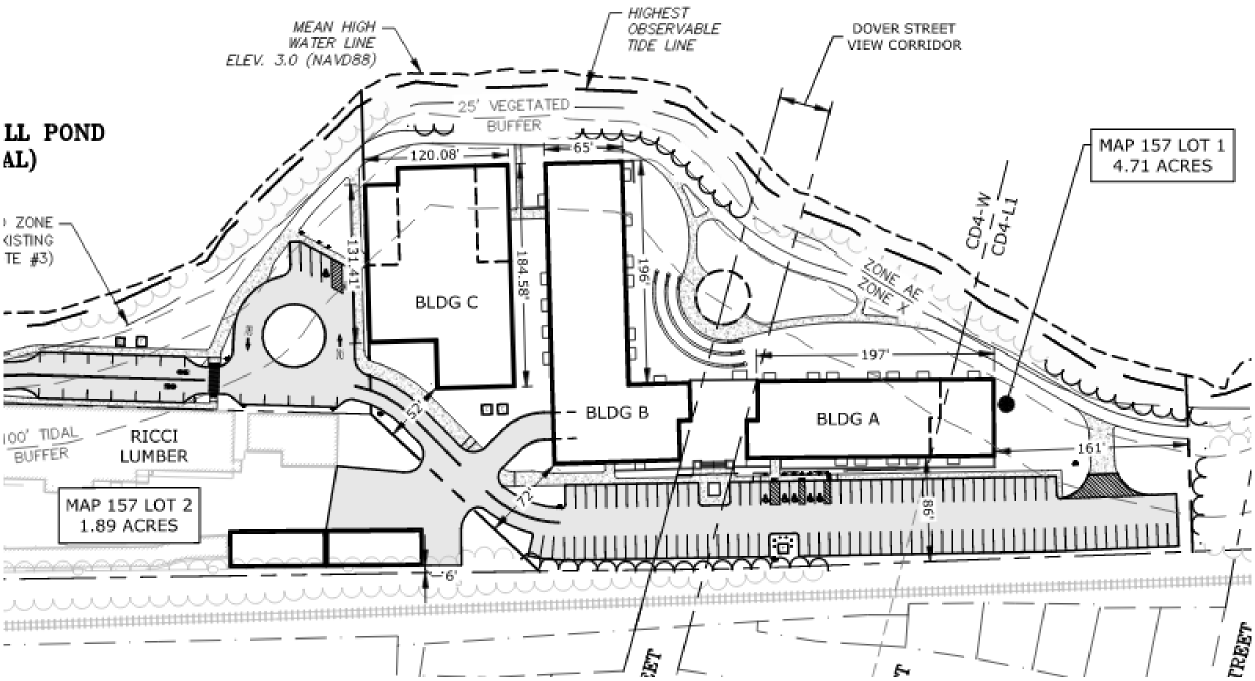
Sincerely,

Elizabeth Bratter

March 19, 2020 Planning Board Submission (Postponed)-reader page 6. To find this one must go to TAC September 10, 2019, choose 105 Bartlett and it opens ALL the 2019 and 2020 files.



November 4, 2020 Conservation Commission Submission (reader page 6)



I was not able to find any legends regarding the many abbreviations presented in the reports. Here are two I found important to basically understand some of the drainage information.

Curve number (CN) A dimensionless site-specific runoff parameter developed by the (former) Soil Conservation Service (now Natural Resources Conservation Service) to empirically estimate rainfall excess; it accounts for infiltration losses and initial abstractions

Acre-foot (af) A unit for measuring the volume of water, is equal to the quantity of water required to cover 1 acre to a depth of 1 foot and is equal to 43,560 cubic feet or 325,851 gallons. The term is commonly used in measuring volumes of water used or stored.

From:	Private General
To:	Planning Info
Subject:	ConCom meeting Nov 4th
Date:	Monday, November 2, 2020 10:03:43 AM
Attachments:	portsmouth-105 Bart-Concom-11-4-20 letter.docx

Dear Planning Department,

Please find a letter for the Conservation Commission for the November 4, 2020 meeting. *I am only submitting it should the meeting move forward.* **I would like to ask the meeting be postponed** since there is a tremendous amount of information and it references Lot number which seem to no longer exist in many of the reports. The (proposed??) new lot numbers were not just a straight combination of two lots, they cut and diced them up making it difficult to differentiate information provided. This lot number issue starts with the opening letter. I am NOT even sure if Lot 164-4-2 still exists OR if it already has been changed to the new lot based on the information provided. I have asked the Planning Department to review the information provided to the Conservation Commission for such discrepancies. Thank you, Liz

From: Lenore Bronson
To: Planning Info
Subject: 105 Bartlett Conservation Commission hearing
Date: Sunday, November 1, 2020 8:25:03 AM

To the members of the Conservation Commission and Planning Department:

As you know, many residents throughout the City are very concerned about the outcome of the hearing that includes the 105 Bartlett project. The wetlands and wildlife habitat issues as well as the obvious impact to the entire end of the City needs further input for and from residents.

The timing of the meeting is especially inconvenient for realistic and fair opportunity for the public to voice their concerns.

Please consider postponing this crucial meeting and decision until till more homework and due diligence is completed.

Thank you.

Sincerely,
Lenore Weiss Bronson

From:	Catherine Harris
To:	Planning Info
Subject:	11/4 2020 meeting of the Conservation Commission
Date:	Sunday, November 1, 2020 9:07:38 AM

To members of the Conservation Commission,

I would like to request that the portion of your upcoming 11/4 meeting dealing with the 105 Bartlett Street submission be postponed to a later date.

The agenda for this meeting was just made known on Friday, 10/30. The timing seems deliberately inconvenient, as it affords concerned citizens scant time to digest the 115 page submission and formulate input and responses.

This massive project will have a serious impact on the surrounding neighborhoods and we want to be given ample opportunity to study the new proposals and voice any concerns before anything is approved or finalized by your Commission.

Thank you,
Catherine(Kate) Harris
166 Clinton Street

From:	Juliet T.H. Walker
To:	Izak Gilbo; Tracy A. Gora
Cc:	Peter L. Britz
Subject:	FW: 105 Bartlett St before the Conservation Commission 11/4/2020
Date:	Monday, November 2, 2020 8:35:29 AM

From: Nancy Johnson [mailto:n_johnson81@comcast.net]
Sent: Sunday, November 1, 2020 4:14 PM
To: Juliet T.H. Walker <jthwalker@cityofportsmouth.com>; Peter L. Britz <plbritz@cityofportsmouth.com>
Subject: 105 Bartlett St before the Conservation Commission 11/4/2020

Juliet: Please forward the following to the Conservation Commission for their upcoming meeting 11/4/2020.

To: Conservation Commission

We feel that 105 Bartlett has been allowed to schedule a very important meeting with 115 pages of material to study, on a piece of property that consists of 5 lots which are being changed to 5 differently bordered lots, making comparisons almost impossible for concerns such as total amount of untreated water that will be discharged into the North Mill Pond. Also have the required notices to abutters been received by the abutters at least 10 days before the Con Com meeting? We think this project should be rescheduled for the following Con Com meeting on 11/18.

The developers are granting an easement to the City to improve the pedestrian/bike path that locals have used for decades into a formal public multiuse path. The developers are not responsible for the path itself. But they have to provide fire truck access to the Pond side of their proposed buildings. The developers plan on providing rear fire truck access using the 25 to 50 foot buffer that is being granted as the easement to the City for the path. The fire truck access should be considered to be an essential part of the developer's project. The fire truck access has to be wide enough (see previous Con Com meeting) so that the ladder truck(s) have enough stable width to put down the stabilizing legs to support the ladder truck(s) when the firemen are up on the ladders fighting an upper story fire. Because this emergency fire access is a part of the developer's project it should be the responsibility of the developers. Essentially such a wide path behind the buildings situated on the 25 - 50 foot wetland buffer will eliminate most of the wildlife value of the 25 to 50 foot currently heavily vegetated buffer along that part of the Pond. Such a wide clearing will be devastating for wildlife. The area will be left with nothing but dandelions, house sparrows, crows, blue jays and gray squirrels.

Nancy & Brian

Dear Conservation Commission,

I am horrified and saddened by the environmental impact the 105 Barlett St proposal will have on the North Mill Pond and disgusted by Clipper Traders et al's denial of the impacts. Why is dismissal of the 100 ft setback even being considered? Setbacks are about viable ecosystems, not just drainage. If setbacks are too narrow, they can't act as they should. There has to be a critical mass to be effective. New research is showing setbacks should be much larger.

The North Mill Pond is its own entity. Its shoreline, as it exists now with the thickets of trees, shrubs, and grasses, is incredibly valuable for the wildlife and ecosystem of the Pond. Actually, it's more valuable than ever for the whole city because trees and shrubs are being ripped out at every new building or park site around the City. If this time of covid has taught us anything, it is that people need and want the outdoors and nature. Instead, we should be doing more to clean up and reduce the human damage inflicted on the habitat along the Mill Pond's entire shoreline.

In reference to the headings of criteria the Zoning Ordinance requires:

"The land is reasonably suited to the use, activity or alteration."

This land is not suited for excavation because of high ground water levels and man-made toxins stored in the soil. It is also not suited for a raise in grade, let alone the proposed 17 ft increase. Their drainage plans don't nullify their behemoth of impervious materials. How will this play out for the McDonough neighborhood? Increasing runoff and adding more drainage locations into the Mill Pond is their idea of improving water quality for the Mill Pond. Run-off has proven to be environmentally destructive. The track record of care for the Mill Pond from the Clipper Traders individuals is a bad omen.

Also, from a tax payer perspective, the grade increase would be detrimental to all surrounding property values on both sides of the Pond. Not only is the actual building complex taller than anything nearby, but then add 17 ft more of height in grade change. Suddenly, there would be a behemoth that geologically does not belong.

"There is no alternative location outside the wetland buffer that is feasible and reasonable for the proposed use, activity or alteration."

Yes, there are alternatives, and plenty of people have made suggestions. Perhaps the builders/architects aren't creative enough. Maybe Clipper Traders et al only care about making as much money as possible, while they live elsewhere. They should have seen this was not a good property for any building before they bought the parcels… or did they figure they had a sure thing in getting city approval? They don't have to build the project at all.

Perhaps the City could offer them a reasonable price for their unbuildable land and live up to its own "2007 Resolution and Declaration of Portsmouth As An Eco-Municipality" and put in a pedestrian way that is NOT within the 100 ft set back, let alone within the 50 ft setback currently offered up. And then the habitat could be saved and improved. And Portsmouth could keep a real gem!

“There will be no adverse impact on the wetland functional values of the site or surrounding properties.”

The density of the project is not suitable for the ecosystem of the Pond. On one side of the Pond, there are about 25 dwellings for the whole shoreline, most adhering to setbacks or grandfathered in, but many with significant vegetation along the shoreline. If you take the same area of land across the Pond from the proposed project (similar shoreline and non-shore), you find about 14 houses. In that same land mass of 14 homes, the 105 Bartlett project puts in 170+ dwellings and all the hardscaping that goes with it. That’s a 1200% increase in home density for just that area. (And that says nothing about their earlier proposal that might rear its ugly head for units the rest of the way to the track widening.)

The light pollution from those dwellings and all the accompanying all-night lighting for parking lots and walkways would be devastating for the habitat. Learn the lessons from the Foundry Garage.

The high density of human activity would be disruptive and destructive to Mill Pond habitat. Some years back, Ed Hayes had trees and shrubs cleared out (illegally?) along the shoreline for his incoming tenant (Great Rhythm). Between the loss of vegetation and increased human activity there, the nesting area for the great blue heron is gone! Just a couple weeks ago, perching on and soaring over the secluded remnants of the old Turntable building, I counted 14 of what I think were turkey vultures. The North Mill Pond ecosystem is important!

“Alteration of the natural vegetative state or managed woodland will occur only to the extent necessary to achieve construction goals.”

The whole project is designed to destroy habitat well within the 50 ft setback and will damage into the 25 ft setback. Clipper Traders et al shouldn’t have even entertained this project, as they’ve proposed it so far. The buildings themselves sit on or go inside the 50 ft marker. The destruction from construction will get much closer to the shoreline. Once the construction starts and all that area is torn up, the habitats will be destroyed, wildlife killed or driven off.

As for the finished product, the greenway, with all the human activity (and probably night lighting?), is completely inside the 50 ft margin. And the current footprint with the proposed landscaping doesn’t even try to restore it to anything close to natural. It looks like typical, sterile, suburban, office-park landscaping job that is the farthest thing from a native habitat.

The Clipper Traders et al proposal glosses on about public access and educational possibilities – making the reader think they’re going to be improving the shoreline. I’m really tired of people, especially developers selling recreational access as an improved environment. We need to think about the ecosystem and what it needs, not what we can get out of it. When we do take the generous, stewardship direction, not only does nature do better, but we get more existential benefits in the short and long run.

I know I’m supposed to keep this short, but the many issues swirling around this proposal could mean permanent destruction and this is too important to me to be cryptic. For every letter you get there are many more people with the same sentiments.

Thank you,
A concerned Portsmouth resident,
Abigail Gindele
229 Clinton St.

Izak Gilbo

From: JAH <samjakemax@aol.com>
Sent: Monday, November 2, 2020 5:46 PM
To: Izak Gilbo; Peter L. Britz
Subject: Fwd: 105 Bartlett Street Project
Attachments: State of North Mill Pond April, 1998.pdf; B-1.2_PortsmouthResilience_115_Buildings_20120215-small.pdf; B-1.3_PortsmouthResilience_135_Buildings_20120215-small.pdf

Please forward this one to all members of the Conservation Commission also.

Jim Hewitt

-----Original Message-----
From: JAH <samjakemax@aol.com>
To: samjakemax@aol.com
Sent: Mon, Jun 8, 2020 10:02 am
Subject: Fwd: Re: 105 Bartlett Street Project

-----Original Message-----
From: JAH <samjakemax@aol.com>
To: sjm544@comcast.net <sjm544@comcast.net>
Cc: planning@cityofportsmouth.com <planning@cityofportsmouth.com>
Sent: Mon, May 11, 2020 08:38 PM
Subject: Re: 105 Bartlett Street Project

Please ignore earlier e-mail sent prematurely

Dear Conservation Commission Chair Miller:

(Kindly forward to all members of the Conservation Commission)

I understand this project is proposed to be constructed on land that is about 10 to 11 feet above sea level adjacent to North Mill Pond. I find it peculiar that Portsmouth is encouraging development on land that so close to sea level. Portsmouth's own Climate Change and Sea Level Rise expert, Dr Cameron Wake, PhD, of UNH, stated in 2016 the homeowners in low lying areas in the South End should "Sell now while you can still get money out of the home" . (see story on link below) The homes he was encouraging the owners to sell in the South End are at the same elevation above sea level (10 - 11 ft) as the proposed project at 105 Bartlett St. I find it counterintuitive that Portsmouth would allow new development on low lying land that the City's own sea level rise expert is telling City homeowners, with homes at the same elevation, to abandoned because they will soon be flooded on a regular basis.

All this information can be found on the City's Sustainability Coastal Resilience Initiative page here: https://www.cityofportsmouth.com/planportsmouth/cri

Attached are flood maps that depict both the South End properties and the North Mill properties that will be flooded on regular basis from Climate Change sea level rise.

Strawberry Bank has used the 13.5 ft elevation map for its sea level rise planning purposes as shown on the link here: https://www.strawberybanke.org/sea-level-rise.cfm

I would encourage the Conservation Commission to have the applicant present plans that have 1 foot land contours to show how different sea level rise scenarios (11.5 feet and 13.5 feet) would affect this property, along with the lowest building floor elevations.

I also believe the attached "State of the North Mill Pond" study of April, 1998 would be useful for commission members to read.

https://www.seacoastonline.com/article/20160323/NEWS/160329641

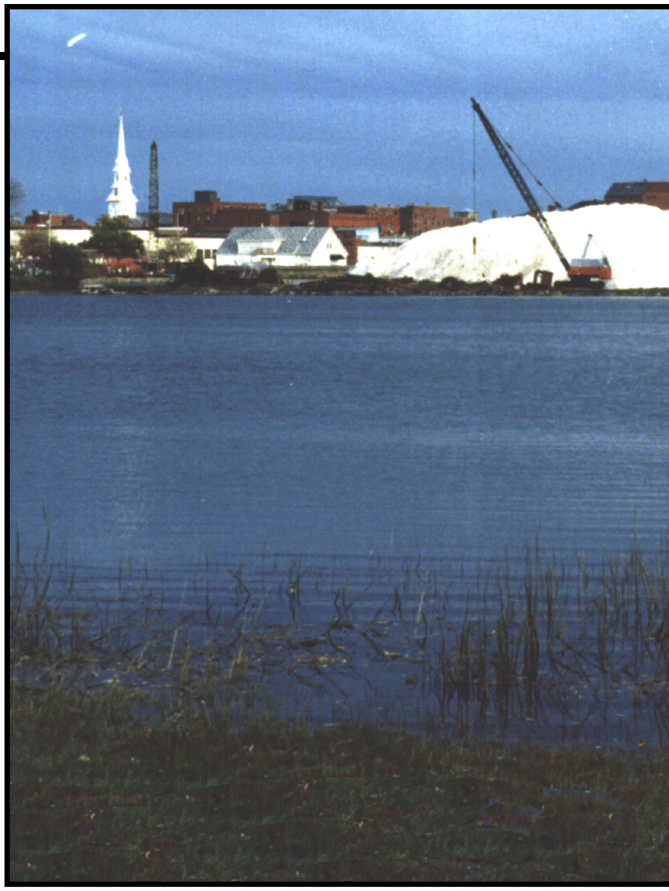
https://www.seacoastonline.com/article/20160329/news/160329077

Regards,

Jim Hewitt

Map B-1.2
Portsmouth Resilience Initiative
Buildings Impacted
Stillwater Elevation 11.5 feet NAVD
February 2013


Legend
Sub-Area Boundaries
Portsmouth Boundary
Railroads
Mean High Water Line
Buildings Impacted
All Buildings
North
Central
South
Sagamore
Flood Depths
0 - 3 Feet
3 - 6 Feet
6 - 9 Feet
> 9 Feet
Map B-1.3
Portsmouth Resilience Initiative
Buildings Impacted
Stillwater Elevation 13.5 feet NAVD
February 2013
Note: Depth of Flooding = Stillwater Elevation minus Ground Surface Elevation
0 0.2 0.4 0.6 0.8 1 mile
Data Sources: NH GRANIT, USGS, City of Portsmouth, Google
Map data ©2013 Google - Terms of Use



The State of the North Mill Pond

Portsmouth, New Hampshire

A Report to the
New Hampshire Estuaries Project
Submitted by

The Advocates for the North Mill Pond
April 1998

New Hampshire Estuaries Project

This project was funded in part by a grant from the Office of State Planning, New Hampshire Estuaries Project, as authorized by the U.S. Environmental Protection Agency pursuant to Section 320 of the Clean Water Act.

Other funding supplied by Greater Piscataqua Community Foundation, New England Grassroots Environmental Fund, and the City of Portsmouth.

The State of the North Mill Pond
Portsmouth, New Hampshire

A Draft Report to
the New Hampshire Estuaries Project
Submitted by

The Advocates for the North Mill Pond
March 1998

Edited by Doug Bogen

Contributors:
Doug Bogen
David Burdick
Nancy Johnson
Doreen MacGillis
Mark Mattson
Steve Miller
Melody Nestor
Ann Reid

Report Design and Production
Patricia Miller

Funded by

Office of State Planning/New Hampshire Estuaries Project

City of Portsmouth

The New Hampshire Charitable Foundation's
Greater Piscataqua Community Fund and
New England Grassroots Environmental Fund

Contact Information

Advocates For North Mill Pond

230 McDonough Street
Portsmouth, NH 03801

For information, contact Steve Miller at 603-433-1160 or
Doreen MacGillis at 603-431-9246

Great Bay Watch

c/o Sea Grant Extension
Kingman Farm, UNH
Durham, NH 03824

For information, contact Ann Reid at 603-749-1565

Clean Water Action/Clean Water Fund

163 Court Street
Portsmouth, NH 03801

For information, contact Doug Bogen at 603-430-9565

Jackson Estuarine Laboratory

85 Adams Point Road
Durham, NH 03824

For more information, contact David Burdick at 603-862-2175

New Hampshire Estuaries Program

152 Court Street
Portsmouth, NH 03801

For more information, contact Chris Nash at 603-433-7187 or Jim Chase at 603-436-8043

Table of Contents

FIGURES

TABLES

EXECUTIVE SUMMARY

This report presents the results and recommendations of a year-long project conducted by members of Advocates for the North Mill Pond to assess the health of this tidal pond in Portsmouth, New Hampshire. Despite being literally right in the backyards of much of the citizenry of Portsmouth, the North Mill Pond is a largely unknown and neglected quantity for most people. In the past, little research had been done on the health or dynamics of the Pond, and little but speculation existed on what kinds and degrees of pollution were impacting it.

Our aim in this project was to conduct a natural resource and pollution source survey of the Pond, as well as initiate a water quality monitoring program that would provide baseline data for existing and proposed shoreline and wetland restoration projects at the Pond. During the summer and fall of 1997, teams of volunteers combed the shorelines of the Pond, identifying plant and animal life, searching for wastewater discharge pipes, measuring incoming water flows, and collecting water and sediment samples, all in an effort to quantify some of the resources and pollution factors in and around the Pond.

While no limited inquiry such as this could hope to tease out all the various factors impacting a given body of water, the image of the North Mill Pond that this study presents is that of an abused and neglected but resilient and functioning ecosystem. Despite the historical diminishment of its shorelines and saltmarshes, it continues to provide important habitat and feeding grounds for many species of birds, finfish and shellfish.

Its waters are often contaminated by human and/or animal wastes and other typical urban pollution from a number of point-source discharges and its upstream watershed. Of particular concern are the indications of excess nutrients and fecal matter entering the Pond from its freshwater inlet at Hodgson Brook and several other point sources. Its sediments are contaminated with toxic heavy metals and petroleum byproducts at levels which could be affecting organisms within the Pond. Our most troubling finding is the presence of dioxins and furans in the southeasternmost mudflats at levels that may not be safe for human exposure and could complicate plans for greater public assess. Continued threats to the health of the Pond include encroachment to its saltmarshes by both residential and commercial activities, polluted runoff from developed areas, and continued fecal contamination from a few residences, stormdrains and upstream sources.

Key Recommendations:

1) Sewage discharges to the Pond, including all drain pipes and upstream sources, should be investigated further and reduced to the maximum extent possible.
2) Further research should be conducted on dioxin/furan and polycyclic aromatic hydrocarbon contamination in the southern end of the Pond, and a determination made on need for clean-up or access restrictions.
3) The City of Portsmouth should enforce existing land use ordinances and wetland regulations as they pertain to the Pond.

In addition to the need for cleaning up past abuses, the findings of this study also present us with numerous opportunities for preservation and restoration of the Pond's attributes. What will be required to make this promise a reality is the continued commitment of the many local volunteers that made this project possible, along with the hastened cooperation of local and state authorities and adjacent landowners. A restored and prolific North Mill Pond can only bring benefit to our surrounding community, in ecological, aesthetic and economic senses.

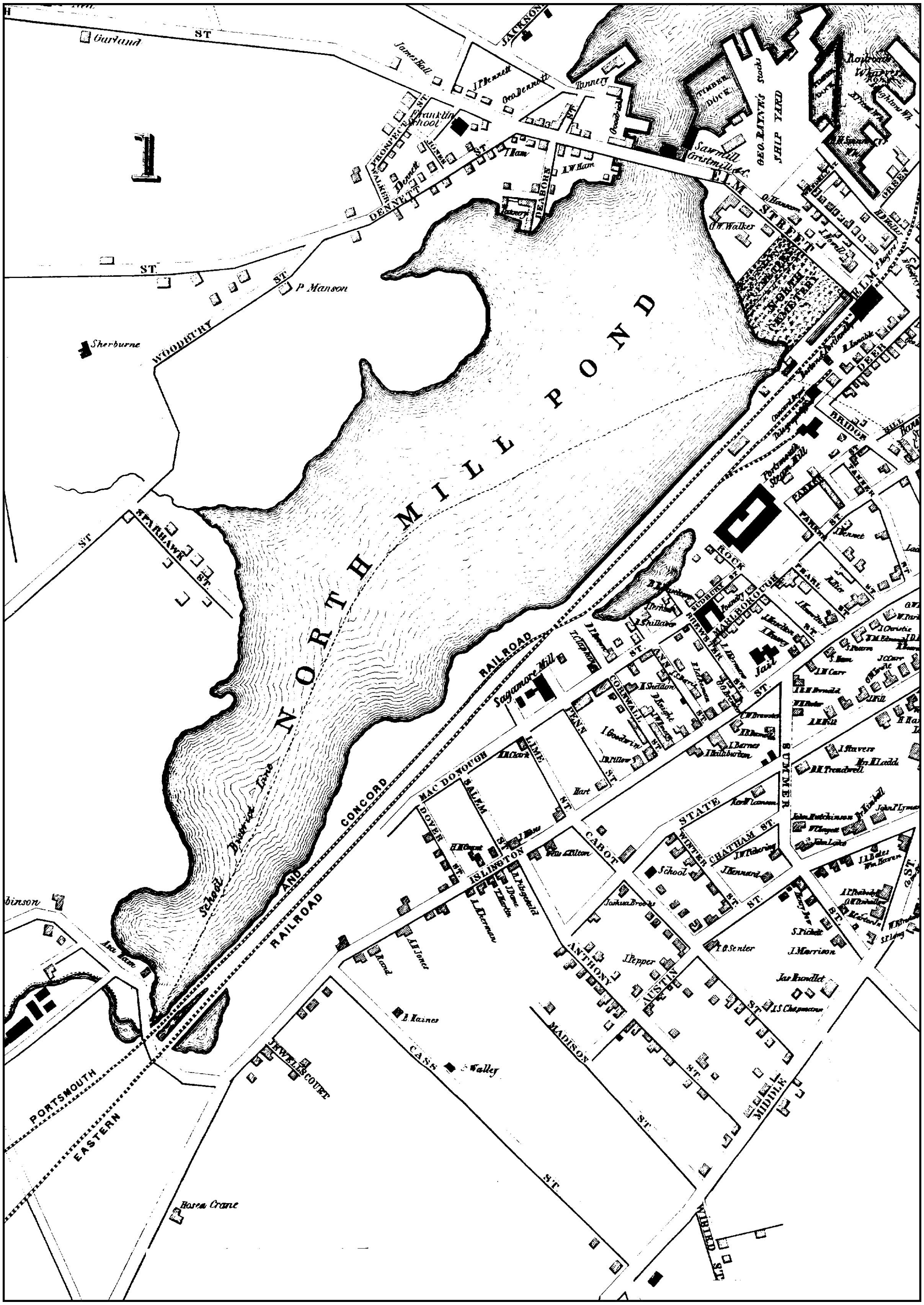


__Figure 1__. The North Mill Pond, ca. 1850. From Map of the City of Portsmouth, NH from Original Surveys under the direction of H.F. Walling, Civil Engineer, C.W. Brewster, Publisher, 1850.

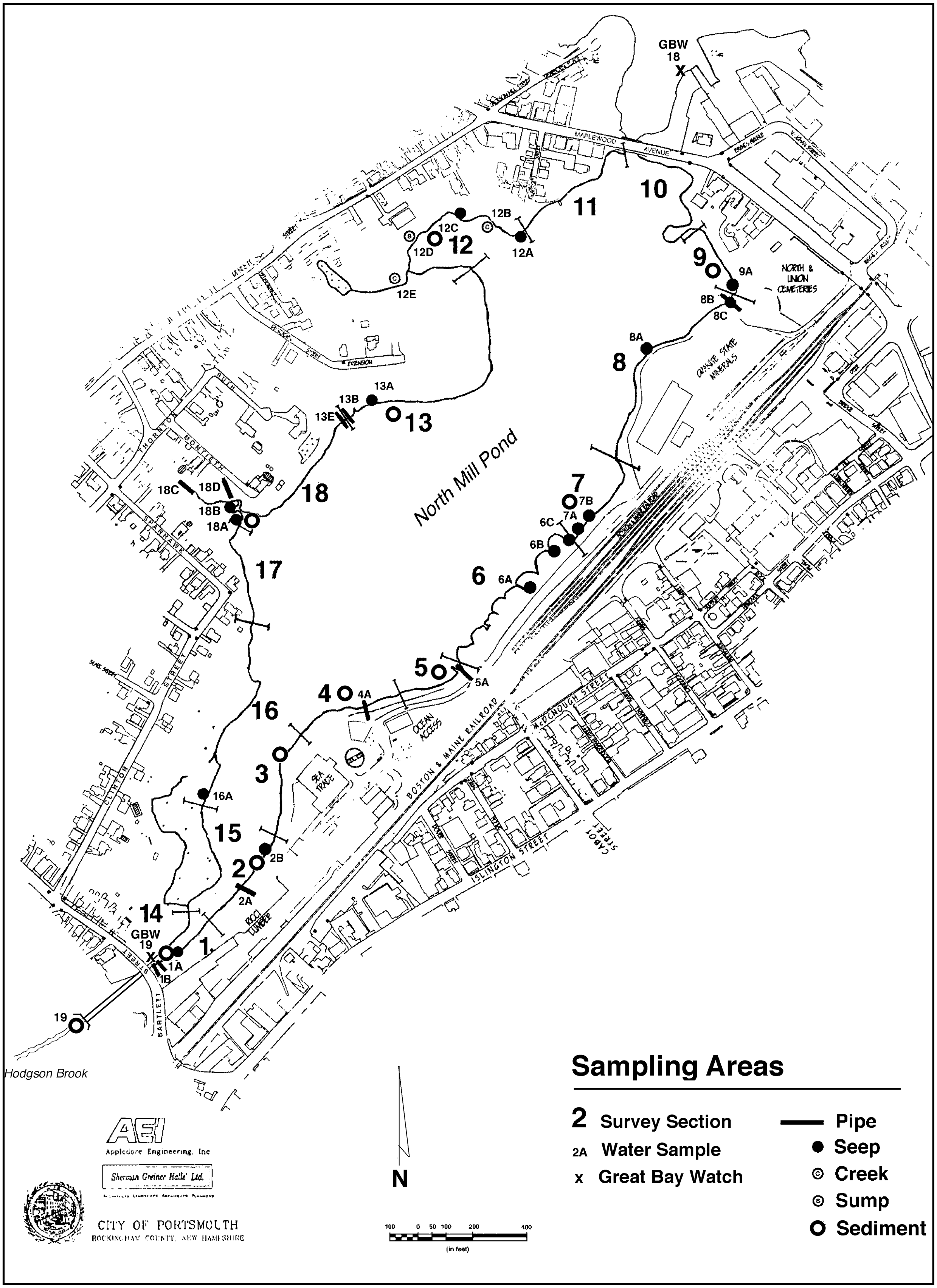


Figure 2. Contemporary view of North Mill Pond, showing ANMP project sampling and survey areas.

Acknowledgments

This report is dedicated to those who have helped clean up the Pond and who are working to create a safe and healthy environment, allowing more people to enjoy the area. Special thanks go to Melody Nestor for organizing the Advocates for the North Mill Pond and for all her efforts in bringing the community's attention to the Pond and its neighborhoods.

Labs and Contractors:

We would like to thank the laboratories and other institutions that provided the data analysis and other technical support for this project:

Citizens Environmental Laboratory, Clean Water Fund, Great Bay Watch, Jackson Estuarine Lab, and Normandeau Associates Inc. Also, Arthur Rose, Professor Emeritus, Geochemistry, State College PA, for assistance in interpretation of sediment sampling results

Volunteers:

This project was dependent on the time and abilities of many volunteers, including:

Shoreline Survey:
Lab: Shanna Burt, Kim Foley, Amy Manzelli, Chad Turmelle, Dave Waltz.
Field: Doug Bogen, David Burdick, Chris Johnson, Nancy Johnson, Doreen MacGillis, Ann Reid, and Anne Smith

Shellfish Survey
David Burdick, Doreen MacGillis, Nancy Johnson, David Cohen, Doug Bogen, and Melody Nestor

Fish Survey
Brad Agius, Alison Bowden, Michele Dionne, Tin Smith, and Scott Oringer

Bird Survey
Steve Miller and Tricia Miller

Water Flow Monitoring and Storm Water Sampling
Doug Bogen, and Mark Mattson

Great Bay Watch Water Testing:
Jim Chase, Kathy Driscoll, Nancy Johnson, Steve Miller, Tricia Miller, Ann Smith, Steve Wallace. **QAQC**: Shanna Burt, Kim Foley, Amy Manzelli, and Ann Reid

Sediment and VOC Sampling
Doug Bogen, David Burdick, Steve Miller, Melody Nestor, and Ann Reid

Shoreline Cleanup
Planning and Clean Up: Kathy Hoerbinger, Marty Hoerbinger, Ginny Swift, Harry Swift, Melody Nester, Ed Nester, Doreen MacGillis, Alison McCarthy, and David Slanetz.

Clean Up Crew: Michale Bailey, Doug Bogen, Jennifer Bosworth, Alison Bowden, Liz Bratter, Dave Burdick, Jeffrey Cooper, Nicole Cooper, Ryan Davis, John Jacobsmeyer, Brian Johnson, Nancy Johnson, Christina Johnson, Ed Hayes, Cynthia Lay, Libby Carlisle, Jeffrey Carlisle, Eileen MacDonald, Gabe Memmert, John Mersereau, Steve Miller, Tricia Miller, Miriam Rosenson, Sally Rosenson, Robert Padian, Dean Plager, Michele Richard, Dana Skiffington, and Mike Spinsosa.

INTRODUCTION

The physical environment of North Mill Pond is that of a shallow, urban, tidal pond. It receives freshwater inflow primarily from Hodgson Brook, which enters the pond from the southwest by passing under a bridge over Bartlett Street, and from storm drains and surface runoff along both northwest and southeast shores. The North Mill Pond also receives a substantial tidal flow during flood tides that enter the pond from the northeast under the bridge at Maplewood Avenue.

Formerly there were tide gates under the Maplewood Avenue bridge that were used to impound the water, with only occasional flushes. An auto accident in the 1950s destroyed the tide gates. By the early 1980s the North Mill Pond was slowly but visibly becoming a functioning tidal marsh again. Sightings of horseshoe crabs, clam holes, mummichogs, egrets, gulls, night herons, nesting wood ducks, and numerous small birds, especially on the mud flats at low tide, were noted with enthusiasm by some residents.

North Mill Pond is and has been a central part of Portsmouth's commercial and residential development. However, despite being literally right in the backyards of much of the citizenry of Portsmouth, the North Mill Pond is a largely unknown entity to most people. In the past, little research had been done on the health or dynamics of the pond, and limited data existed on what kinds and degrees of pollution were impacting it.

The land surrounding the North Mill Pond is among the most significantly impacted in the Portsmouth region, as it was one of the first areas to experience industrial development. The northern shore of the pond and its immediate headwaters has had residential development for over a century, with impacts from both runoff and sewer/septic leakage. Changes to the Pond's features include its initial impoundment to provide mill power, and substantial filling of its saltmarsh on the southern shore for rail lines and commercial development.

Current industries affecting the pond include seafood processing, marine contracting, salt storage, and ongoing freight rail operations. The former Pease Air Force Base (now Pease International Tradeport) encompasses the headwaters of Hodgson Brook. With the closure of the base, numerous toxic contamination sites are being remediated and monitored as part of a Superfund process, but up until now, no testing of waters and sediments off-base in Hodgson Brook had been done. Recent use of urea for de-icing at the airport has led to increases in nitrates in groundwater there, though it is unknown what affect its use has been on surface waters. Additionally, a major fire in May, 1991 that destroyed Ricci Supply, located on the southwest corner of the pond, could have had a significant contamination impact on the pond.

Another more obvious impact on the health of the North Mill Pond is the presence of accumulated rubbish and industrial waste along the shores and mudflats of the pond. Not only is this dumping having an impact on the ecology of the pond, but it clearly detracts from the aesthetic quality of the area and symbolizes the general abandonment of the space by adjacent businesses and the community. While volunteer shoreline cleanups were conducted during the past two summers along the railroad right-of-way, there remains a quantity of heavier and less accessible material (e.g., on the mudflats) as well as further contributions by "midnight dumpers" to contend with.

Despite its degraded state, the pond remains a significant habitat for shorebirds, fish and other estuarine life. Growing interest from nearby residents in furthering public awareness and taking on greater stewardship of this resource resulted in the formation of Advocates for the North Mill Pond (ANMP) in February of 1997. In addition to hosting annual trash clean-ups, ANMP recognized a need for baseline data on the existing ecological health of the pond to determine opportunities and priorities for pollution abatement and restoration of the pond's aesthetic and ecological qualities.

With funding from the New Hampshire Estuaries Project, the New England Grassroots Environmental Fund, the Greater Piscataqua Community Foundation, and the City of Portsmouth, ANMP initiated a water quality monitoring and pollution source identification program, along with a natural resources survey for the North Mill Pond. Additionally, establishment of Great Bay Watch (GBW) monitoring sites at the mouth and headwaters of the North Mill Pond has filled a critical data gap in GBW's knowledge of the waters of the Estuary. This project has also produced an ecological baseline that can be used as a reference in the ongoing remediation/restoration of the Pond and adjacent waters being carried out as part of the New Hampshire Port Authority Expansion Project.

In addition, it has created a focal point for greater citizen awareness and involvement in preserving/enhancing the Pond's resources for the future of the city.

This report describes the three main parts of our general inquiry into the ecological health of the North Mill Pond, including natural resource surveys, water quality testing and monitoring, and sediment sampling. Each of these sections is in turn broken down into specific projects and analyses to provide a broad but focused view of existing conditions in the Pond and possible threats to preservation or continued restoration.

All sample numbers refer to shoreline sections depicted in Figure 3 in the first section, except for GBW sites on the Pond, which are two of 21 throughout the Great Bay Estuary. More specific sampling locations can be found in other maps in following sections.

PROJECT DESCRIPTION

NATURAL RESOURCE SURVEYS

Shoreline

David M. Burdick

Introduction

In order to characterize conditions around the Pond, a shoreline survey was performed using the Shoreline Evaluation Form, developed in cooperation with the Cooperative Extension Service, and the New Hampshire Estuaries Project. The shoreline survey helped to objectively identify and evaluate shoreline conditions, potential pollution sources and estuarine habitats by characterizing land use, shoreline development and habitat health. As part of the survey, water samples were collected and assayed for the presence and abundance of coliform bacteria. In addition, the survey helped to identify and characterize several specific shellfish resources.

Methods

A simple checklist was used in conjunction with water sample collections to evaluate shoreline conditions, potential pollution sources and estuarine habitats. The checklist, called the NEP Shoreline Evaluation Form, was developed for the New Hampshire Estuaries Program and is attached in Appendix A. It provided a way for volunteers to objectively assess shoreline conditions and highlight potential pollution problems that could be investigated further at a later date.

The survey teams were composed of lay volunteers and two to three volunteers professionally involved in water or habitat quality issues. The Shoreline Evaluation Form was followed and water samples were collected for coliform analysis. The Pond was divided into 18 sections for the survey, with a data sheet for each section. These numbered sections were also used for identifying sites in subsequent water and sediment sampling (see Figure 3). The survey was conducted over four dates: two in June and one each in July and August, 1997. Volunteers participated in training and work sessions for shoreline evaluations in June and July 1997 to learn how to fill out the checklist. The sessions informed participants how to recognize different conditions that would indicate potential pollution sources as well as natural processes.

Results

Land use was characterized around the entire Inner North Mill Pond to relate development to habitat and water quality. Most of the Pond is surrounded by buildings, roads parking and other structures (Appendix B). On the southeastern side, this development is characterized as commercial, with the railroad owning most of this shore. In contrast, the western shore is generally residential, but still highly developed. Most of the sections show eroding banks along the edge of the Pond with fill or rip-rap coverings and buildings or other structures commonly built up to the bank.

More often than not, direct evidence of ground water discharge cannot be observed along shorelines. Observations of iron oxides on coarser sediments, and indicator plants such as Common Reed, Purple Loosestrife and green algae helped to identify areas of ground water discharge (Appendix B). Ground water samples were collected from these sites for fecal coliform analyses. A total of eight outfall pipes actively discharging water into the

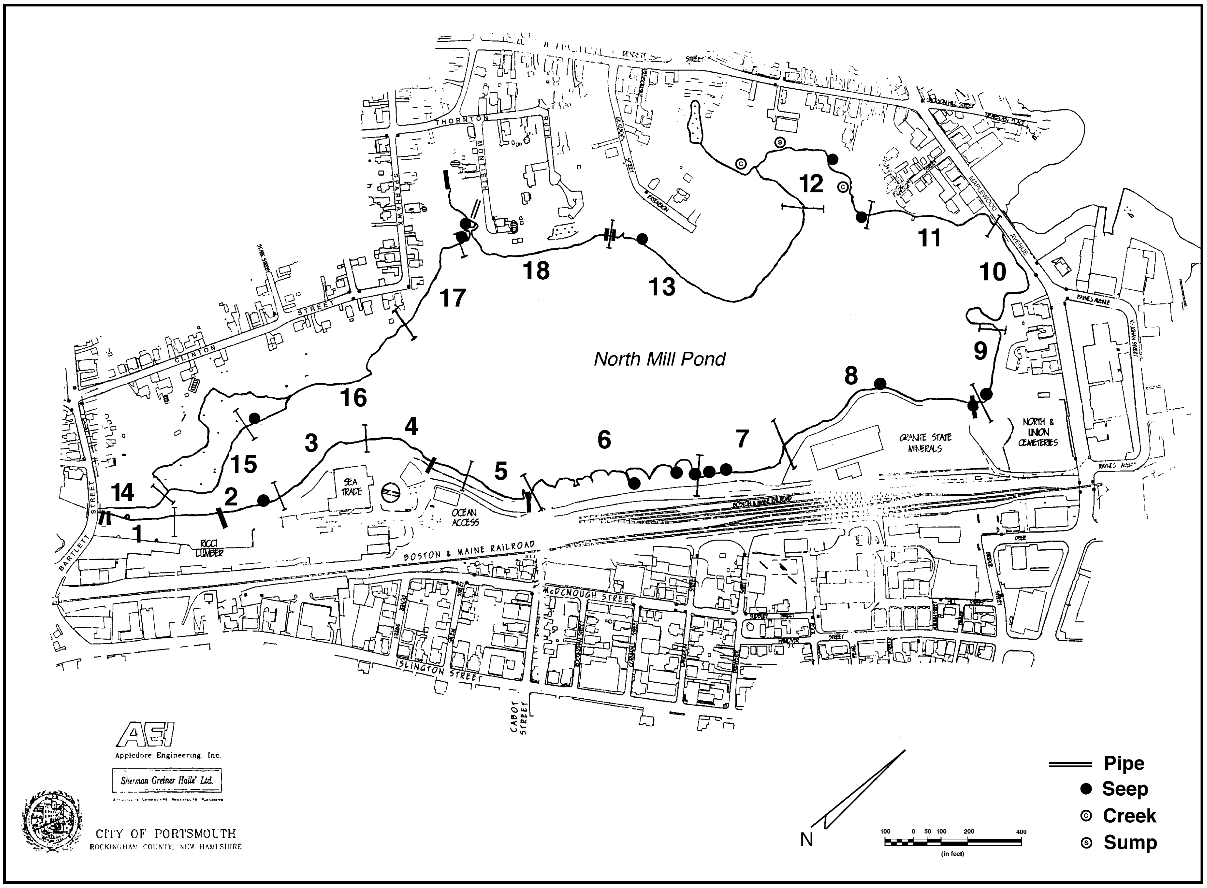


Figure 3. *Shoreline Survey at North Mill Pond, showing survey sections 1 though 18 and shoreline features.*

Pond were found and sampled, and two other dry pipes were identified along the shoreline. Although not associated with pipes, 14 seeps were identified and sampled. Fecal coliform counts were very high and the most contaminated outfalls and seeps had no salinity (i.e. were fresh). Results of this sampling are found in the water quality section, p. 18).

Observations of shellfish resources were made to increase our knowledge of these resources in the Pond. No horseshoe crabs were observed during the shoreline survey. Clam holes were counted (intertidal areas only), and the relative abundance of both blue mussels and oysters were noted. The data collected in the shoreline surveys regarding shellfish resources are presented and discussed in the next section.

Discussion and Conclusions

The trends in the data characterize the southern end of the Pond as most degraded in terms of eutrophication, sewage contamination as well as other types of pollution. We have identified this area of the Pond as having high risk factors for water quality as well as habitat health. Two other areas of concern regarding pollution and habitat health are the areas by Monteith Street and between the cemetery and Granite State Minerals.

Salt marshes provide several important ecological services to estuarine ecosystems. From a rather narrow human view, these services include: habitat for commercially and economically important animals, filtration of sediments and contaminants, nutrient transformations, erosion control and flood control. In providing these services, salt marshes improve water quality. Although the health of these systems is important to water quality as well as estuarine health, salt marshes in New Hampshire continue to be degraded and destroyed. Most of the salt marshes within the North Mill Pond have had their upland edges filled by development. Of the 18 sections of shoreline, 17 are categorized as showing evidence of fill on existing salt marsh. Eleven sections had evidence of erosion at their edges and marshes in seven sections showed signs of fragmentation. Three sections showed that marshes were covered by algal mats and another marsh had been mowed. The algal mats were associated with heavy green algal blooms on the sediments in sections 14 and 1 to 5, (i.e. around the southwest/ inlet end of the pond) indicating the presence of excess nutrients.

Shellfish

David M. Burdick

Introduction

North Mill Pond shellfish surveys were conducted by volunteers during summer and fall of 1997. Beside the direct or commercial values of some benthic invertebrates such as soft-shelled clams and clam worms, benthic invertebrates can indicate the relative health of the community of benthic organisms within a water body. A shoreline survey performed using the NEP Shoreline Evaluation Form provided a qualitative description of mussel and oyster abundance and estimates of clam hole densities in the area. Four areas of the Pond were selected for benthic sampling based on numbers of clam holes observed during the shoreline survey (see Appendix B).

Methods

The shoreline survey included observations of shellfish resources to increase our knowledge of these resources in the Pond. Clam holes were counted (intertidal areas only), and the relative abundance of both blue mussels and oysters were noted. The shoreline evaluation procedure is described in Appendix A and a description of the specific procedure for using the North Mill Pond survey is found elsewhere in this report.

The teams for the benthic surveys were composed of about 1-2 lay volunteers and 1-2 volunteers professionally involved in water or habitat quality issues. The benthic survey was conducted on two days in fall 1997: October 2 and 11th. The Standard Operating Procedure for the Shellfish Survey (found in Appendix A) was followed. The benthic survey included four sites: two were chosen with high densities of clam holes (5.25 - 14.0/m^2), and two were chosen with low densities (0.0 - 3.0/m^2).

Figure 4. *Shellfish samplers David Burdick, Doreen MacGillis, and Nancy Johnson on the central southeast shore of North Mill Pond.*

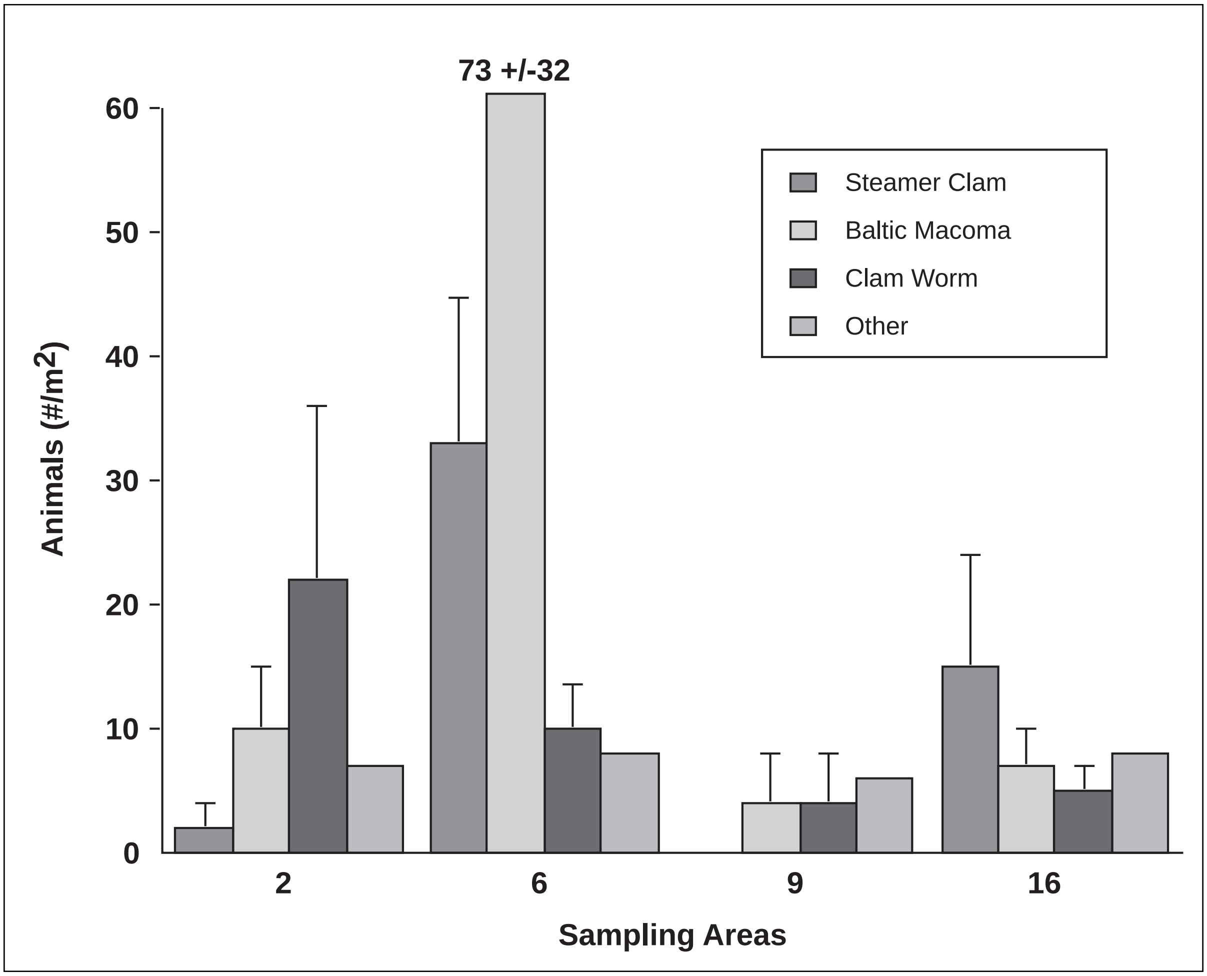


Figure 5. *Relative quantities of benthic invertebrates found at four sampling areas of North Mill Pond.*

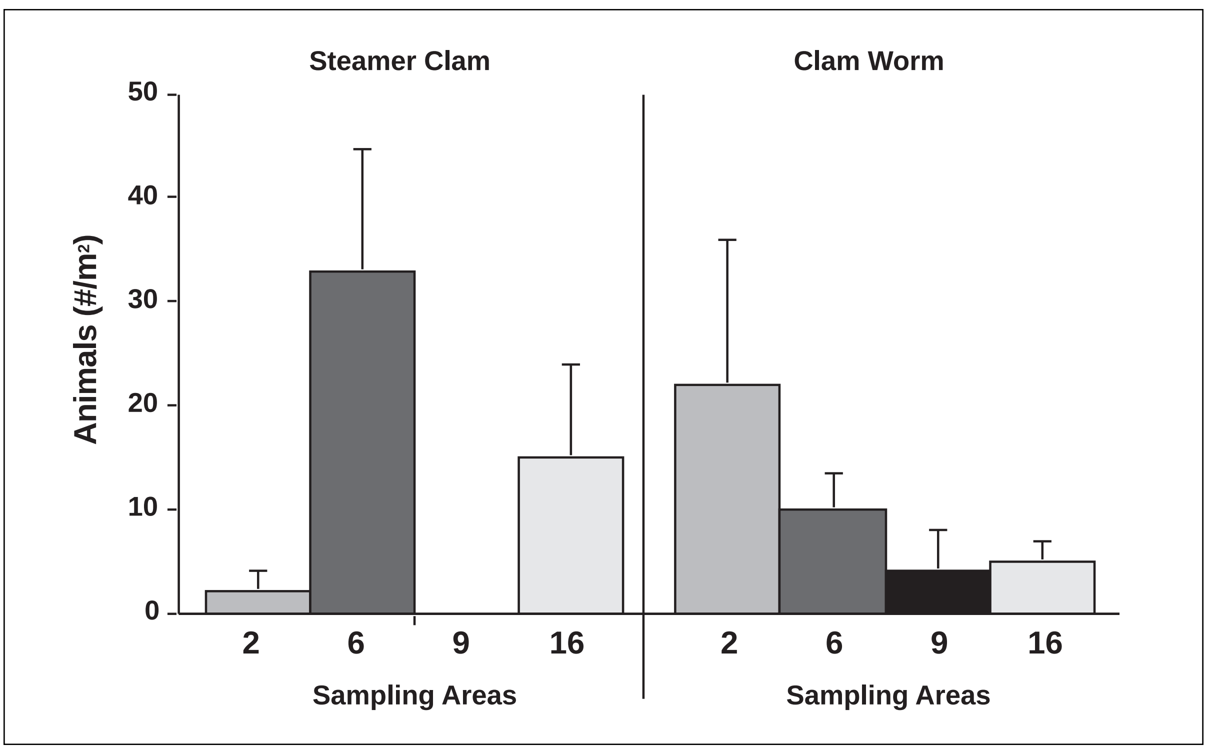


Figure 6. *Relative quantities of two benthic invertebrates in four sampling areas of North Mill Pond.*

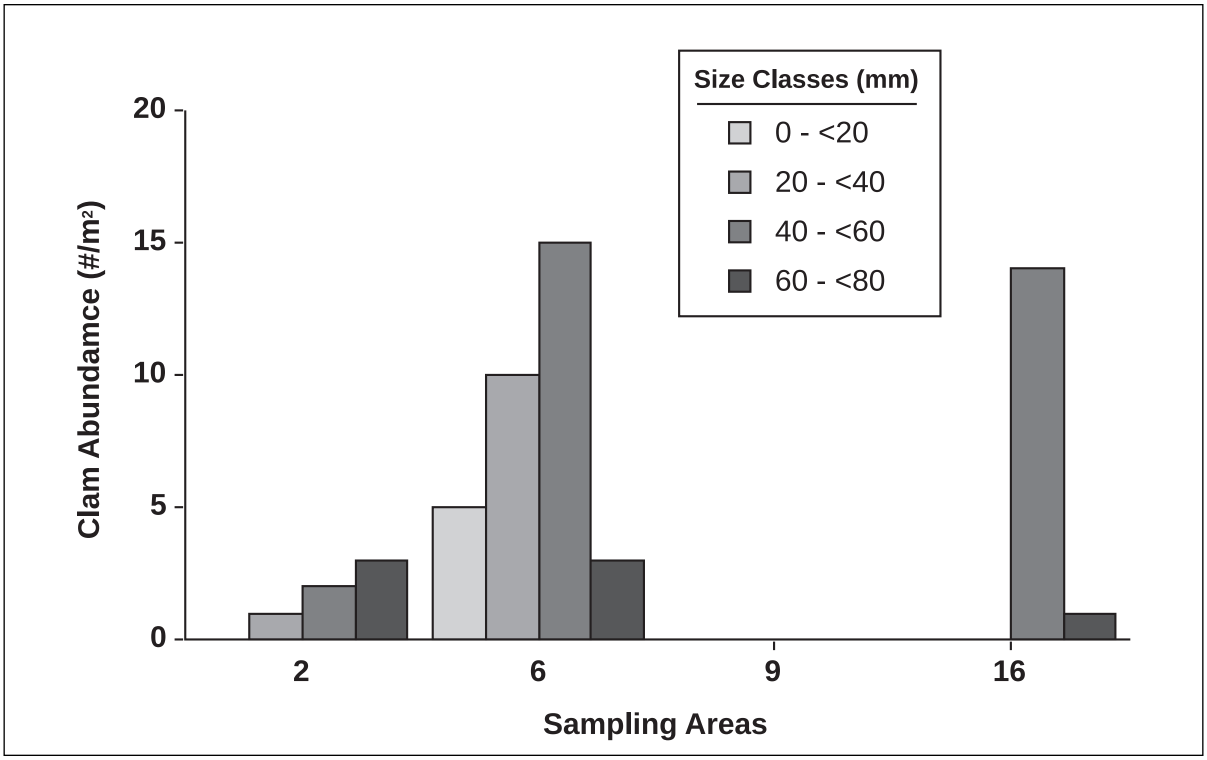


Figure 7. *Size-frequency distribution for soft-shelled clams.*

Results

During the shoreline survey, blue mussels were abundant and found in clumps in the subtidal portion of the Pond near the Maplewood Avenue bridge (Appendix B). Oysters were never found. The estimates of clam hole density ranged from 0 to 26 per square meter.

Benthic sampling found that the two high density sites yielded an average of $24/m^2$ soft-shelled clams (*Mya arenaria*) while only $1.0/m^2$ clams were found at the two low density sites. Other species found in the benthic samples were the clam worm (*Nereis virens*), Balthic macoma clam, an Anthurid isopod, green crabs and another species of worm (unknown) (Appendix B). In general, areas near sites suspected of high pollutant loads and concentrations (extreme northern and southern ends of the Pond near the bridges) supported the least number of clams. The areas with the greatest number of clams were found seaward of salt marshes (natural and created).

Animals greater than 1 centimeter in size were collected, identified and measured from 14 quadrats at four sites around the Pond. Overall, 214 animals were found as shown in Table 1. The majority (67%) belonged to two species of bivalve: soft-shelled clam and Baltic macoma, and most of the remaining animals were clam worms (19%). The relative abundances of the benthic invertebrates is illustrated in Figure 5. Other animals that were found included a mud-dwelling Anthurid isopod that was abundant (9%); less common were green crabs (1%), and an unidentified pink worm (3%).

Our shoreline survey suggested a low clam population at both ends of the eastern, industrialized side (sites 2 and 9), with moderate to high numbers in the eastern center (site 6: in front of the created marsh) and much of the western side of the Pond. These estimates were borne out by the actual collections which showed significant differences when numbers of soft-shelled clams from high and low density sites were compared. The two high density sites (6 and 16) both supported greater soft-shelled clam densities than did the two low density sites (2 and 9; Figure 6). On average, 24/m^2 soft-shelled clams (*Mya arenaria*) were found at the two high density sites, while only 1.0/m^2 clams were found at the two low density sites. Clam sizes were generally restricted to larger size classes at sites 2 and 16, with all size classes up to 80 mm represented at site 6 (Figure 7).

Discussion and Conclusions

The presence of filter feeding clams of commercial value in North Mill Pond (soft-shelled clams and blue mussels), highlights the complexity of ecological health and public health issues in the management of coastal tidal ponds and their resources. This survey was not intended to provide a foundation or impetus to open this area to shellfishing for human consumption, but as a tool to assess the health of the pond and a guide to helping the human community become involved in decision making regarding the natural resources of the pond. Our results considered in light of the other parts of this report suggest there is a small shellfish resource in the Pond that is likely a significant resource to higher trophic levels. However, these shellfish are likely to be be contaminated by sewage as well as heavy metal and hydrocarbon contaminants (see Water Quality and Sediment Sampling sections of report). We recognize that these shellfish provide support for fish and wildlife higher in the food web of the Pond and are concerned that certain contaminants may compromise the ability of these wild animals to survive. Two important points are that the shellfish resources appear to be more abundant and may be healthier in the less impacted areas along the southeastern and northwestern sides of the Pond. Furthermore, the benthic habitat in the subtidal area at the northeastern end of the Pond, which is dominated by blue mussels, also appears healthy.

Table 1. Benthic Infauna of Lower Intertidal Zone identified in shellfish survey, North Mill Pond.

	SITE				Total Indiv.
	2	6	9	16	Collected
Mya arenaria (Soft-Shelled Clam)	2	33	0	15	50
Macoma balthica (Baltic Macoma)	10	73	4	7	94
Nereis spp. (Clam Worm)	22	10	4	5	41
Anthurid Isopod	7	8	0	5	20
Unknown worm	0	0	6	0	6
Carcinus maenas (Green Crab)	0	0	0	3	3
Totals per site	41	124	14	35	**214**

Fish

David M. Burdick

Introduction

Fish were sampled on each side of the Pond using fyke nets on two occasions in 1997 to determine the species and abundances of fish using the intertidal habitat at North Mill Pond. In order to characterize the type and abundance of forage fish in the Pond, a fish survey was performed using fyke nets. Fyke nets are long, low nets that steer fish into a trap after they swim into shallow waters with the incoming tide.

Methods

The survey teams were composed of two to three professional researchers. The created marsh (labeled INMP-C), is located on the eastern shore of North Mill Pond, adjacent to the railroad tracks and the gravel access road. The reference marsh (INMP-R), is located on the western shore, at the end of Monteith Street. Fyke nets with two 15 meter long wings were used to sample fish at each site during June and September 1997. Sampling followed the Standard Operating Procedure (SOP) found in Appendix A. In brief, nets were set on rising evening tides and retrieved several hours later on a falling tide, after the water level dropped below the level of the first fyke. In each sample all fish were identified to species, counted, and measured for total length. Total biovolume was also measured for each species. If more than thirty individuals of a species were captured, a random sample of thirty was selected and measured for total length and biovolume. Following identification and measurements, the fish were released. Data reported here includes species and abundance. The high tide line was marked with garden stakes, and the area of marsh sampled was calculated for each site.

Results

Five species of fish totaling 136 individuals as well as 71 green crabs and 8 shrimp were caught in the fyke nets. The fish species included, from most to least numerous: 118 mummichogs, 6 American eels, 6 Atlantic silversides, 3 alewife, and 3 tomcod. Mummichogs were the most abundant fish and were caught in both nets on both sampling dates. Averaging over 10 individuals per 100 square meters of marsh fished, this species

Table 2. Fish Abundances in the Intertidal Salt Marsh.*

		CREATED MARSH		REFERENCE MARSH	
		June	**Sept**	**June**	**Sept**
Alosa pseudoharengus	alewife	0.99	0	0	0
Anguila rostrata	American eel	0.33	0	0.3398	1.6227
Fundulus heteroclitus	mummichog	12.57	8.6713	2.3785	17.0385
Menidia menidia	Atlantic silverside	0.33	1.1189	0	0.4057
Microgadus tomcod	tomcod	0	0	1.0194	0
Carcinus maenus	green crab	7.61	2.5175	5.7764	8.9249
Paleaomonaetes sp.	shrimp	2.65	0	0	0

**Values represent number of individuals per square meter caught in fyke nets.*

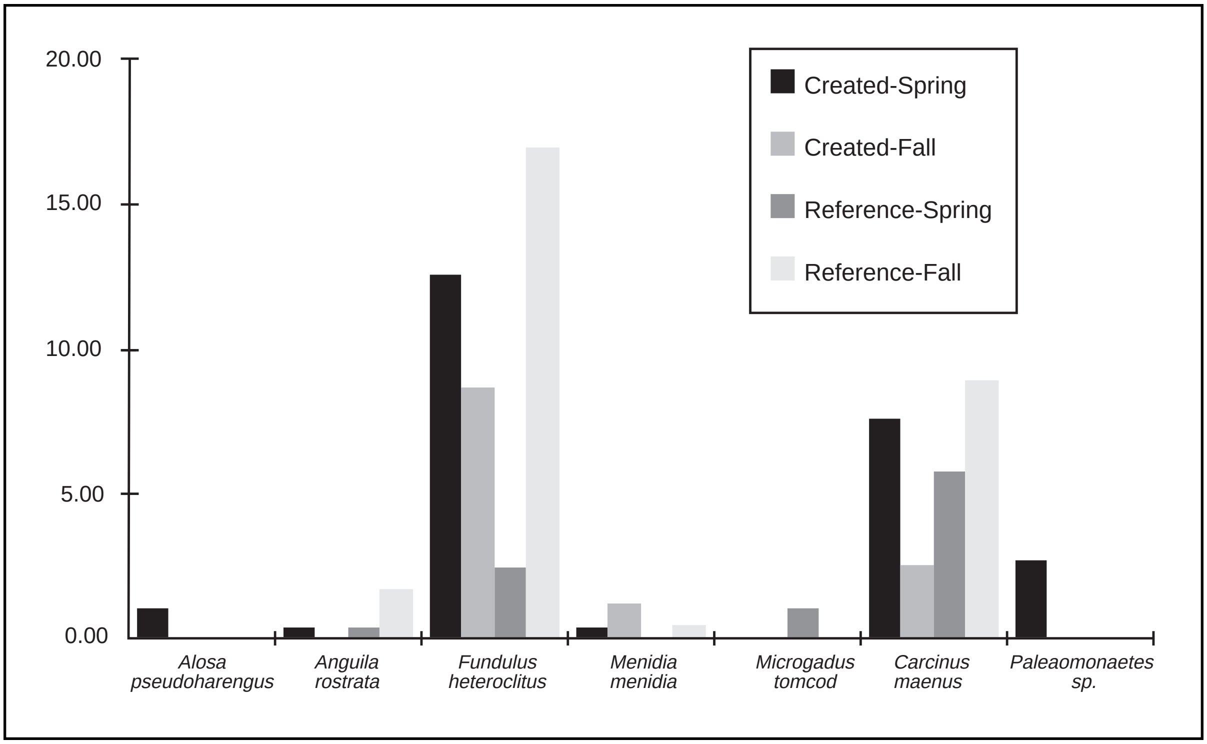


Figure 8. *Abundance of fish and crustaceans in the North Mill Pond.*

can be considered abundant in North Mill Pond (Table 2). American eels and Atlantic silversides were found in three of the four catches and averaged about 6 individuals per 1000 square meters of marsh fished. These species should be considered common in the Pond. Green crabs were caught in all four efforts and they were abundant, averaging 6 individuals per 100 square meters (Figure 8). Both tomcod and alewife were caught only once, with both efforts yielding three individuals. These two less common species as well as the Atlantic silversides and abundant mummichogs are important forage fish in the Pond. They provide food for wading birds and raptors as well as sport fish like bluefish and striped bass.

Conclusion

This information could become important baseline data for future resource management. Further surveys could provide data necessary to determine changes in species or abundances as a result of a change in conditions, management strategies, or in response to a local catastrophe (e.g. an oil spill). Further investigations could determine the roles of these forage fish in the Pond ecosystem.

Birds

Steve J. Miller

Introduction

The goal of this study was to survey the bird species that utilize the North Mill Pond during a specific time period. Another recent bird survey was done as part of a wildlife habitat evaluation by the U.S. Fish and Wildlife Service in 1991 as part of the NH Port Authority Expansion Project. That study will be reviewed in this discussion.

Methods

Bird species that utilize the North Mill Pond were surveyed on ten dates between August and November 1997. The surveys focused on those species of birds that feed on the pond or the mud flats at low tide. Bird species that live in the neighborhoods around the pond were not specifically surveyed.

The first surveys were made by walking around the pond and making observations from any location that afforded an overall view, such as from the Maplewood Avenue bridge and from the eastern shore. Two locations on the Northwest shore were identified that allowed a full view of the pond: the end of Monteith Street allowed viewing of the middle and southern end of North Mill Pond almost all the way to Bartlett Street. From the point of land at the end of Mill Way (the old Dearborn Street) one can view the middle and northern end of the pond to Maplewood Avenue Bridge. Binoculars and/or a spotting scope were used for all observations. Data and notes were recorded each day of observation. Any species that could not be positively identified were recorded as unknown and all field marks recorded so that with study, a future observation might lead to an identification.

Only birds that were observed on the North Mill Pond (in or on the water) or seen on the mudflats were recorded. Birds in the surrounding shore habitats were not recorded. The shore line of the pond is very diverse in habitat, from rail yards and a wide array of disturbed areas to a small area of salt marsh in relatively good condition. Although these habitats are inhabited by a diverse bird life, the focus of this survey was restricted to the pond itself with the goal of tracking the birds most easily observed by novice bird watcher or citizens without specialized equipment or knowledge.

Results

Twenty-three bird species were seen in this study area (see Table 3). The number of birds on the pond on any one survey date varied from a low of six species, with 54 birds present, to a high of 14 species, with over 400 birds feeding on the mud flats. The greatest quantities of birds were seen during the migration periods of the Semipalmated Plovers, Semipalmated Sandpipers, and Black-bellied Plovers. The North Mill Pond is an important feeding habitat for these migrating species.

This survey is limited in that the ten survey dates were between August and November and therefore only document late summer and early fall species of birds. None-the-less, the data shows that a wide variety of species utilize the pond as feeding habitat. From personal observations made over the last five years of living on the North Mill Pond, there are many other species which utilize the area but were not seen in this survey. The spring and fall migration periods bring Canada Geese, Buffleheads, Common Mergansers, Red-breasted Mergansers, and Hooded Mergansers to feed on the pond. Summer residents include Green Herons and Red-winged Blackbirds, both of which nest on the shores of the pond. Rare species have also been documented utilizing North Mill

Pond, including a Lark Sparrow that wintered in a backyard on Dennett Street in 1995. During the winter the pond serves as an important open water habitat for several species of ducks and gulls whose numbers can at times be into the hundreds.

Discussion and Conclusions

North Mill Pond is valuable wildlife habitat and provides migrating and resident birds an important feeding grounds. It is an important habitat for a wide variety of birds. The U.S. Fish and Wildlife Service in their Wildlife Habitat Evaluation Study (Pedevillano, 1991), states "North Mill Pond provides high value habitat for wildlife." In this study, field observations on three dates (8/22/90, 9/24/90, and 10/9/90) revealed that a large diversity and number of shorebirds utilize the mudflats in North Mill Pond. On August 22, 1990, 19 species were seen totaling an estimated 343 individuals. In August 1997, there were 18 different species seen on three dates, with 13 species seen on each date and 397, 172, and 259 individuals seen on each respective date. The U.S. Fish and Wildlife Service evaluation states "This level of usage indicates that the North Mill Pond mudflats serve as important feeding areas for migrating shorebirds", and "Since shorebird populations have been declining in recent years this type of habitat becomes even more important." Pedevillano ends her study by stating, "Although portions of the pond are considered to be degraded, it remains a functional ecosystem utilized by a diversity of wildlife species in seasonal abundance."

The diversity of bird species that are present on North Mill Pond add to the quality of life for human residents. These birds are easily viewed by the public from a variety of easy access locations. When the birds are in the highest numbers during their northern and southern migrations, the area is full of bird life and offers an exciting wildlife viewing area that adds a new dimension to life in Portsmouth.

Table 3. Bird Species and Numbers Observed on North Mill Pond, August-November 1997.

Species	8/19	8/22	8/23	9/1	9/3	9/12	9/17	10/5	10/12	11/2	Total
Double crested Cormorant	11	2	4	22	13	2	6	0	11	0	71
Great Blue Heron	1	0	1	1	2	1	1	0	0	1	8
Snowy Egret	2	9	5	6	4	2	0	0	0	0	28
Green Heron	0	0	0	0	0	1	0	0	0	0	1
Black-crowned Night Heron	0	0	0	1	3	1	3	2	0	0	10
American Black Duck	34	12	13	12	12	0	0	0	0	4	87
Mallard	12	0	0	0	0	0	15	0	7	13	47
American Coot	0	0	0	0	0	0	0	0	0	1	1
Sharp-shinned Hawk	0	0	1	0	1	0	0	0	0	0	2
Red-tailed Hawk	0	0	0	0	0	0	1	0	0	0	1
Osprey	0	1	0	0	0	0	0	0	0	0	1
Belted Kingfisher	0	1	1	2	0	1	2	0	0	0	7
Black-bellied Plover	9	14	5	7	9	9	15	0	0	0	68
Semipalmated Plover	90	75	126	39	10	0	0	0	0	0	340
Greater Yellowlegs	20	13	33	11	6	2	7	9	15	0	116
Lesser Yellowlegs	21	0	0	2	1	0	0	0	0	0	24
Semipalmated Sandpiper	180	21	50	17	171	0	2	0	0	0	441
Common Tern	0	0	3	0	0	0	0	0	0	0	3
Great Black-backed Gull	0	1	0	0	1	0	0	0	0	2	4
Herring Gull	6	8	16	7	37	21	15	7	22	42	181
Bonaparte's Gull	0	0	0	0	0	0	0	0	0	15	15
American Crow	2	13	1	0	0	2	0	0	3	1	22
Tree Swallows	3	2	0	0	0	0	0	0	0	0	5
Total	391	172	259	127	270	42	67	18	58	79	**1483**

Great Bay Watch

Nancy Johnson and Ann Reid

Introduction

With the founding of the Advocates for the North Mill Pond in 1997, the opportunity arose to perform water quality monitoring of the North Mill Pond under the auspices of Great Bay Watch (GBW). Great Bay Watch is a volunteer water quality monitoring program under Sea Grant Extension, a joint program of the University of New Hampshire's Cooperative Extension and UNH/UM Sea Grant College Program, Durham, NH.

Methods

Under Great Bay Watch volunteers received five hours of training in water quality monitoring and a manual which fully explained not only the procedures for performing the tests, but also an explanation of the importance of the test, and why it is a useful measure of the water quality. Twice a month from late April to early November six trained volunteers sampled at site 18 (Tricia and Steve Miller) and site 19 (Nancy Johnson, Ann Smith, Kathy Driscoll, and Christina Johnson) on the full and new moon at both low and high tide. The water quality parameters included dissolved oxygen, air and water temperature, water transparency, salinity, pH, and fecal coliform bacteria. An EPA approved Quality Assurance/Quality Control (QAQC) was performed on all samplers before sampling began, and twice during the sampling period.

Results

GBW Site 18: Maplewood Avenue:

Site 18 samples were taken at a floating dock on the eastern side of Maplewood Avenue. bridge near Cindy Ann Cleaners. Because of this sites proximity to the ocean, and the influence of the ocean water in the tide, this site had one of the coldest temperature readings of all GBW sites (low tide average = 13.3°C, high tide average = 14.4°C), and was one of the highest salinities (low tide average = 26.9 ppt, high tide average = 28.0 ppt). The pH at Site 18 as well as at Site 19 was very stable, Site 18 having a low tide average of 7.7, and a high tide average of 7.9. The dissolved oxygen and dissolved oxygen percent

Figure 9. *Tricia and Steve Miller collecting water samples at Great Bay Watch Site 18.*

Table 4. Data from Great Bay Watch Sites 18 & 19 on North Mill Pond.

Site 18: Maplewood Avenue

Date	WTempL °C	WTemp H °C	DO-L ppm	DO-H ppm	Sal-L ppt	Sal-H ppt	Sat-L %	Sat~H %	pH-L	pH-H	Fecal L CFU/100	Fecal H CFU/100	LP L cm	LP H cm	Depth. cm	Depth cm	ATemp L °C	ATemp H °C
04/23	8	9.5	9.9	10.4	13.9	17.1	91.24	101.23	7.4	7.8	180	10	90	*	90	*	9	15
05/06	8	8.5	9.0	8.9	22.7	23.5	87.71	88.19	7.6	7.8	40	10	15	205	15	280	8	9
05/22	8	11	8.7	9.6	24.7	24.5	85.91	101.29	7.6	7.8	*	*	22	167.5	22	265	9	17
06/05	12	14	8.0	9.5	27.15	28.2	87.74	109.40	7.3	7.9	60	0	28	250	28	280	10	18
08/23	18	17	8.2	8.9	28.9	29.2	102.71	109.54	7.8	7.8	150	10	20	192.5	20	250	22	28
07/07	16	17	8.7	7.7	30.3	29.9	105.73	95.20	7.8	7.6	*	*	33	250	33	250	29	26
07/21	17	17	6.8	8.2	29.0	28.35	83.59	100.39	7.7	7.8	70	0	20	215	20	215	18	17
08/04	18	17.5	6.6	8.4	28.6	30.6	82.51	105.32	7.8	8.1	TNTC	*	20	245	20	245	18	25
08/19	16.5	16	6.3	8.2	30.3	30.45	77.32	99.75	7.8	7.9	110	0	30	270	30	270	16	22
09/03	18.5	19	6.1	7.9	30.15	31.2	77.74	102.32	7.7	7.8	30	0	30	245	30	245	17.5	19
09/18	17	18	6.2	7.6	30.4	30.2	76.89	95.97	7.8	8.1	*	*	30	270	30	270	17.5	29
10/02	9	12.5	7.4	8.5	29.9	30.0	77.40	95.98	7.8	7.9	30	0	30	225	30	225	9	18
10/17	10.5	13	7.5	8.9	29.35	31.5	80.79	102.58	7.6	8.0	40	0	30	275	30	275	5	17
11/09	10	11	7.6	8.7	22.3	27.1	77.32	93.35	7.5	7.7	*	*	25	215	25	235	8	14.5

Site 19: Bartlett Street

Date	WTempL °C	Wtemp H °C	DO-L ppm	DO-H ppm	Sal-L ppt	Sal-H ppt	Sat-L %	Sat-H %	pH-L	pH-H	Fecal L CFU/100	Fecal H CFU/100	LP L cm	LP H cm	Depth. cm	Depth cm	ATemp L 0c	ATemp H 0c
04/23	8	11	10.4	10.6	1.1	12.7	88.82	103.94	7.4	7.5	22	10	22	83	22	83	12	14
05/06	9	10	9.5	11.2	2.0	2.6	83.54	101.15	7.5	7.6	50	10	17	88	17	88	10	11
05/22	11	14	9.4	11.8	1.9	7.9	86.58	120.20	7.2	7.6	*	*	25	60	25	60	12	18
06/05	13	15	7.9	9.0	0.3	1.5	75.45	90.40	7.8	6.9	170	100	20	75	20	75	1 1	17
06/23	20.5	23	7.7	7.3	1.1	2.2	86.38	86.43	8.0	7.9	450	370	12.5	78	12.5	78	26.5	27.5
07/07	18	24	8.8	10.8	2.1	13.5	94.41	138.32	7.8	8.2	760	210	10	55	10	55	23	29
07/21	18	19	8.0	9.1	9.6	25.6	89.42	113.85	7.7	8.1	510	280	10	75	10	75	19	20
08/04	19	21	8.4	8.9	1.8	2.0	91.82	101.31	7.8	7.8	TNTC	*	10	65	10	65	19	21
08/19	16	21	8.6	9.8	1.5	17.95	88.23	121.73	7.1	7.6	TNTC	200	5	72.5	5	95	15	26
09/03	19	19	8.9	9.1	1.35	13.0	97.05	105.76	8.1	7.6	510	30	10	65	10	65	21	21
09/18	16	19	8.8	8.9	2.2	7.6	90.63	100.37	7.6	7.8	*	*	10	110	10	110	18	28
10/02	9	12	10.6	10.7	1.6	22.0	93.00	113.55	7.5	7.8	220	0	5	60	5	60	4	16
10/17	10	12	9.9	9.1	1.8	28.1	89.04	100.43	INV	7.8	1030	20	10	125	15	125	5	16.5
11/03	11	11.5	8.3	8.5	1.15	1.48	76.12	78.99	7.1	7.1	*	*	25	90	25	90	8	14.5

DO = Dissolved Oxygen; Sal = Salinity; Sat = Saturation; LP = Light Penetration; WTemp = Water temperature; ATemp = Air Temperature; TNTC = Too numerous to count; INV = Invalid saturation were very good at both low and high tide averaging at 85.3% for low tide and 100.2% at high tide. All readings at both tides were above the class B standard of 75%. The average transparency was 216 cm at high tide, 91% of the average depth.

GBW Site 19: Bartlett Avenue

Site 19 is located at the far end of North Mill Pond near Ricci's Supply Company Inc. The temperatures at site 19 were slightly higher than at site 18 on the other end of the pond, (low tide average = 14.0°C, high tide average = 16.4°C) however the average salinity was markedly lower, (low tide average = 2.1 ppt, high tide average =11.3 ppt). The pH at Site 19 as well as at Site 18 was very stable, 19 having a low tide average of 7.6, and a high tide average of 7.7. Site 19 had high dissolved oxygen and dissolved oxygen percent saturation values, as did Site 18. There was only one low tide value below the Class B standard of 75%. The average transparency was 78.7 cm at high tide, 98% of the average depth.

Because this is the first year of sampling, no comparisons of either site can be made to previous years. The results of the GBW Water Quality Monitoring sampling did not present any surprises, and confirmed the concern that during late summer and early fall the fecal coliform bacteria counts increased to unacceptable levels (shown in Table 4) as TNTC - too numerous to count). At low tide, Site 19 (Bartlett St.) had the highest average fecal coliform count of any of the 21 Great Bay Watch sites throughout the Estuary during the 1997 survey season (Reid et al., 1998).

Conclusions and Discussion

As a result of all the samplings and testing performed, the ANMP has decided to continue most of the samplings for at least another year in order to look for trends. An effort will be made to determine sources of the fecal coliform bacteria, and, if possible, to begin to eliminate some of the sources of pollution. A liaison is being set up with the businesses that border the pond and the City of Portsmouth, to enlist their cooperation in preventing pollutants from entering the pond.

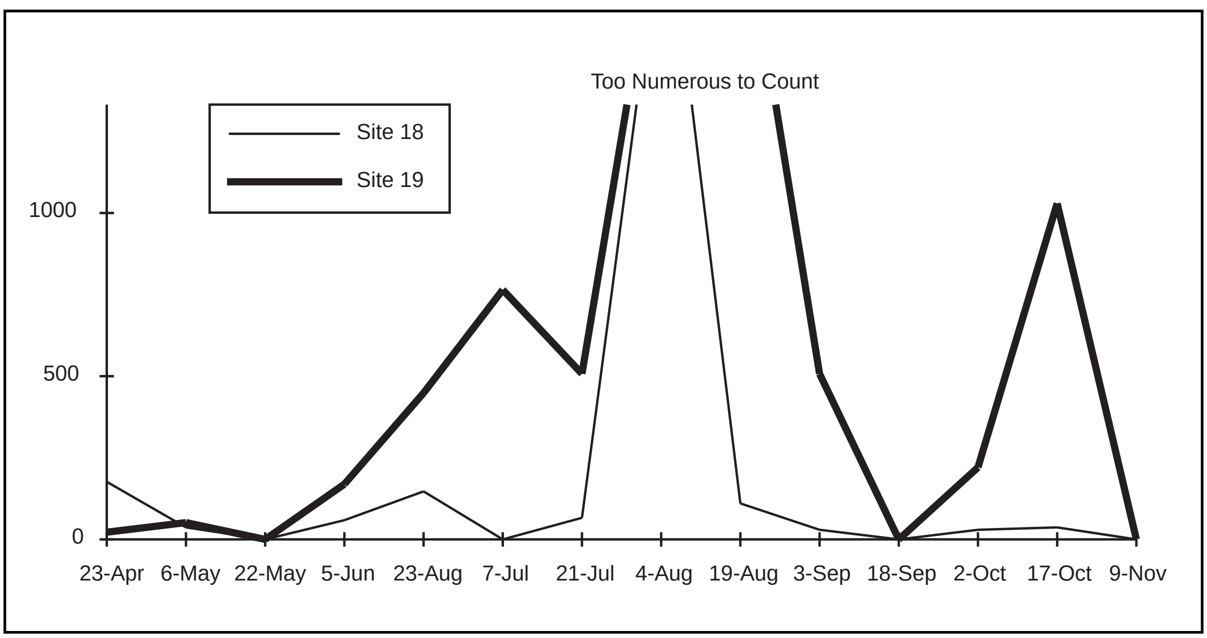


***Figure 10**. Fecal levels at Sites 18 and 19, at low tide.*

Water Flow Monitoring and Primary Nutrient Loading

Mark Mattson

Introduction

A thorough knowledge of the dynamics of water flow into and through the North Mill Pond is essential to quantifying the contribution of water-born pollutants and the ability of the pond to flush itself clean of pollution. The loading rate of pollution carried in freshwater and groundwater inflow from both point and non-point sources, and the flushing of these pollutants into the Piscataqua River due to tidal mixing, determines the health of North Mill Pond and the ability of the pond to support aquatic communities and associated recreational opportunities. Most of the EPA pollution loading models (i.e. QUALIIe) are formulated based on the hydrodynamic conditions of the receiving water body and measures of pollutant concentrations in the water. With the long-term goal of identifying and eliminating major point and non-point sources of pollution in North Mill Pond, this section of the report provides reconnaissance level data describing the nitrate and nitrite nitrogen dynamics of North Mill Pond during May through October 1997.

Materials and Methods

Flow Monitoring

Flow monitoring of Hodgson Brook was accomplished by installing a Stevens water level meter in the flood control structure located behind the Eldridge Building off Cate Street. This structure is a rectangular (box) culvert, about 10 feet wide and six feet high, with a concrete floor and side walls and was ideal for measuring flow and establishing a stage-discharge relationship. The Stevens water level meter was installed in a 12-inch PVC standpipe fastened to the side of the flood control structure. The Stevens meter recorded water levels in Hodgson Brook on a paper chart continuously from 1840 DST on 21 September 1997 through 1645 DST on 28 November 1997. Please note that all times referred to in this report are in Daylight Savings Time (DST) because most of the observation period occurred during this time.

The volume of water (liters per second) passing through the flood control structure was estimated on three different dates to provide water depths representative of the range of different flow conditions in Hodgson Brook. On each of the three dates, water velocity was measured with a mechanical flowmeter (pygmy Gurley meter) at five points covering the entire cross section of the flood control structure. A linear relationship was then drawn between the cross-sectional area represented by the observed water depth and the weighted average flow. Flow was then predicted for each hour of water depth recorded by the Stevens meter based on linear extrapolation from the regression equation representing the line between each pair of calibration points. In this manner, the instantaneous flow (liters per second) and total flow (cubic meters) was determined for each hour (or longer period of time) in the monitoring period.

Seasonal Nitrogen Sampling

Whole water nitrate and nitrite nitrogen samples were collected along with each Great Bay Watch sampling (twice in each month between May and October 1997). Samples were collected twice per day, once at approximately high tide, and again at low tide on eight dates in the monitoring period. Great Bay Watch Station 19 was located in North Mill Pond where Hodgson Brook flows in, just east of Bartlett Street. Great Bay Watch Station 18 was located in North Mill Pond at a point just east of Maplewood Avenue (Figure 12). Nitrogen samples were also collected on two dates in Hodgson Brook at the flow monitoring station.

Nitrate and nitrite nitrogen surface water grab samples were collected in sterile, clean containers provided by the laboratory, labeled with station, date and time, placed in a cooler, kept on ice, and processed within 24 hours of collection by Normandeau Associates, Inc., an EPA and NH Certified Laboratory. The chemistry laboratory used EPA Method 353.2 for nitrate and nitrite determination for samples collected before 21 July 1997, providing two significant decimal places when reporting concentrations as milligrams per liter (mg/l). EPA Method 353.3 (nitrate) and EPA Method 354.1 (nitrite) were used on and after 21 July 1997, providing three significant decimal places for the reported values as mg/l.

Results and Discussion

Flow Monitoring

Hodgson Brook was at or near a minimum flow of 12 liters/second for 1,321 hours out of the 1630 hours of monitoring. Seven storm events were recorded during the monitoring period, with peak flow observed as follows:

29 September with a peak flow of 150 l/sec. at 1500 DST
5 October with a peak flow of 120 l/sec. at 1300 DST
27 October with a peak flow of 106 l/sec. at 1400 DST
1 November with a peak flow of 1670 l/sec. at 2400 DST
9 November with a peak flow of 390 l/sec. at 1600 DST
22 November with a peak flow of 560 l/sec. at 1100 DST
27 November with a peak flow of 150 l/sec. at 1100 DST.

The highest flow observed during the 21 September through 28 November 1997 monitoring period was 1670 l/sec. at midnight on 1 November. Hodgson Brook flows from this storm event began to increase above minimum at 1540 DST on 1 November, peaked at midnight, and remained elevated through 3 November, and gradually approached minimum again more than 72 hours after the storm (Figure 11). The total rainfall during the storm was measured on 1 November as 0.5 cm at 1500 DST, 6.4 cm of rain had fallen by 0030 DST on 2 November, and the storm was over by 0830 DST on 2 November with a total rainfall of 6.6 cm.

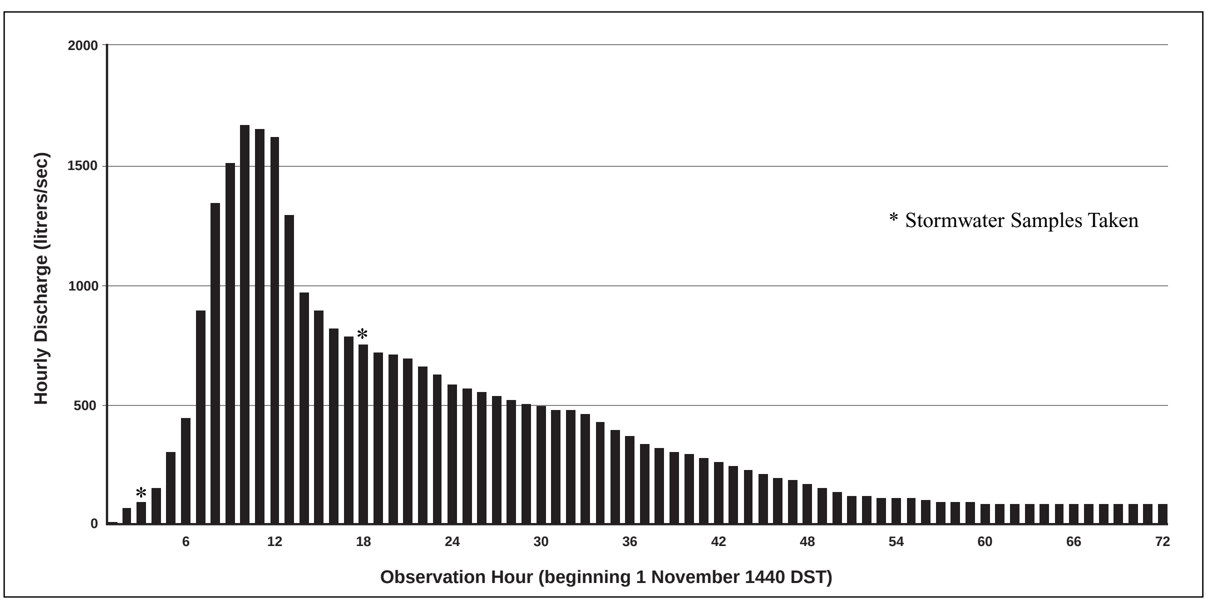


Figure 11. *Hourly discharge (liters/second) in Hodgson Brook during 72 hours of a major rain storm, 1 November 1440 DST - 4 November 1340 DST, 1997.)*

An interesting supplemental observation was made by the Stevens water level recorder in Hodgson Brook. We assumed that the flood control structure where we monitored flow was sufficiently upstream from North Mill Pond to be above the head of tide. This assumption was generally true, except for the spring tides that occurred during 14-18 October and 13-16 November 1997. During these two periods, a sharp rise and fall in water level was observed in Hodgson Brook over a brief period at approximately 12-hour intervals, indicating tidal periodicity. A peak rise of 6.1 inches was observed on 16 October at 1945 DST, and a peak rise of 12.4 inches was observed on 15 November at 1330 DST. The difference in timing between the observed tidal peaks in Hodgson Brook and the predicted high tides for those dates by the NOAA tide tables for Portland, Maine provide a unique opportunity to determine the exact time adjustment to predict high and low tides at the most upstream portion of North Mill Pond using the Portland, Maine tide tables. These tidal peaks are shown in Table 5.

Table 5. Comparative High and Low Tides in Portland Maine and the North Mill Pond.

Portland, M E Date and Time	NMP Date and Time	Difference
14 Oct 0951 DST	14 Oct 0545 DST	-4 hr 6 min
14 Oct 2116 DST	14 Oct 1610 DST	-5 hr 6 min
15 Oct 1043 DST	15 Oct 0645 DST	-3 hr 58 min
15 Oct 2216 DST	15 Oct 1900 DST	-3 hr 16 min
16 Oct 1133 DST	16 Oct 0715 DST	-4 hr 18 min
17 Oct 0004 DST	16 Oct 1945 DST	-4 hr 19 min
18 Oct 0056 DST	17 Oct 2010 DST	-4 hr 46 min
19 Oct 0149 DST	18 Oct 2045 DST	-5 hr 4 min
13 Nov 1024 DST	13 Nov 1130 DST	+1 hr 6 min
14 Nov 1115 DST	14 Nov 1245 DST	+1 hr 30 min
14 Nov 2349 DST	15 Nov 0115 DST	+1 hr 26 min
15 Nov 1203 DST	15 Nov 1330 DST	+1 hr 27 min
16 Nov 1252 DST	16 Nov 1400 DST	+1 hr 8 min

Therefore, high tide was observed in North Mill Pond an average of 4 hours and 22 minutes before predicted high tide in Portland, Maine during October 1997. High tide in North Mill Pond was 1 hour and 19 minutes after predicted high tide in Portland, Maine during November 1997.

Seasonal Nitrogen Sampling

Nearly all of the dissolved nitrogen observed in North Mill Pond during the seasonal sampling was in the form of nitrate (Table 6). The presence of predominantly nitrate nitrogen on most sampling dates indicates that well oxygenated water and good tidal flushing occurred in North Mill Pond during the monitoring period. Nitrate concentrations were observed to range from <0.01 mg/l to 0.90 mg/l. Nitrate concentrations were highest at both high and low tide at Bartlett and Maplewood Stations on 22 May, and were also high on 2 October at low tide (Bartlett) and high tide (Maplewood). Nitrite concentrations were observed to range from <0.01 mg/l to 0.225 mg/l . The highest nitrite concentrations were seen at the Bartlett Street Station on 18 September 1997 at both high and low tide, suggesting that low oxygen conditions occurred in North Mill Pond on that date. Dissolved oxygen data from the Great Bay Watch monitoring on 18 September found concentrations at Maplewood Avenue during low tide to be among the lowest observed in the study (Table 4). However, the GBW monitoring observed moderate levels of dissolved oxygen at Bartlett Street on 18 September during low tide. The range of nitrate and nitrite concentrations observed in this program is representative of the values seen in other estuarine systems.

Table 6. North Mill Pond Nitrate and Nitrite Water Chemistry Data, April - October 1997

Collection Date	Time (DST)	Tide	Station (GBW#)	Concentration (mg/l) Nitrate	Nitrite
23-April-97*	7:30	Low	Maplewood 18	< 0.2	< 0.1
	9:00	Low	Bartlett 19	< 0.2	< 0.1
	14:05	High	Maplewood	< 0.2	< 0.1
	13:45	High	Bartlett 19	< 0.2	< 0.1
22-May-97	7:01	Low	Bartlett 19	0.20	<0.01
	13:30	High	Maplewood 18	0.90	<0.01
	13:45	High	Bartlett 19	0.29	<0.01
23-Jun-97	8:50	Low	Maplewood 18	0.01	<0.01
	9:06	Low	Bartlett 19	0.17	0.01
	15:00	High	Maplewood 18	0.01	<0.01
	15:04	High	Bartlett 19	0.15	0.01
7-Jul-97	9:00	Low	Maplewood 18	0.01	<0.01
	8:36	Low	Bartlett 19	0.15	<0.01
	14:30	High	Maplewood 18	0.04	<0.01
	15:11	High	Bartlett 19	0.08	<0.01
21-Jul-97	7:30	Low	Maplewood 18	0.023	0.007
	7:41	Low	Bartlett 19	0.101	0.009
	14:30	High	Maplewood 18	0.021	0.009
	13:00	High	Bartlett 19	<0.01	<0.01
3-Sep-97	7:20	Low	Maplewood 18	0.040	0.004
	7:09	Low	Bartlett 19	0.063	0.004
	7:16	Low	Hodgson Br.	0.048	0.002
	14:41	High	Maplewood 18	0.013	0.004
	14:50	High	Bartlett 19	0.039	0.003
	14:37	High	Hodgson Br.	0.090	0.003
18-Sep-97	7:46	Low	Maplewood 18	0.076	0.006
	7:20	Low	Bartlett 19	0.010	0.225
	14:01	High	Maplewood 18	0.006	0.065
	14:30	High	Bartlett 19	0.007	0.113
2-Oct-97	7:30	Low	Maplewood 18	0.098	0.004
	7:00	Low	Bartlett 19	0.321	0.004
	7:02	Low	Hodgson Br.	0.161	0.003
	13:30	High	Maplewood 18	0.245	0.004
	13:34	High	Bartlett 19	0.104	0.006
	13:37	High	Hodgson Br.	0.113	0.004
20-Oct-97	18:32	High	Maplewood 18	0.026	0.005
	18:25	High	Bartlett 19	0.021	0.005
	18:15	High	Hodgson Br.	0.028	0.004

Station Descriptions:

Maplewood 18	Great Bay Watch Station 18 east of Maplewood Avenue
Hodgson Br.	Hodgson Brook just upstream from Colonial Cleaners
Bartlett 19	Great Bay Watch Station 19 east of Bartlett Street

* samples analyzed by CEL; all others were analyzed by Normandeau Associates, Inc.

Shoreline Fecal Sampling

Introduction

From casual observations and historical evidence, we put a priority on locating and measuring sources of fecal contamination (human or animal wastes) going into the North Mill Pond. A number of pipes had been observed regularly discharging into the pond and we had heard rumors of one or more residences on the northwest side of the pond not being hooked up to the city sewer system. In addition, a culvert near Bartlett St. was said to have formerly been used as a combined sewer overflow (CSO) (which would discharge overflows of untreated sewerage during storm events), and we wanted to verify whether it was no longer in use.

Our sampling efforts were greatly aided by the development of a similar program by the New Hampshire Estuaries Project on the Belamy River/Little Bay shoreline. We were able to utilize the personnel and methods from that effort and thus follow a consistent procedure. The work presented here was done in conjunction with a broader shoreline survey of the Pond described earlier in this report.

Methods

Sampling was done on four separate occasions between mid-June and mid-August, 1997 at all shoreline sites where sufficient water was observed entering the Pond, either from pipes and culverts or surface seeps. 27 usable samples were collected from 25 sites, including 16 seeps, 8 pipes, 1 drainage ditch and 1 stagnant sump (Figure 12). Samples were collected using Great Bay Watch procedures and supervision, then refrigerated and taken to their facilities for incubation and analysis (Appendix C).

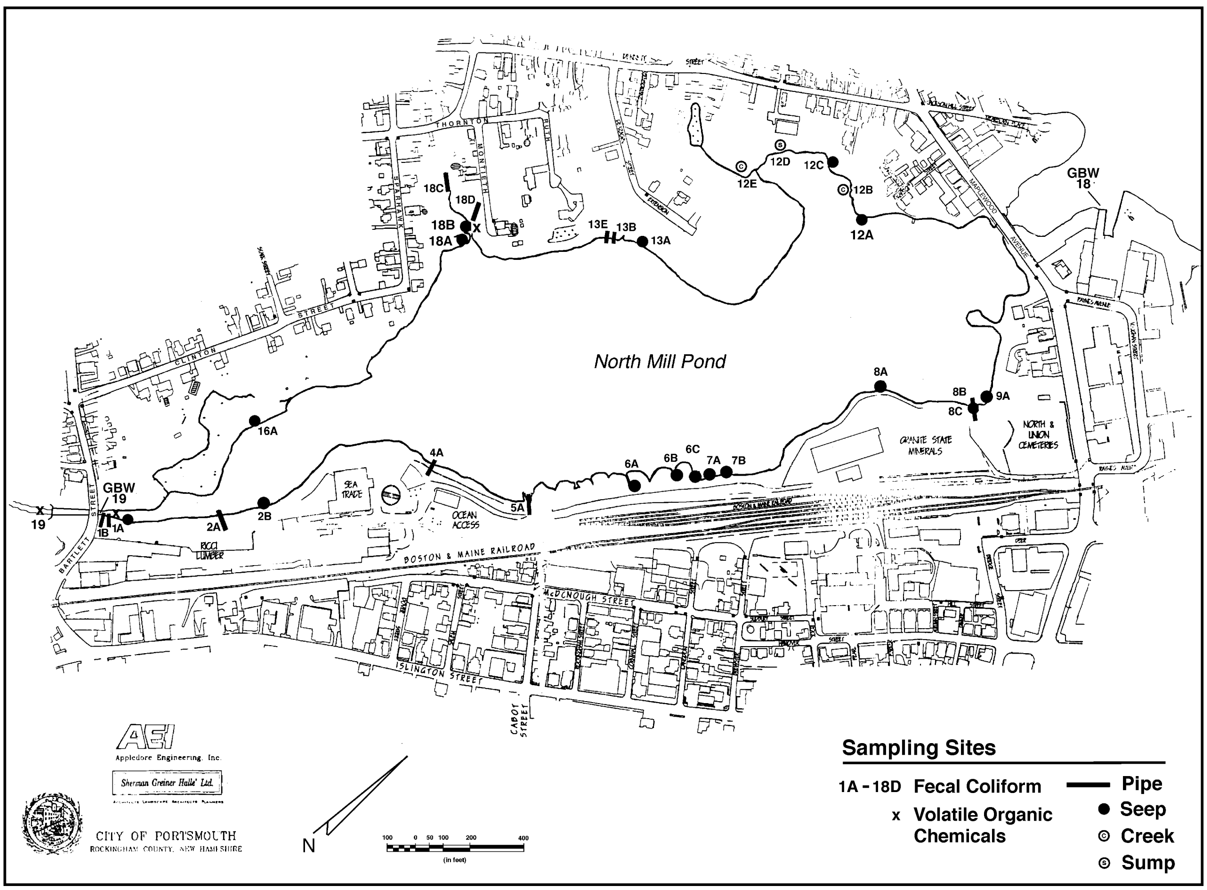


Figure 12. View of North Mill Pond showing Great Bay Watch, volatile organic chemical, and shoreline fecal coliform sampling sites.

Table 7. Fecal Coliform Counts at North Mill Pond Sites (see Figure 12)

Site	Date	Count (100ml)	Origin
1A	6/16	11,700	old culvert
8B	6/20	>10,000	stormdrain
9A	6/20	4,800	seep
18A	8/12	>10,000	seep
18B	8/12	1,100	seep
18C	8/12	>10,000	stormdrain
18D	8/12	>10,000	straight pipe

Results

As listed in Table 7, five sites showed very high fecal counts(>10,000), including two of the three large stormdrains entering the Pond, one seep, a former CSO culvert and a possible strait pipe (direct residential discharge). Two other seeps had high counts (10,000>x>1000) and three other pipes and a sump showed moderate counts (1000>x>100). Where measured, most of the discharges with the highest counts had no salinity, indicating freshwater sources.

Discussion and Conclusions

These results, coupled with the data collected through the Great Bay Watch monitoring, indicate that North Mill Pond receives significant fecal contamination from surrounding sources. While a determination of swimmable water quality would require more specific E. coli measurements, we would urge caution to anyone desiring to use these waters for bathing or wading, especially during low tide. Likewise, an official shellfishing safety determination would require further, more extensive research, but the fecal levels found here, along with other contaminants, make it very unlikely that shellfishing could be done safely anywhere in the Pond in the foreseeable future.

Given that we did our sampling during a very dry part of the summer, the regular discharge of fecally-contaminated water from stormdrains around the Pond suggests that a likely source would be leaks from the City's sewer lines. Considering the age and baffling nature of the Portsmouth sewer system, along with other recent sewer problems in the neighborhood, this result should not be surprising. The evidence for a continued direct residential sewer discharge and possible septic system leakage (contaminated seeps) on the northwest side of the Pond by Monteith St. is more troubling, since all residences were supposed to be hooked up to the sewer system years ago. Additionally, we were recently informed by a City code enforcement officer that the City was aware of this situation but that no action was taken.

Storm Water Sampling

Mark Mattson

Introduction

Samples were taken during a major stormwater event on 1-2 November 1997 to characterize runoff from surrounding areas and quantify the total loading of nitrate, nitrite, total petroleum hydrocarbons, and coliforms. Samples were collected from three point sources, as well as Hodgson Brook and the two Great Bay Watch sampling sites on the pond.

Methods

Flow was monitored at three storm drains flowing into North Mill Pond along the southeast shore during the 1-2 November 1997 storm event (see Figure 12). The Cemetery storm drain is a concrete culvert measuring 119 cm inside diameter, that is located in the southeast corner of North Mill Pond near Maplewood Avenue. The Cabot Street/ McDonough Street double culvert is located along the southeast shore approximately midway between Maplewood and Bartlett Streets; each of the two concrete culverts measured 53 cm inside diameter. A corrugated steel culvert 109 cm inside diameter discharged into North Mill Pond near Bartlett Street. Flow from these three culverts was monitored by recording the time to fill a container of a known volume at the times that water quality samples were taken near the beginning and end of the storm event. Flow was then extrapolated for each culvert to the entire storm event by proportional scaling of the observed flows compared to the corresponding Hodgson Brook Stevens Meter data recorded at the same time and for the entire 72 hours of elevated flow during the storm event.

Stormwater samples were obtained from these culverts, Hodgson Brook, and from the two Great Bay Watch stations at the beginning of the stormwater runoff period and again after peak flow. Each stormwater sample was collected as a surface water grab into sterile, clean containers provided by the laboratory. Stormwater samples were analyzed for nitrate and nitrite nitrogen, total petroleum hydrocarbons, and total and E. coli coliform colonies. Nitrate and nitrite nitrogen was determined by the same EPA laboratory methods described above for seasonal sampling. Total petroleum hydrocarbons (TPH) were determined by the laboratory using Modified EPA Method 8100 GC/FID against a fuel oil standard. Coliform analysis was performed on the samples by EPA Method 600 to determine coliform forming units (CFU) per 100 milliliters of sample. The stormwater samples were placed on ice, received by the laboratory, and processed within the holding times for the methods used, except for the coliform analysis. Coliform samples have a six-hour holding time for *E. coli* analysis, and because the storm lasted more than six hours, it was not practical to deliver these samples to the laboratory within the specified holding time. Therefore, the *E. coli* results may produce low values, particularly for the samples collected during the beginning of the stormwater runoff period.

Parameter concentrations observed for each source of stormwater were multiplied by the corresponding flow or volume to determine total loading. The first flow concentrations were applied to the flows leading up to and including peak flow (as observed at Hodgson Brook), and the second set of concentration data was applied to stormwater flows after the peak flow. For example, assume the first flow nitrate concentration was 2 mg/l, and the second nitrate reading was 0.5 mg/l. If the storm drain had a total discharge of 1500 liters for the period leading up to and including peak flow, and a total discharge of 500 liters after peak flow, then the total nitrate loading would be (2mg/l * 1500 liters) + (0.5mg/l * 500 liters) = (3,000 mg) + (250mg) = 3,250 mg total loading, or 3.25 grams of total loading of nitrate nitrogen for the storm event.

Results and Discussion

Stormwater sampling occurred on 1-2 November 1997 during the highest single flow event recorded in our two-month monitoring period. Stormwater samples were collected during hour 3 and hour 18 of the 72-hour runoff period (Figure 11), representing first flush and after peak flow conditions. In general, concentrations of most pollutants measured were found to be lowest at the Maplewood Station and highest in the storm drains (Table 8). Low concentrations of pollutants at the Maplewood Station indicates the importance of tidal flow in diluting stormwater runoff into North Mill Pond. Coliform concentrations were low, indicating that no combined sewage overflows were operating during this storm event in the storm drains located along the southeast side of North Mill Pond. It should also be noted that the old culvert near Bartlett Streets did not exhibit any increase in flow during the storm event, indicating that it no longer serves as a combined sewer overflow. Order of magnitude higher flows in Hodgson Brook compared to the storm drains resulted the greatest total pollution loading coming from this source during the storm event. However, the range of pollutant concentrations observed during this storm event is representative of the values seen in other urban or suburban systems, and typical of street and highway runoff.

Nitrogen compounds were generally in highest concentrations after peak flow, and total petroleum hydrocarbons were in highest concentrations during first flush sampling. Nitrate concentrations ranged from 0.385 mg/l (Maplewood) to 0.620 mg/l (steel pipe) during the first flush sampling on 1 November and from 0.188 mg/l (Maplewood) to 2.077 mg/l (Cabot/ McDonough) after peak flow on 2 November 1997 (Table 3-2). Nitrate concentrations were highest at the corrugated steel and Cabot Street/McDonough Street culverts after peak flows (Table 8). However, when these concentrations were weighted by the total flow to calculate total loading, the high flow in Hodgson Brook resulted in a total loading of nitrate that was 69 kilograms for Hodgson Brook compared to 2 kilograms for the Cabot Street/McDonough Street culvert and 3 kilograms for the corrugated steel culvert (Table 8).

Nitrite concentrations were observed to range from 0.015 mg/l (Maplewood) to 0.180 mg/l (corrugated steel) during the first flush sampling and from 0.022 mg/l (Maplewood, Bartlett, Hodgson) to 0.545 mg/l (corrugated steel) after peak flow (Table 8). The highest nitrite concentrations were seen in the corrugated steel culvert flow during both sampling events. Nitrite concentrations were particularly low in Hodgson Brook, resulting in a total nitrite loading of 2 kilograms compared to 1 kilogram from the corrugated steel culvert (Table 9).

Total petroleum hydrocarbons (TPH) were seen in highest concentrations during the first flush sampling, and were in highest concentration in the three storm drains compared to Hodgson Brook or the two North Mill Pond Stations (Table 8). TPH ranged from 0.11 mg/l (Maplewood) to 0.89 mg/l (corrugated steel) during the first flush sampling and from 0.17 mg/l (Maplewood) to 0.38 mg/l (corrugated steel) after peak flow (Table 8). Total loading of TPH was 23 kilograms from Hodgson Brook during the 1-2 November storm event, which was more than three times higher compared to the Cemetery culvert (7 kilograms), nearly five times higher than the corrugated steel culvert (5 kilograms), and more than seven times higher than the Cabot Street/McDonough Street culvert (3 kilograms) (Table 9). This indicates that Hodgson Brook delivers the majority of TPH to the Pond.

Table 8. North Mill Pond Stormwater Sampling Chemistry Data, 01 and 02 November 1997.

Date	Collection Time (DST)	Station	Concentration (MG/L) Nitrate	Nitrite	TPH	Coliform (CFU/100 ML) Total	E-Coli	Flow Liters/Sec
1-Nov-97	17:55	Maplewood (GBW18)	0.385	0.015	0.11	<1	<1	
1-Nov-97	17:20	Cemetery (8B)	0.443	0.057	0.62	2300	220	20
1-Nov-97	17:30	Cabot/McD. (5A)	0.419	0.081	0.59	2300	<1	10
1-Nov-97	17:45	CS (1B)	0.620	0.18	0.89	2300	<1	10
1-Nov-97	17:40	Hodgson Br. (19)	0.484	0.016	0.12	360	110	106
2-Nov-97	9:45	Maplewood (GBW18)	0.188	0.022	0.17	2300	690	
2-Nov-97	9:30	Cemetery (8B)	0.475	0.025	0.19	2300	360	0.2
2-Nov-97	9:20	Cabot/Mcd. (5A)	2.077	0.123	0.2	2300	690	0.6
2-Nov-97	9:05	CS (1B)	1.855	0.545	0.38	2300	1200	0.6
2-Nov-97	8:40	Hodgson Br. (19)	0.578	0.022	0.18	690	510	760
2-Nov-97	9:00	Bartlett (GBW19)	0.678	0.022	0.25	1610	690	

Station Descriptions:

Maplewood GBW18 — Great Bay Watch Station 18 east of Maplewood Avenue
Cemetery 8B — Storm drain culvert near Maplewood Avenue Cemetery (119 cm diameter)
Cabot/McD. 5A — Double culvert storm drain near intersection of McDonough and Cabot Streets (53 cm diameter each)
CS 1B — Corrugated steel culvert near Bartlett Street (109 cm diameter)
Hodgson Br. 19 — Hodgson Brook just upstream from culvert under Colonial Cleaners
Bartlett GBW19 — Great Bay Watch Station 19 east of Bartlett Street

Table 9. Estimated total loading of nitrate, nitrite, total petroleum hydrocarbons, and coliforms into North Mill Pond from three stormdrains and Hodgson Brook during a major storm event, 1-2 November 1997.

Station	**72-hr Total Discharge Cubic Meters**	**Total Loading (Kg/72 Hrs) Nitrate**	**Nitrite**	**TPH**	**Total Loading Coliform (CFU/72 Hrs) Total**	**E-Coli**
Cemetery 8B	11000	5	0.6	7	2.50e+09	2.40e+08
Cabot/McD. 5A	5500	2	0.4	3	1.30e+09	3.70e+06
CS 1B	5500	3	1.0	5	1.30e+09	6.00e+06
Hodgson Br. 19	111600	69	2.0	23	1.40e+10	5.70e+09

Station Descriptions:

Cemetery 8B — Storm drain culvert near Maplewood Avenue Cemetery (119 cm diameter)
Cabot/McD. 5A — Double culvert storm drain near intersection of McDonough and Cabot Streets (53 cm diameter each)
CS 1B — Corrugated steel culvert near Bartlett Street (109 cm diameter)
Hodgson Br. 19 — Hodgson Brook just upstream from culvert under Colonial Cleaners

Total and fecal (*E. coli*) coliform concentrations were extremely low for a stormwater sampling event, suggesting that there were no combined sewage overflows connected and operating in the storm drains monitored. Total coliforms ranged from <1 colony forming units (CFU) per 100 ml (Maplewood) to 2300 CFU/100 ml (the three culverts) during the first flush sampling and from 690 CFU/100 ml (Hodgson Brook) to 2300 CFU/100 ml (4 stations) after peak flow (Table 8). Fecal coliform ranged from <1 CFU/100 ml to 220 CFU/100 ml during first flush to 390-1200 CFU/100 ml after peak flows.

Volatile Organic Chemicals

Doug Bogen

Introduction

In recognition of the presence of a dry cleaning business just upstream from the Pond on Hodgson Brook, among other potential sources of volatile organic chemicals (VOCs), we determined that it would be worthwhile to have some additional water samples analyzed for these chemicals. Besides the mere presence of the dry cleaners, which would use some of these chemicals as cleaning solvents, our interest was raised by previous observations of episodes of bubbles on the water emerging from the Brook culvert, as well as rumors of old discharge pipes within the culvert itself.

Methods

Water samples were collected into glass vials from three locations: just upstream from the culvert on Hodgson Brook, immediately downstream from the Hodgson Brook culvert, and downstream from the sewer pipe flowing into the tidal creek near Monteith St. on the northwest side of the Pond (site 18D, Figure12). The samples were refrigerated and delivered to Citizens Environmental Lab in Cambridge, Mass. within 24 hours.

Results and Discussion

No concentrations of common VOCs were found above the detection limits at any of the sites sampled (see Appendix B for complete data). The lab did identify an unfamiliar VOC in the sample from the Monteith St. site, which was subsequently tentatively identified as methyl tert butyl ether (MTBE), a recently-introduced additive in gasoline fuel. Further analysis by the lab determined that it was present at approximately 36 parts-per-billion.

It is obviously difficult to say much from one bit of data such as this, but it should be noted that the site the MBTE sample was taken from is downgradient and probably downstream from surface runoff to stormdrains in the vicinity of the Route 1 Bypass and its associated gasoline stations. Moreover, one of those station's underground tanks is known to have leaked fuel to an adjacent residential property a couple years ago. Clearly though, without further sampling in the area, an attempt to derive any conclusions about the source or the impact of this contaminant is unwarranted.

Sediment Sampling

Doug Bogen

Introduction

Recent concern over potential contamination in North Mill Pond began initially with the suggestion that pollution from the former Pease Air Force Base, upstream in the Hodgson Brook watershed, may have been washed downstream into the Pond. Studies by the Air Force and New Hampshire Department of Environmental Services in Newfields Ditch and Grafton Ditch, respectively, found elevated levels of certain heavy metals, cyanide, and persistent pesticides in ditch sediments. Added to this concern were the high levels of nitrates that were showing up in Base groundwater following recent use of urea as a deicing agent on the runway.

As we began delving more into the history of the Pond and its immediate surroundings, it became evident that other earlier sources of contamination may have impacted the Pond. From early tanneries to century-and-a-half-old railyard operations to recent industrial uses and urban runoff, the possibilities for undue contamination are many and varied. Of particular concern were the possible effects of a serious fire that destroyed the Ricci hardware store adjacent to the Pond in 1991. Fires of this sort often produce and/or distribute a witches brew of toxic chemicals, including persistent ones like dioxins and furans. These two types of substances are often referred to as the most toxic chemicals known, for their powerful cancer-causing and reproduction/development-disrupting effects.

In addition to the assessments done upstream at Pease, some sediment sampling was done in the Pond in April, 1990 and downstream in Outer North Mill Pond (northeast of Maplewood Avenue.) and Inner Inner Cutts Cove (south of Market St.) in June, 1993, both in conjunction with habitat remediation schemes associated with the New Hampshire Port Authority Expansion Project. A comparison of this earlier data with our findings will be given in the discussion portion of this section.

Methods

Sediment samples were collected on November 10, 1997 around low tide at 10 sites around the Pond and one upstream in Hodgson Brook for selected heavy metals, 5 sites in the Pond for pesticides/PCBs/PAHs and one site offshore adjacent the Ricci Supply property for dioxins/furans (see Figure 13). Sampling locations were selected to provide an overall survey of the Pond, in the case of heavy metals, as well as to catch likely sedimentation areas from key land drain outfalls identified in our shoreline survey. Samples were collected using 3 in. dia. PVC push corers rinsed with HCL and distilled water between samplings and put in new plastic jars for metals analysis and precleaned glass jars for Pesticides/PCBs/PAHs/Dioxins analyses. All samples were taken from mudflats approximately 20 ft. from shore, except for sites 1 and 19, which were from shoreline sediments upstream from mudflat areas. All samples were immediately refrigerated and delivered to Citizen's Environmental Labs in Cambridge, MA within 24 hours for analysis.

Results

Toxic Heavy Metals

Analyses were done for Chromium (Cr), Copper (Cu), Lead (Pb) and Mercury (Hg). Overall, as summarized in Table 10 results were fairly consistent throughout the Pond, with values indicating elevated but not major metallic contamination, not unusual for an urban area. The relatively cleanest sites were on the central northwest shore, which also

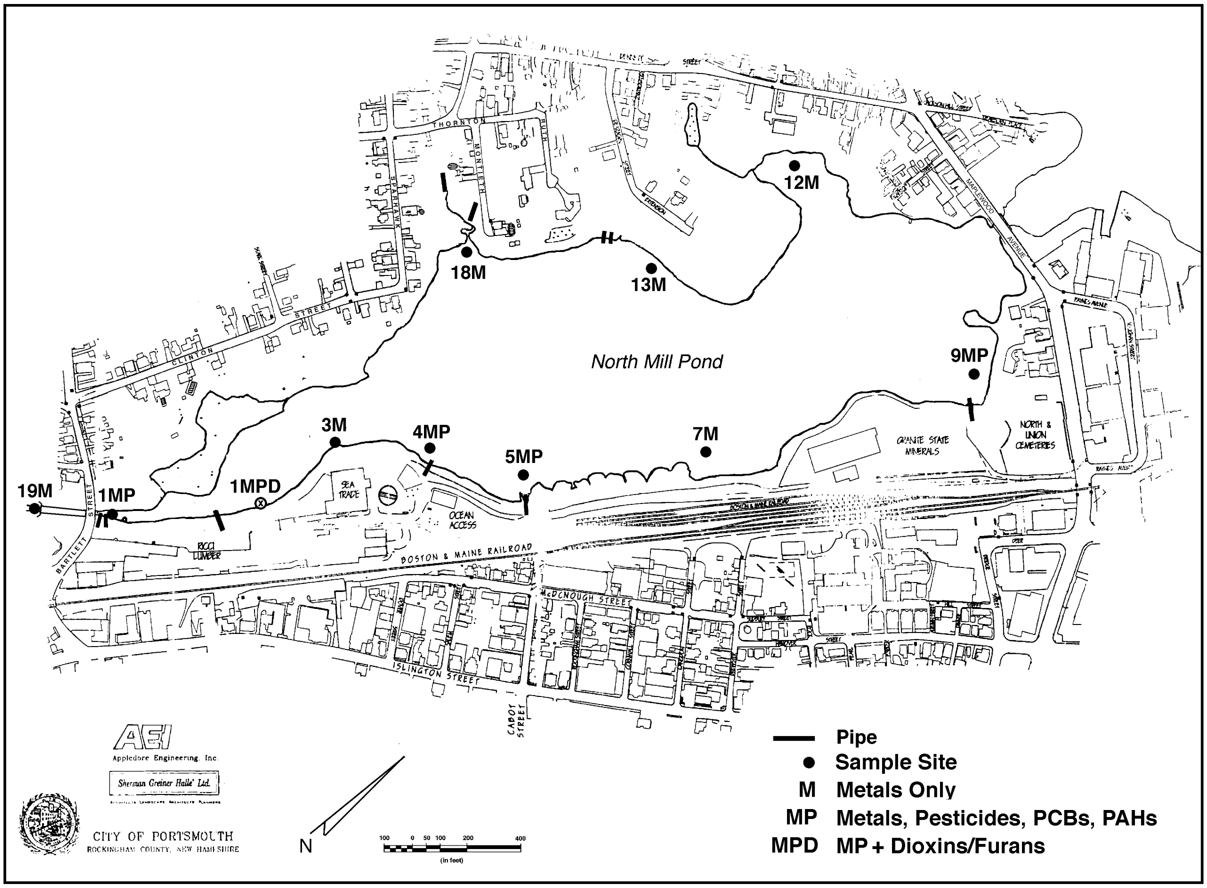


Figure 13. *View of North Mill Pond showing sediment sampling locations.*

Table 10. Heavy metals found in sediment samples from North Mill Pond. Sampling locations shown on map.

Sample ID		Chromium	Copper	Lead	Mercury
Sample #1	Shoreline sediment	20.6	205	180	0.31
Sample #2	Mudflat sediment	73.8	67.9	155	0.72
Sample #3	Mudflat sediment	87.9	70.1	157	0.61
Sample #4	Mudflat sediment	91.3	60.8	148	0.54
Sample #5	Mudflat sediment	83.5	50.9	178	0.52
Sample #7	Mudflat sediment	87.2	44.3	117	0.46
Sample #9	Mudflat sediment	53.4	57.3	185	0.34
Sample # 12	Mudflat sediment	83.4	46.3	110	0.45
Sample # 13	Mudflat sediment	51.7	28.2	51	0.20
Sample # 18	Mudflat sediment	55.2	50.7	106	0.30
Sample # 19	Creek sediment	81.6	40.8	185	ND, <0.10
NOAA ER: Low/Med*		81/370	34/270	47/218	.15/.71
NJ ECRA**		100	170	250-1000	1.0

ND = not detected
Heavy metals analysis was performed at IEA Laboratories. Reports for solid samples are reported as dry weight. All results are reported in parts per million (ppm).

* National Oceanographic and Atmospheric Administration's Biological Effects Range – low/medium toxicity values for sediments (Long and Morgan, 1990).

** NJ Environmental Cleanup Responsibility Act Limits

Table 11. Total Polycyclic Aromatic Hydrocarbons in North Mill Pond sediment samples, in parts per billion.

ER: L/M*	ECRA**	Site #1	Site #2	Site #4	Site 5	Site #9
4,022/44,792	10,000	23,620	1,640	ND, <683	ND, <726	5,600

* National Oceanographic and Atmospheric Administration's Biological Effects Range – low/medium toxicity values for sediments (Long and Morgan, 1990).

** NJ Environmental Cleanup Responsibility Act Limits
ND = not detected
Polycyclic aromatic hydrocarbons analysis was performed at IEA Laboratories. Reports for solid samples reported as dry weight.

display the healthiest saltmarsh and least upland development. There was little indication of substantial metals contamination coming from Hodgson Brook, except for relatively high Pb levels, only matched by sediments on the opposite side of the Pond, adjacent to the cemetery and the salt facility. There was also a unique "spike" of Cu contamination in sediment just downstream of the granite culvert near Bartlett St. A comparison to NOAA biological Effects Range (ER) toxicity figures (Long and Morgan, 1990) shows that almost all of our values for Cu, Pb, and Hg, and 2/3 of the Cr values were above the "low" ER figure but none were above the "medium" ER figure. Likewise, none of our values, excepting for the aforementioned Cu spike, were above the New Jersey Environmental Cleanup (ECRA) limits. Complete lab analysis data for metals and all other contaminants is found in Appendix D.

Pesticides/PCBs
None of our samples showed any persistent pesticides (such as Chlordane, Endrin or DDT) or Polychlorinated Biphenyls (PCBs) above their detection limits, indicating low, if any contamination in the Pond by these persistent organic chemicals. It should be noted that detection of these chemicals was obscured by relatively high detection limits, due to interference by unknown substances in the analysis.

PAHs
Five sites along the southeast shore of the Pond (see Figure 13) were sampled for Polycyclic Aromatic Hydrocarbons (PAHs), which are cancer-causing petroleum byproducts. Table 11 summarizes total PAH results for these sites. Only sites 1 and 2, near the inlet to the Pond, and site 9, adjacent to the salt facility and a large culvert had detectable PAH levels. The greatest concentrations were found in shoreline sediment just downstream of the granite culvert and a large storm drain near Bartlett St., with lesser amounts downstream. In comparison with NOAA ER and ECRA figures, samples from sites 1 and 9 are above the "low" range effects, but none are above the "medium" range, and only site 1 is above the ECRA limits (consistent with the Cu figure mentioned above).

Dioxins/Furans
Due to exorbitant lab costs, only one sample was analyzed for dioxins and furans, from the mudflats adjacent to the Ricci Supply property. Five different types of dioxins and seven types of furans were detected in varying but significant concentrations, from 8 to 3200 parts per trillion (ppt). After accounting for their various toxic equivalency factors, a total Toxicity Equivalency (TEQ) of 50 ppt was calculated for the whole sample. Useful comparisons were hard to come by, but this figure is higher than the Massachusetts Contingency Plan TEQ limit of 20 ppt for limited soil contact and far exceeds their limit of 4 ppt TEQ for high contact areas.

Discussion and Conclusions

Based on our limited sampling, it appears that the sediments of the North Mill Pond have elevated but not unexpected levels of heavy metals, as well as PAH contamination in specific areas where land drains or surface runoff introduce them to the Pond. The significant quantity of dioxins and furans detected in our one sampling is troubling, especially considering its proximity to a shoreline area proposed for greater human access (a bike and walking path). Clearly, more dioxin/furan sampling would need to be done to determine the true extent and severity of this contamination.

The relatively consistent and ubiquitous nature of heavy metal contamination found in our sampling suggests that it doesn't derive from any specific point source, such as a former tannery site in the case of chromium, but is instead the result of nonpoint sources (e.g., runoff from developed areas or seepage from fill) or general atmospheric deposition. Possible specific air sources for the moderate mercury levels found throughout the pond could include the Schiller coal-burning power plant just up the Piscataqua River, or a solid waste incinerator, formerly located at Pease Air Force Base, that ceased operation over a decade ago. Relatively high lead and mercury levels are common in sediments throughout the adjoining Piscataqua River and Great Bay Estuary in general (Short, 1992), with the other possible significant source being the Portsmouth Naval Shipyard.

In comparing our data to previous sediments studies in and around the North Mill Pond, the results were fairly consistent. Those studies (Bohlen, 1990 and Clark, 1993) both detected somewhat higher levels of mercury and chromium but similar levels of lead and copper. They also obtained similar results for pesticides/PCBs (no detections at detection limits, except for trace levels of pesticides in the earlier study, perhaps connected with higher levels found upstream at Pease) and PAHs.

Neither these previous studies nor studies done at Pease looked for dioxins/furans, so our data is the only detection in this region to our knowledge. Levels found in river sediments downstream of paper mills in Maine range as high as 64 ppt TEQ, just slightly higher than the level found in our sample. Besides the above-mentioned fire at Ricci Supply, other possible sources for this contamination include the former incinerator at Pease, one that operated at Portsmouth Naval Shipyard a decade earlier, or other long-range air deposition.

Shoreline Clean Up

Introduction

Back in 1996 residents of the North Mill Pond area became disgruntled with the dumping, litter and industrial debris strewn across the shoreline on the south side of the Pond. These residents organized a three-day clean up in August after obtaining permission from Guilford Transportation, the primary landowner in this area, and assistance from the City of Portsmouth. Volunteers were recruited to walk the area, collect the litter and gather it into piles which the City of Portsmouth later collected for disposal.

Much of the larger industrial debris was removed from the shoreline and railroad land. However, illegal dumping and strewing of cans and bottles continued during the next year and the same group, now organized officially as ANMP, decided to host the Second Annual Shoreline Clean Up in June of 1977.

Methods

Because much of the largest debris had already been removed, the second clean up was only a one day event. This time the clean up was made possible with funding of clean up expenses (gloves, bags, hauling of trash, disposal, etc.) handled by the N.H. Coastal Program.

Volunteers again were recruited to help collect and bag glass, cans and debris scattered along the shoreline and surrounding land area. A local company (Ricci Supply) provided a driver and truck to collect the bags of trash and drive them to dumpsters which were provided by N.H. Coastal Program for the clean up. N.H. Coastal Program contracted with a waste management company for the hauling and disposal of the trash and debris in the dumpsters.

Results

Nearly 5 tons of debris were collected and hauled away from the North Mill Pond and surrounding area after ANMP's second Annual Shoreline Cleanup. The debris included 50 tires, one washer/dryer unit, a broken shopping cart, scraps of metal, bottles, cans, broken glass and other miscellaneous junk.

Discussion and Conclusions

Both shoreline clean ups were great community building events, bringing neighbors, city officials and other concerned citizens together around the cause of the Pond. For many volunteers, it was their first exposure to the extent of the pollution problems affecting the Pond.

Extensive press coverage also helped educate other non-involved Portsmouth citizens about the existence of the North Mill Pond, its importance to the community, and the nature and scope of environmental problems impacting it. The same coverage also demonstrated that there are neighbors and others who care about the Pond and are prepared to do what they can to conserve, enhance and protect it.

Both Shoreline Clean Ups have reduced the amount of debris on the shoreline and land surrounding the Pond. However, littering, partying and dumping continue, requiring the clean up to be an annual event until other measures are employed to reduce the effects of others treating the area as a dump.

COMMUNITY OUTREACH

Since its inception in February 1997, the Advocates for the North Mill Pond have worked to involve neighborhood residents and business owners in a revitalization of the Pond area. The goal of local advocacy organizations is to bring public attention and interest to the renewal of urban neighborhoods, and ANMP has used the Pond itself as a focal point of their efforts. This important wetland area provides many benefits to the community such as stormwater management, water quality improvement, wildlife habitat, fisheries development, as well as recreational activity and aesthetic beauty. Through local outreach efforts, the ANMP hopes to educate the community about this asset that is in their backyards, and as a result, revitalize the North Mill Pond and its surrounding neighborhoods.

Public meetings, door to door distribution of a newsletter, and the creation of an informational brochure (Appendix E) are some of the ways ANMP is endeavoring to educate people about the potential of the North Mill Pond. This brochure, accompanied by an insert containing information for area landowners on marsh stewardship ("DOs and DON'Ts"), will be distributed throughout the community in the coming months. ANMP plans to continue to work closely with businesses, residents, the City of Portsmouth's Planning Department, the Conservation Commission, and public schools to further plans to revitalize, protect, and conserve the pond. The neighboring elementary school has been motivated by ANMP's efforts and by the educational potential that Advocates activities present: New Franklin School will be initiating a Junior Advocates program this year to involve students in hands-on scientific studies on North Mill Pond. ANMP's annual shoreline clean up (see page 33) will continue to improve the physical appearance of the area, while acting as a catalyst for greater community involvement in the overall restoration of the area.

ANMP's longterm goal is to create a sense of stewardship for an area that has been long neglected. This goal is dependent on further community awareness, involvement, and support, so outreach will continue to be an important element in ANMP's activities.

CONCLUSIONS

While no limited inquiry such as this could hope to tease out all the various factors impacting a given body of water, the image of the North Mill Pond that this study presents is that of an abused and neglected but resilient and functioning ecosystem. Despite the historical diminishment of its shorelines and saltmarshes, it continues to provide important habitat and feeding grounds for many species of birds, finfish, and shellfish.

Its waters are often contaminated by human and/or animal wastes and other typical urban pollution from a number of point-source discharges and its upstream watershed. Of particular concern are the indications of excess nutrients and fecal matter entering the Pond from its inlet at Hodgson Brook and several pipes in the southernmost portion of the Pond, along with a concentration of presumably residential wastewater entering from seeps and a pipe near Monteith Street on the northwest shore.

Its sediments are contaminated with toxic heavy metals and combustion byproducts at levels which could be affecting organisms within the Pond but are not cause for immediate alarm. The distribution of metals is fairly uniform except for some increases near the inlet, suggesting widespread air or waterborne contamination rather than specific point sources. Our most troubling finding here is the presence of dioxins and furans in the southeasternmost mudflats at levels that may not be safe for human exposure, though the distribution and average concentration of these highly toxic compounds is unknown based on our one sampling.

Continued threats to the health of the Pond include encroachment to its saltmarshes by both residential and commercial activities, polluted runoff from developed areas, continued fecal contamination from residences and stormdrains and broad but moderate-level contamination of its sediments from heavy metals and combustion byproducts(PAHs). Efforts should be made to reduce the fecal matter entering the Pond, particularly where it derives from possibly illegal sources, and a broader investigation into the extent of dioxin/furan contamination should be conducted before increased public access to the contaminated area is allowed.

In addition to the need for cleaning up past abuses, the findings of this study also present us with numerous opportunities for preservation and restoration of the Pond's attributes. Our surveys, combined with other research being conducted as part of the New Hampshire Port Authority wetlands remediation project, provides a baseline of data for the effects of future restoration of the saltmarsh around the Pond and related projects. As intertidal and subtidal vegetation is increased, upland pressures on existing saltmarsh is lessened, and pollution inputs are reduced, we expect that the abundance and health of Pond organisms will increase accordingly.

What will be required to make this promise a reality is the continued commitment of the many local volunteers that made this project possible, along with the hastened cooperation of local and state authorities and adjacent landowners. A restored and prolific North Mill Pond can only bring benefit to our surrounding community, in ecological, aesthetic and economic senses.

RECOMMENDATIONS

Due to the multi-institutional response needed to address the findings of this project, we have categorized our recommendations as to which entity they are to be directed.

Advocates for the North Mill Pond

1) Great Bay Watch monitoring should be continued to gather long-term data on physical parameters of NMP and fecal coliform levels.

2) Another stormwater sampling would be useful for comparison to existing data, especially if done in late summer and/or done at the central northwest shore stormdrain.

3) Further sampling along the central northwest shore and stormdrain outfalls of the Pond should be done specifically for methyl tert butyl ether(MTBE). A small number of samples could be collected by Advocates volunteers and analyzed relatively inexpensively using existing funds.

4) More information should be gathered on possible sources of and potential dangers from MTBE and other possible petroleum pollutants, including the stormdrain relationship between Route 1 Bypass and North Mill Pond.

5) Further fecal sampling should be done upstream on Hodgson Brook to determine possible sources of contamination showing up at the Bartlett St. inlet/Great Bay Watch site #19.

6) Further outreach should be done with adjoining landowners to deter shoreline abuses and encourage their involvement in ANMP projects (see brochure and "Do's and Don'ts" info., Appendix E).

7) Annual Shoreline cleanups should be continued and expanded to other areas of the Pond, both to decrease the impact of litter and debris on the Pond's environment, and encourage greater public involvement in protecting the Pond.

City of Portsmouth

1) The City (or the State, if necessary) should conduct further investigations to determine the source(s) of sewage discharge near Monteith St., with the timely goal of eliminating these contamination sources.

2) Further research should be done to determine whether sewage leaks to the North Mill Pond stormdrains and old CSO culvert are indeed occurring, and whether they can be corrected.

3) Within their jurisdiction, the City should take a more aggressive approach toward shoreline landuse code enforcement around the Pond, especially with regard to waste storage and disposal and filling or other damage to wetlands.

Shoreline Landowners:
Residential

1) Abutters to the Pond must not dump leaves, brush or other waste onto the saltmarsh areas.

2) Shoreline landowners should not mow saltmarsh or other wetland areas in pursuit of larger lawns.

Commercial

1) Abutting businesses should remove rubbish and junked equipment from shoreline areas and be more vigilant in stopping illegal dumping and vandalism along the shoreline.

2) Abutting businesses should abide by local ordinances, and respond to City requirements in a timely and forthright manner.

3) Abutting businesses should not continue any unpermitted filling, nor should they store or dispose of waste in any way such that it could enter the Pond.

State of New Hampshire/Federal EPA

1) Further sampling should be conducted in the area where we detected dioxins and furans, particularly in soils upland of the shoreline and in other sections of the Pond to better determine the extent of possible contamination. The prohibitive cost of this analysis necessitates that State or federal agencies take this on.

2) If further dioxin contamination is uncovered and/or if government agencies determine that further action is needed, then plans for greater public access to the area should be re-evaluated in light of this determination.

3) Further sampling should be conducted for polycyclic aromatic hydrocarbons(PAHs) near the Bartlett Street end of the Pond, as well as upstream in Hodgson Brook. With more comprehensive data, a determination should be made whether remedial action is warranted in this area.

4) The State should work with the City and ANMP to make sure that all abutting landowners are in compliance with local and state regulations regarding wetlands.

5) Continued/expanded technical and financial support will be needed from the State and/or federal agencies to assist our organization and the City of Portsmouth in addressing all the above listed needs.

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Appendix A: Standard Operating Procedures

UNH, JEL STANDARD OPERATING PROCEDURE	LAB SOP 1.22
FOR ASSISTING SANITARY SURVEYS WITH THE	Revision 1.1
COLLECTION OF SAMPLES AND	March 1998
CHARACTERIZATION OF SHORELINE HABITATS	Page 1 of 4

POINT OF CONTACT:

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I. OBJECTIVE

1. Survey the ecological health of estuarine and coastal tidal waters using a guided question and answer sheet. These assessments can be used to categorize the general health, the major habitats and some of the resources of shoreline areas and coastal waters. The information may also be used to pinpoint the location of specific features or problems.
2. Aid the sanitary survey team in locating surface water and pollution sources to coastal receiving waters. The shoreline survey was developed to complement public health sanitary surveys conducted by the state as part of the regulatory process for categorizing potential shellfishing areas. Sanitary survey and shoreline survey teams should be coordinated so that surveys run concurrently to minimize duplication of effort. To this end, the shoreline survey team should alert the sanitary team to any surface water flows and pollution sources they happen upon.

II. SAFETY

Safety issues are addressed to minimize the chance or severity of accidents that may occur during the sampling procedures. The focus is on safety, including communications, appropriate footgear for walking on steep, wet, and muddy surfaces, and protective clothing that is appropriate for sampling in areas where hazardous materials may be found.

III. MATERIALS AND EQUIPMENT

A. Field

- Clipboard and data sheets
- Map of survey area
- Boots
- Gloves
- Quadrat, 1 by 1 foot
- GIS system with trained personnel

B. Laboratory - NONE

IV. METHODS

A. Field Collection

1. Work in pairs or larger groups. One person is selected as recorder and requests (calls out) each piece of information from their partner(s).

2. Using the map, and a quick examination of the shoreline (major changes in land use, geologic features, etc.) choose the length of shoreline to be covered by the first data sheet.
3. Working from the area above tidal action, the partners examine the stretch of shoreline and respond to survey questions, then repeat for tideline, upper intertidal, lower intertidal and subtidal areas.
4. Where clam holes have been noted, the quadrat is tossed upon the sediment and the clam holes within each quadrat are counted and recorded. Two to four haphazardly placed quadrats should be sampled for each distinct area (upper intertidal, lower intertidal and subtidal).
5. Where seeps, concealed outfall pipes, or the evidence of these is detected by the survey team, the team needs to contact the sanitary survey team and a decision needs to be made regarding how and where to sample the water at this site.
B. Laboratory Processing - NA

V. TROUBLE SHOOTING / HINTS
1. Survey trips should be planned ahead and timed so work begins an hour prior to low tide. In this way work can proceed for 2 to 3 hours without significant data losses as described below.
2. The beginning and end of each shoreline section described for a survey sheet should be marked on the map as well as positions recorded using the GIS. Following computer entry, this allows the location for each survey data set to be checked.
3. Oftentimes the lower intertidal and especially subtidal areas will either be under water or portions will extend out across mudflats that may be dangerous to traverse. In these cases, the problems should be noted and the areas of the survey sheet left blank, where appropriate.

VI. STATISTICAL ANALYSIS AND DATA USAGE

1. Survey sheets should be collected and copied, with the original data kept in the custody of the person responsible for the survey. Data entry can be made to any computer spreadsheet software that allows flexibility for recording and transfer to other programs.
2. The data can be reduced or transformed many ways to communicate the results. Percentages of existing shorelines with specific conditions can be listed in tables or charts, or reported as text. Two such examples are: 1) "The occurrence of outfall pipes and seeps averaged 2.4 per mile for the 12.6 miles of shoreline surveyed"; and 2) "Of the 12.6 miles of shoreline surveyed, healthy salt marsh was found along 3.4 miles and unhealthy, eroding marshes were scattered along 6.2 miles."
3. Maps of the survey area can be divided for each sheet and then colored to show the general conditions for each area. For example: the density of clam holes may be categorized and the corresponding areas of the map colored to reflect their densities.

COLOR	CATEGORY	AVERAGE # HOLES/QUAD
RED	many	> 3.00
ORANGE	common	1.49-3.00
YELLOW	few	0.49-1.50
WHITE	rare	0.00-0.50

VII. REFERENCES
None Available

UNH, JEL STANDARD OPERATING PROCEDURE FOR SHELLFISH SURVEYS, INCLUDING BENTHIC INVERTEBRATES	LAB SOP 1.23 Revision 1.0 March 1998

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I. OBJECTIVE

Assess the shellfish resource and infauna in benthic sediments of estuarine and coastal tidal waters. The major clam species are identified and the density of each major species of clams is quantified. These assessments can also be used to categorize the general health of benthic communities.

II. SAFETY

Safety issues are addressed to minimize the chance or severity of accidents that may occur during the sampling procedures. The focus is on safety, including communications, appropriate footgear for walking on steep, wet, and muddy surfaces, and protective clothing that is appropriate for sampling in areas where hazardous materials may be found.

III. MATERIALS AND EQUIPMENT

A. Field

- Clipboard and data sheets
- Map of survey area
- Tide chart
- Boots
- Gloves
- Quadrat, 0.5 by 0.5 meters
- Shovels and or clam rakes
- Sieves with 1 mm openings
- Calipers or rulers
- Bucket
- Flags

B. Laboratory - NONE

IV. METHODS

A. Field Collection

1. Four haphazardly placed quadrats (0.25 meters square in area) are sampled at each site selected for assessment. Site selection (both number and location of sites) depends upon the quantitative needs of the study, the size of the area to be assessed, and the variability in shellfish resources or benthic community surmised from previous studies or a visual assessment of the survey area.

2. Work in pairs or teams of three. One person is selected as recorder and fills out the data sheet (see attached) while the other is the digger. A third person can identify and measure the animals, or this responsibility can be shared between recorder and digger.

3. First, the location of the quadrat is determined and marked on its four corners with flags.

4. The sediments are dug up and all the invertebrates (clams, worms, crustaceans, etc.) are collected and placed in the bucket. The sample area is dug to 20 cm depth (vertical sides from the surface of the hole). The sediment should be sieved to find other animals greater than 0.2 cm in their shortest dimension This will ensure all animals greater than 1 cm (about 1/2 inch) in their longest dimension are collected and identified.

5. When finished digging and sieving, each organism is identified to type (soft-shell clam, razor clam, clam worm) and measured in length (longest dimension) with the ruler, while these data are recorded on the data sheet.

B. Laboratory Processing - NA

V. TROUBLE SHOOTING / HINTS

1. Survey trips should be planned ahead and timed so work begins one to two hours prior to low tide. In this way work can proceed for up to four hours, depending on the tidal range and site locations.

VI. STATISTICAL ANALYSIS AND DATA USAGE

1. Survey sheets should be collected and copied, with the original data kept in the custody of the person responsible for the survey. Data entry can be made to any computer spreadsheet software that allows flexibility for recording and transfer of information to other programs.

2. The data can be reduced to interpret and communicate the results. Shellfish densities of the survey area or for specific sites can be determined by averaging sample data. Species richness and diversity indices could be developed from the data collections.

VII. REFERENCES

Langan, R. 1997. Assessment of shellfish populations in the Great Bay Estuary. New Hampshire Estuaries Project. 34 pp.

SHELLFISH SURVEY DATA SHEET

Jackson Estuarine Laboratory, UNH

DATE:________________ SAMPLERS:___________________________________

SITE: North Mill Pond AREA: __________________

REPLICATE: ____________		REPLICATE: ____________	
SPECIES	SIZE (CM)	SPECIES	SIZE (CM)

POINT OF CONTACT

Michele Dionne
Wells National Estuarine Research Reserve
RR 2, Box 806
Wells, Maine 04090

I. OBJECTIVE

Obtain estimates of fish populations within creek channels of natural and created salt marsh habitats.

II. NECESSARY MATERIALS AND EQUIPMENT

A. Field

- Fyke net, 4 ft diameter, with 25 foot wings and 0.25 inch mesh netting
- Danforth anchors, two 71b and one 4 lb
- Dry suit waders and foul weather gear
- Water proof data book and pens
- Plastic sample bags, label tape, permanent marker
- Sample jars, preservative
- Cooler with ice
- Fish measuring board
- First aid kit and safety glasses
- Site maps
- Site markers (painted reinforcing rod)
- Graduated 1 liter pouring flask
- Battery powered work lights
- Three buckets
- Aquarium net

B. Laboratory

- Sample jars, labels, permanent markers
- Preservative
- Computer supplies
- Computer equipped with suitable spreadsheet, statistical (ANOVA) and graphics software packages.

III. METHODS

1. Set fyke net at mouth of study creek at low tide to fish incoming night tide (Maine Department of Marine Resources 1991; Mc Cleave and Fried 1975).

2. Haul net at high tide, shaking fish to net's cod end; empty catch into bucket of water.

3. Identify and count all fish, transferring fish from sample bucket to receiving bucket as they are identified. Measure total length of random sample of up to 30 fish for each species. Measure biovolume of each species.

4. For species with more than 30 individuals, measure volume of the 30 fish measured for length, and then measure volume of remaining individuals of that species.

5. On the first and fourth of the eight scheduled sample dates, both members of the sample crew process the entire fish sample separately (identification, counting, and measuring lengths and volumes).

6. During the course of the study, preserve up to ten individuals of each species identified for reference collection.

IV.TROUBLE SHOOTING / HINS

1. Avoid putting too many fish in a single bucket to minimize mortality. For large samples, change water in buckets occasionally while processing sample.

2. Keep injured and dying fish for preservation and gut content analysis.

V. STATISTICAL ANALYSIS AND DATA USAGE

The means of a number of fish population variables (total abundance, biovolume, individual species abundances and biovolumes, species richness, species diversity, etc.) from two replicate samples for each site will be compared statistically between the natural marshes and the created marshes.

VI. REFERENCES

McCleave, J. D. and S. M. Fried.
1975. Nighttime catches of fishes in a tidal cove in Montsweag Bay near Wiscasset, Maine. Trans. Amer. Fish. Soc. 104: 30-34.

Maine Department of Marine Resources.
1991. Ecology of groundfish along the coast of Maine.

NH NEP Shoreline Evaluation for Water Quality

LOWER INTERTIDAL

Grain Size	Algae	Mudflat	Eelgrass
G	G	—	—
M,G	G	P	—
flooded	flooded	flooded	flooded
G,R	B,G	P	—
flooded	flooded	flooded	flooded
M	—	P	—
M	B,G	P	—
M	G	P	—
M	—	P	—
M,G	B	P	—
flooded	flooded	flooded	flooded
M	B	P	—
M	B,G	P	—
B	M	—	P
M	—	P	—
M	—	P	—
M	—	P	—
M,G	G	P	—

M=Mud	B=Brown	P=Present	H=Healthy
S=Sand	R=Red	—=None	A=Algal Cover
G=Gravel	G=Green		—=None
R=Rock	—=None		

SUBTIDAL ZONE

Grain Size	Algae	Eelgrass
G,R	G	—
G,R	G	—
flooded	flooded	
flooded	flooded	flooded
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
NA	NA	NA
M,S,G	R	—
	flooded	flooded
NA	NA	NA
NA	NA	NA
—	NA	NA
NA	NA	NA
M	G	—
NA	NA	NA
M,G	G	—

M=Mud	B=Brown	
S=Sand	R=Red	A=Algal Cover
G=Gravel	G=Green	—=None
R=Rock	—=None	

UPLAND

Date	Site	Type	Edge	Wrackline
6/16/97	1	B,P	S,E,R	—
6/16/97	2	B,R,P	S,F,E	A,O
6/16/97	3	B,P	T,S,F,R	—
6/16/97	4	B,R	T,S,E,R	M
6/16/97	5	R	T,S,R	M
6/20/97	6	R,O	S,F	M,D
6/20/97	7	R,O	E,F,O	D
6/20/97	8	B,R,P,O	F,R	D
6/20/97	9	B,R,P,O	T,S,B,F,R,O	M,A,O
6/20/97	10	B,R,O	B,S	A
7/22/97	11	B,R,O	S,F,R,O	—
7/22/97	12	B,R	T,S,F,R	D
7/22/97	13	F	T,S,R,F	M,A
8/12/97	18	B,R	T,S,B,F,R,Str,O	—
8/12/97	17	B	T,S,STR,F,R	—
8/12/97	16	B	T,S,O	M,D
8/12/97	15	F,B	T,S,O	—
8/12/97	14	B,R	T,S	—

		F=Fields	E=Eroding	E=Eelgrass
		B=Buildings	T=Trees	M=Marsh
		R=Roads	S=Shrubs	A=Algae
		T=Forest	P=Phragmites	O=Other
		O=Other	B=Buildings	—=None
		P=Parking Lot	Str=Structures	
			F=Fill	
			R=Rip-Rap	
			O=Other	

UPPER INTERTIDAL

Grain Size	Seep	Pollution	Mudflats	Saltmarsh	Algae
G,R	R,W,A	T,H	—	E,F,D0	G
M,G,R	W,A	H	•	E,D,A	G
G	R,A	T,O	—	E,D,A	G
G	R,W,P,A	T,H,O	—	F,D,A	G
G	—	—	—	D	G
M,S	—	T	—	H,D	G
M,G	R,W,A	T	—	H,E,D	G
G	R,W,A	T,H	•	F,D	B,G
M,G,R,	R,W,A	T,H	—	E,F,D	G
M,S,G,R	R,W	T,H	—	H,E,F,D	B
G	R,W	T	—	E,F,D	B
M	W	T,H	—	H,E,D	B
M	R,W	O	—	H,D	B
M	W	T,S,O	—	H,D,C	B
M,G	R	T	—	H,E,D	B
M	W	T	—	H,E,D,C	B
M	P	—	—	H,C,Mowed	—
M,R	R,W	T	—	H,E,F,D	—

M=Mud,Peat	R=Rust	T=Trash/Debris	•=Present	H=Healthy	B=Brown
S=Sand	W=Water	H=Oil/Hydrocarbons	—=None	E=Eroding Edges	R=Red
G=Gravel	P=Plants	S=Smell		F=Fragmented	G=Green
R=Rock	A=Algae	O=Other		D=Filled by Devel.	—=None
	—=None	—=None		P=Phragmites	
D=Debris				C=Cattail	
				A=Covered w/Algae	
				—=None	

UPPER INTERTIDAL

Date	Site	Grain Size	Mudflat	Clams	Clam holes /sq. ft.	Oysters	Blue Mussels
06/16/97	1	G,R	N	N	0	N	N
06/16/97	2	M,G,R	P	N	0	N	N
06/16/97	3	G	N	N	0	N	N
06/16/97	4	G	N	N	0	N	N
06/16/97	5	G	N	N	0	N	N
06/20/97	6	M,S	N	N	0	N	N
06/20/97	7	M,G	N	N	0	N	N
06/20/97	8	G	P	P	0	N	S
06/20/97	9	M,G,R,	N	N	0	N	N
06/20/97	10	M,S,G,R	N	N	0	N	N
07/22/97	11	G	N	N	0	N	N
07/22/97	12	M	N	N	0	N	N
07/22/97	13	M	N	N	0	N	N
08/12/97	18	M	N	N	0	N	N
08/12/97	17	M,G	N	N	0	N	N
08/12/97	16	M	N	N	0	N	N
08/12/97	15	M	N	N	0	N	N
08/12/97	14	M,R	N	N	0	N	N

LOWER INTERTIDAL

Date	Site	Grain Size	Mudflat	Clams	Clam holes /sq. ft.	Oysters	Blue Mussels
06/16/97	1	G	N	N	0.00	N	N
06/16/97	2	M,G	P	P	0.37	N	N
06/16/97	3	Flooded	flooded	P	0.19	flooded	flooded
06/16/97	4	G,R	P	P	0.09	flooded	flooded
06/16/97	5	flooded	flooded	P	0.19	flooded	flooded
06/20/97	6	M	P	P	0.50	N	N
06/20/97	7	M	P	P	0.50	N	S
06/20/97	8	M	P	P	0.00	N	N
06/20/97	9	M	P	N	0.00	N	N
06/20/97	10	M,G	P	P	0.50	N	S
07/22/97	11	flooded	flooded	flooded	flooded	flooded	
07/22/97	12	M	P	P	0.67	N	N
07/22/97	13	M	P	P	0.50	N	N
08/12/97	18	M	P	P	1.00	N	N
08/12/97	17	M	P	P	0.33	N	N
08/12/97	16	M	P	P	1.33	N	N
08/12/97	15	M	P	P	1.00	N	N
08/12/97	14	M,G	P	P	1.67	N	N
		M=Mud S=Sand G=Gravel R=Rock	P=Present N=None	P=Present N=None		S=Scattered C=Clumps R=Reef N=None	S=Scattered C=Clumps M=Mat N=None

NEP Shoreline Survey: Shellfish Results (continued)

SUBTIDAL ZONE

Sate	Site	Grain Size	Oysters	Blue Mussels	Eelgrass
06/16/97	1	G,R	N	N	N
06/16/97	2	G,R	N	N	N
06/16/97	3	flooded	flooded	flooded	flooded
06/16/97	4	flooded	flooded	flooded	flooded
06/16/97	5	NA	NA	NA	NA
06/20/97	6	NA	NA	NA	NA
06/20/97	7	NA	NA	NA	NA
06/20/97	8	NA	NA	NA	NA
06/20/97	9	NA	NA	NA	NA
06/20/97	10	M,S,G	N	C	N
07/22/97	11	flooded	flooded	flooded	flooded
07/22/97	12	NA	NA	NA	NA
07/22/97	13	NA	NA	NA	NA
08/12/97	18	NA	NA	NA	NA
08/12/97	17	NA	NA	NA	NA
08/12/97	16	M	N	N	N
08/12/97	15	NA	NA	NA	NA
08/12/97	14	M,G	N	N	N
		M=Mud S=Sand G=Gravel R=Rock	S=Scattered C=Clumps R=Reef N=None	S=Scattered C=Clumps M=Mat N=None	H=Healthy A=Algal Cover N=None

North Mill Pond Shellfish Survey: Benthic infauna within one meter square

Date	Site	Area	Rep	*Mya* arenaria	*Macoma* balthica	*Nereis* spp.	Anthurid Isopod	Unknown worm	*Carcinus* maenas
10/02197	2	a	a	0	16	8	12	0	0
10/02/97	2	a	b	8	20	64	8	0	0
10/02/97	2	b	c	0	0	8	8	0	0
10/02/97	2	b	d	0	4	8	0	0	0
10/11/97	6	a	a	32	36	16	8	0	0
10/11/97	6	a	b	64	44	4	8	0	0
10/11/97	6	b	c	28	168	16	12	0	0
10/11/97	6	b	d	8	4 4	4	4	0	0
10/11/97	9	a	a	0	0	0	0	12	0
10/11/97	9	a	b	0	8	8	0	0	0
10/02/97	16	a	a	4	4	8	8	0	8
10/02/97	16	a	b	0	16	8	4	0	0
10/02/97	16	b	c	40	4	4	8	0	0

Appendix C: Data Sets for Water Quality Testing

Shoreline Survey: Fecal Coliform Data, North Mill Pond.

Date	Site	Time	Dil (ml)	Count	per100ml	Colonies	Commments	pH	Salinity	Description
7-17-97	NMP 1A	1800	1	117	11700	1 pink		*	*	old culvert, white sulphur on rocks, foul odor
7-17-97	NMP 1A	1800	10	TNTC	TNTC			*	*	
7-17-97	NMP 2A	1830	1	0	0			7.6	*	seep, no odor, minor oil sheen
7-17-97	NMP 2A	1830	10	0	0			7.6	*	
7-17-97	NMP 2A	1830	10	0	0		DUP	7.6	*	
7-17-97	NMP 2B	1814	1	0	0			7.5	*	no odor, seep from under marsh
7-17-97	NMP 2B	1814	10	0	0			7.5	*	
7-17-97	NMP 4A	1920	1	0	0			8	*	drain pipe draining willow tree
7-17-97	NMP 4A	1920	10	0	0			8	*	
7-17-97	NMP 5A	1940	1	3	300			7.8	*	broken marsh vegetation green crab shells
7-17-97	NMP 5A	1940	10	48	480			7.8	*	
6-20-97	NMP 6A	1750	10	2	20	yellow		*	*	healthy salt marsh veg. b/t 3rd & 4th lobe
6-20-97	NMP 6A	1750	1	0	0			*	*	
6-20-97	NMP 6B	1755	10	0	0			*	*	algae indicating seep, no oil, no fresh H20 pl.
6-20-97	NMP 6B	1755	1	0	0			*	*	
6-20-97	NMP 6C	1800	10	1	10			*	*	upper salt marsh, green algae indicating seep, no fresh H20 pl.
6-20-97	NMP 6C	1800	0	0	0			*	*	
6-20-97	NMP 7A	1805	10	0	0			*	*	
6-20-97	NMP 7A	1805	1	0	0			*	*	
6-20-97	NMP 7B	1810	10	1	10			*	*	green algae bloom above seep
6-20-97	NMP 7B	1810	1	0	0			*	*	
6-20-97	NMP 8A	1835	10	0	0			*	*	no oil, no rust, no algae
6-20-97	NMP 8A	1835	1	0	0			*	*	
6-20-97	NMP 8B	1840	10	TNTC	>1000			*	*	city drain
6-20-97	NMP 8B	1840	1	TNTC	>10000			*	*	
6-20-97	NMP 8C	1835	10	0	0			*		city drain towards marsh
6-20-97	NMP 8C	1835	1	0	0			*	*	
6-20-97	NMP 9A	1900	10	bag flooded				*	*	exposed dead peat
6-20-97	NMP 9A	1900	1	bag flooded				*	*	
6-20-97	NMP 9A	1900	1	481	4800		DUP	*	*	
6-22-97	NMP 12A	1755	10	bag flooded				*	*	seep under marsh w/bubbles
6-22-97	NMP 12A	1755	50	0	0			*	*	

Shoreline Survey: Fecal Coliform Data, North Mill Pond (continued)

Date	NMP Site	Time	Dil (ml)	Count	per100ml	Colonies	Commments	pH	Salinity	Description
6-22-97	NMP 12B	1805	10	0	0	3 pink		*	*	dug channel
6-22-97	NMP 12B	1805	50	0	0			*	*	
6-22-97	NMP 12C	1815	10		bag flooded			*	*	newer seep in marsh
6-22-97	NMP 12C	1815	50		bag flooded			*	*	
8-12-97	NMP 12C1	1400	10	5	50			7.2	18	
6-22-97	NMP 12D	1825	10	61	610			*	*	groundwater collection
6-22-97	NMP 12D	1825	50	TNTC	TNTC			*	*	
6-22-97	NMP 12E	1835	10		bag flooded			*	*	creek passed multi seep area
6-22-97	NMP 12E	1835	50		bag flooded			*	*	
6-22-97	NMP 13A	1910	10	31	30	5 pink		*	*	seep, asphalt in the rip-rap
6-22-97	NMP 13A	1910	50		bag flooded			*	*	
6-22-97	NMP 13B	1915	10		dish broke			*	*	straight pipe 8”, ceramic or metal, rust inside
6-22-97	NMP 13B	1915	50	1	2	7 pink		*	*	small pipe
6-22-97	NMP 13B	1915	10		dish broke			*	*	
8-12-97	NMP 12D	1400	10	21	210		REDO	8.5	20	sump
8-12-97	NMP 12D	1400	1	1	100		REDO	8.5	20	
8-12-97	NMP 13B	1400	10	7	70	3 pink	REDO	*		
8-12-97	NMP 13B	1400	1	2	200		REDO	*	*	
8-12-97	NMP 16A	1400	10	0	0	1 pink		*	*	seep
8-12-97	NMP 16A	1400	1	0	0			*	*	
8-12-97	NMP 18A	1400	10	TNTC	TNTC	31 yellow		*	*	seep
8-12-97	NMP 18A	1400	1	TNTC	TNTC	10 pink, 3 green		*	*	
8-12-97	NMP 18B	1400	10	57	570	5 pink 5 green		*	*	seep
8-12-97	NMP 18B	1400	1	11	1100			*	*	
8-12-97	NMP 18C	1400	10	TNTC	TNTC			7.7	0	double storm drain
8-12-97	NMP 18C	1400	1	TNTC	TNTC			7.7	0	
8-12-97	NMP 18D	1400	10	TNTC	TNTC			7.6	0	1’ dia pipe
8-12-97	NMP 18D	1400	10	TNTC	TNTC		DUP	7.6	0	
8-12-97	NMP 18E	1400	10	4	401			7.3	13	small pipe
8-12-97	NMP 18E	1400	1	2	200			7.3	13	

Analysis of Volatile Organics from North Mill Pond

Analytes	Sample # 1 Creek water	Sample #18 Creek water	Sample #19 Creek water
1,1-Dichloroethene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Methylene chloride	ND, < 5.0	ND, < 5.0	ND, < 5.0
t-1,2-Dichloroethene	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,1-Dichloroethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Chloroform	ND, < 5.0	ND, < 5.0	ND, < 5 0
1, 1,1-Trichloroethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Carbon tetrachloride	ND, < 5.0	ND, < 5.0	ND, < 5.0
Benzene	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,2-Dichloroethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Trichloroethene	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,2-Dichloropropane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Bromodichloromethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
c-1,3-Dichloropropene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Toluene	ND, < 5.0	ND, < 5.0	ND, < 5.0
t-1,3-Dichloropropene	ND, < 5.0	ND, < 5.0	ND, < 5.0
I, 1,2-Trichloroethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Tetrachloroethene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Dibromochloromethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
Chlorobenzene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Ethyl benzene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Xylenes (total)	ND, < 5.0	ND, < 5.0	ND, < 5.0
Styrene	ND, < 5.0	ND, < 5.0	ND, < 5.0
Bromoform	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,1,2,2-Tetrachloroethane	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,3-Dichlorobenzene	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,4-Dichlorobenzene	ND, < 5.0	ND, < 5.0	ND, < 5.0
1,2-Dichlorobenzene	ND, < 5.0	ND, < 5.0	ND, < 5.0

ND = not detected

The analysis of sample 111197-12 (Sample #18, creek water) showed a peak which was not identified as one of the target analyses for the method used. Using a computer library search of mass spectral data the peak is tentatively identified as methyl tert-butyl ether (MBTE).

Volatile Organics Method Summary
Samples were analyzed for volatile organics by EPA Method 8240.
All concentrations are reported in uh/L. This is equivalent to ppb or parts per billion.

Additional Analysis of Methyl Tert Butyl Ether Detection from VOC Sampling in North Mill Pond

Analyte	Sample #18D: Creek Water
Methyl tert butyl ether	36 ppb*

* tentatively identified by mass spectral library search, quantified against benzene standard
Analysis performed by Citizens Environmental Lab

Appendix D: Data Sets for Sediment Sampling

Dioxin Results from One Sampling Location in North Mill Pond (in parts per trillion)

Analyte	Toxicity Sample #2 Mudflat sediment	Equivalency Factor	Toxicity Equivalents
Total Tetrachlorodibenzofurans	110		
Total Pentachlorodibenzofurans	310		
Total Hexachlorodibenzofurans	170		
Total Heptachlorodibenzofurans	300		
Octachlorodibenzofuran	160		
Total Tetrachlorodibenzo-p-dioxins	16		
Total Pentach lorodibenzo-p-dioxins	39		
Total Hexachlorodibenzo-p-dioxins	230		
Total Heptachlorodibenzo-p-dioxins	970		
Octachlorodibenzo-p-dioxin	3200		
2,3,7,8-C14-Dibenzofuran	8.5	0.100	0.850
2,3,7,8-C14-Dibenzo-p-dioxin	ND, < 2.8	1.000	—
1,2,3,7,8-C15-Dibenzofuran	ND, < 2.9	0.050	—
2,3,4,7,8-C15-Dibenzofuran	65	0.500	32.000
1,2,3,7,8-C15-Dibenzo-p-dioxin	ND, < 1.6	0.500	—
1,2,3,4,7,8-C16-Dibenzofuran	7.3	0.100	0.730
1,2,3,6,7,8-C16-Dibenzofuran	ND, < 14	0.100	—
2,3,4,6,7,8-C16-Dibenzofuran	24	0.100	2.400
1,2,3,7,8,9-C16-Dibenzofuran	ND, < 3.7	0.100	—
1,2,3,4,7,8-C16-Dibenzo-p-dioxin	8.2	0.100	0.820
1,2,3,6,7,8-C16-Dibenzo-p-dioxin	19	0.100	1.900
1,2,3,7,8,9-C16-Dibenzo-p-dioxin	20	0.100	2.000
1,2,3,4,6,7,8-C17-Dibenzofuran	110	0.010	1.100
1,2,3,4,7,8,9-C17-Dibenzofuran	6.4	0.010	0.064
1,2,3,4,6,8,9-C17-Dibenzo-p-dioxin	440	0.010	4.400
1,2,3,4,6,7,8,9-C18-Dibenzofuran	160	0.001	0.160
1,2,3,4,6,7,8,9-C18-Dibenzo-p-dioxin	3200	0.001	3.200
Total Toxicity Equivalents			**49.624**

Dioxin analyses were performed by Method 8290.

Toxicity equivalency factors were obtained from "Estimating Exposure to Dioxin-:Like Compounds, Volume I, Executive Summary," Office of Research and Development, US Environmental Protection Agency, EPA/600\6-88/5Ca, June 1994.

Pesticide/PCB Results from Sampling at North Mill Pond.

Analyte	Sample # 1 Shoreline	Sample #2 Mudflat	Sample #4 Mudflat	Sample #5 Mudflat	Sample #9 Mudflat
Aldrin	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
alpha-BHC	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
beta-BHC	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
delta-BHC	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
gamma-BHC	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Chlordane	ND, < 1500	ND, < 1600	ND, < 1500	ND, < 1550	ND, < 1200
4,4' DDD	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
4,4'-DDE	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
4,4'-DDT	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Dieldrin	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Endosulfan I	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Endosulfan II	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Endosulfall sulfate	ND, < 3()0	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Endrin	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Endrin aldellyde	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Heptachlor	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Heptachlor epoxide	ND, < 300	ND, < 320	ND, < 300	ND, < 310	ND, < 240
Methoxychlor	ND, < 600	ND, < 640	ND, < 600	ND, < 620	ND, < 480
Toxaphene	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, ‘2400
Aroclor 1016	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1221	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1232	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1242	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1248	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1254	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400
Aroclor 1260	ND, < 3000	ND, < 3200	ND, < 3000	ND, < 3100	ND, < 2400

ND = not detected

All results are in parts per billion (ppb). Analyses for pesticides and PCBs were performed by IEA Laboratories. Results for solid samples are reported on a dry weight basis.

PAH Results from Sampling at North Mill Pond

Analyte	**Sample #1 Shoreline**	**Sample #2 Mudflat**	**Sample #4 Mudflat**	**Sample #5 Mudflat**	**Sample #9 Mudflat**
Acenaphthene	ND, < 396	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Acenaphthylene	ND, < 396	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Anthracene	540	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Benzo(a)anthracene	1600	ND, < 726	ND, < 693	ND, < 726	690
Benzo(a)pyrene	1800	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Benzo(b)fluoranthene	2400	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Benzo(g,h,i)perylene	920	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Benzo(k)fluoranthene	990	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Chrysene	1800	ND, < 726	ND, < 693	ND, < 726	710
Dibenzo(a,h)anthracene	710	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Fluoranthene	4600	870	ND, < 693	ND, < 726	1500
Fluorene	ND, < 396	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Indeno(1,2,3-cd)pyrene	960	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Phenanthrene	2700	ND, < 726	ND, < 693	ND, < 726	1300
2-Methylnaphthalene	ND, < 396	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Naphthalene	ND, < 396	ND, < 726	ND, < 693	ND, < 726	ND, < 561
Pyrene	4600	770	ND, < 693	ND, < 726	1400
Totals	**23620**	**1640**	**<693**	**<726**	**5600**

ND = not detected
All results are in parts per billion (ppb). Analyses for PAHs were performed by IEA Laboratories. Results for solid samples are reported on a dry weight basis.

Analyses for PAHs were performed using EPA Methos 8270A.

Salt Marsh Stewardship:
Caring for North Mill Pond

A salt marsh is more than just a grassy wet area! It is a very important and complex ecosystem providing habitats for an amazing number of plants, birds, and animals. Marshes also provide humans with many benefits, ranging from high water buffers, to water and air cleaners, to nurseries for the fish and shellfish we like to eat. If you are lucky enough to live near a salt marsh like North Mill Pond, here are some things you can do to protect and care for it.

1 **Let the salt hay grow!**
The roots of *Spartina* and other marsh plants prevent erosion and provide an important food source and habitat for wildlife. Give yourself a break and retire that lawn mower.

2 **Compost your yard waste!**
Even though your leaves are organic material, don't dispose of them in the marsh. Yard waste builds up and kills the marsh grasses. Lawn clippings may contain pesticides and fertilizers, so keep them out of the water!

3 **Be aware of what's downhill from you!**
What you pour out on the ground or in the storm drain may end up in the pond. Think about this the next time you work on your car, paint your house, or put chemicals on your lawn.

4 **Enjoy the pond!**
The North Mill Pond is a unique and valuable asset to Portsmouth that does not get enough positive attention. Take some time to enjoy the view from Maplewood Avenue, do a little birdwatching, or read up on the history of the area. It's your backyard!

ADVOCATES FOR THE NORTH MILL POND

DOs and DON'TS

For your health and the health of North Mill Pond

The Advocates for the North Mill Pond have great hopes for the future of the pond, but are also realistic about the present. The area has been neglected for many years, and it will take a lot of care to make the pond and its surrounding areas a safe and healthy environment. Here are a few tips on what you can do to take care of yourself while taking care of the pond.

1 **Don't drink the water.**
Water testing of the North Mill Pond in 1997 revealed bacterial counts at unacceptable levels. Swimming is NOT a good idea.

2 **Stay out of the mud.**
Low tide in the pond reveals acres of mudflats. These areas are valuable resources for birds and wildlife and should be avoided. In addition, the sediments may contain sharp glass and metal fragments, as well as potentially harmful substances. Enjoy the view – but stay on shore!

3 **Clean it up!**
Both industrial and casual dumping have contributed heavily to the environmental damage and poor image that the pond has suffered in recent years. You can help by picking up litter as you walk, or by joining in the annual ANMP cleanup. If you see dumping or any other illegal activity, report it! Get a license plate if possible and call:

Portsmouth Police: 603-427-1500 (or 911)
Railroad Police: 800-955-9217
Dept. of Environmental Services: 603-271-3503
Coast Guard: 603-433-7324

the North Mill Pond

An area of great value to us all

Located on the north side of Portsmouth, New Hampshire, the North Mill Pond is a 46-acre salt pond, fed by the tidal waters of the Piscataqua River and by the freshwater flow of Hodgson Brook. Though it is an area that has received little appreciation in the recent past, the pond had an integral role in the historic development of the city. Its surrounding neighborhoods are a reflection of the diversity of Portsmouth, with areas ranging from heavy industry to residential neighborhoods to serene salt marsh. A recent study by the Advocates for the North Mill Pond shows that North Mill Pond provides critical habitat necessary for fish and wildlife, and an important stopover for migratory birds.

This brochure was produced with generous support from the following sources: The City of Portsmouth, the Greater Piscataqua Community Foundation; the New England Grassroots Environmental Fund; and the Office of State Planning/New Hampshire Estuaries Program

ADVOCATES FOR THE • NORTH MILL POND •

Advocates for the North Mill Pond (ANMP) is a neighborhood association formed in 1997 with the purpose of protecting, conserving and enhancing the North Mill Pond and its surrounding neighborhoods. ANMP considers the pond an asset to the city of Portsmouth and includes in its mission:

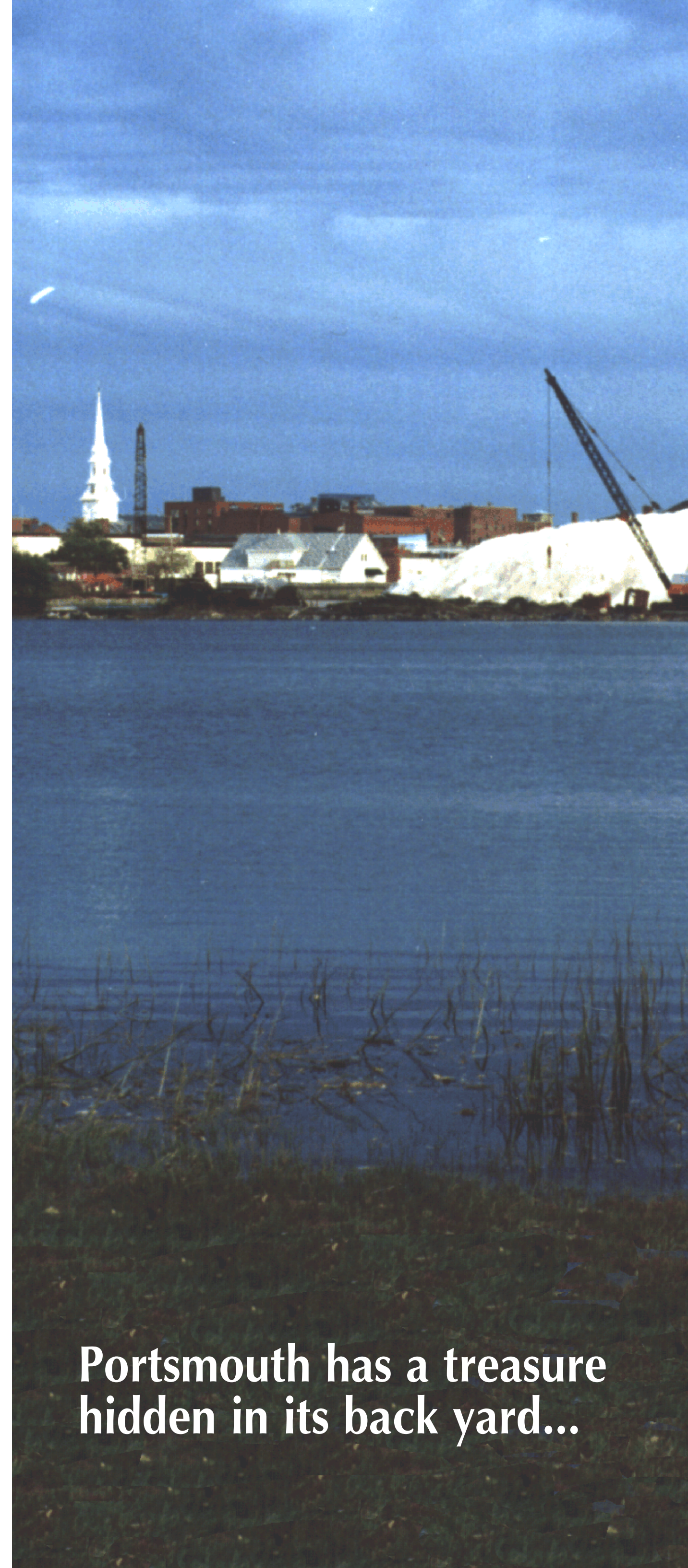
1) To encourage appropriate revitalization that will complement and encourage the stability of the tidal pond ecosystem while enabling the community to utilize appropriate surrounding areas,

2) To foster an appreciation of the historical and cultural resources of the pond and the surrounding area,

3) To encourage stewardship of the pond through activities such as community clean-ups, water quality monitoring, and remediation programs, and

4) To provide a forum that will keep the neighborhoods informed of any and all issues that may impact the North Mill Pond and the surrounding area.

ANMP needs your help! Meetings are held the fourth Thursday of each month. For more information about ANMP and how you can help, call Steve Miller at 603-433-1160 or Doreen MacGillis at 603-431-9246.



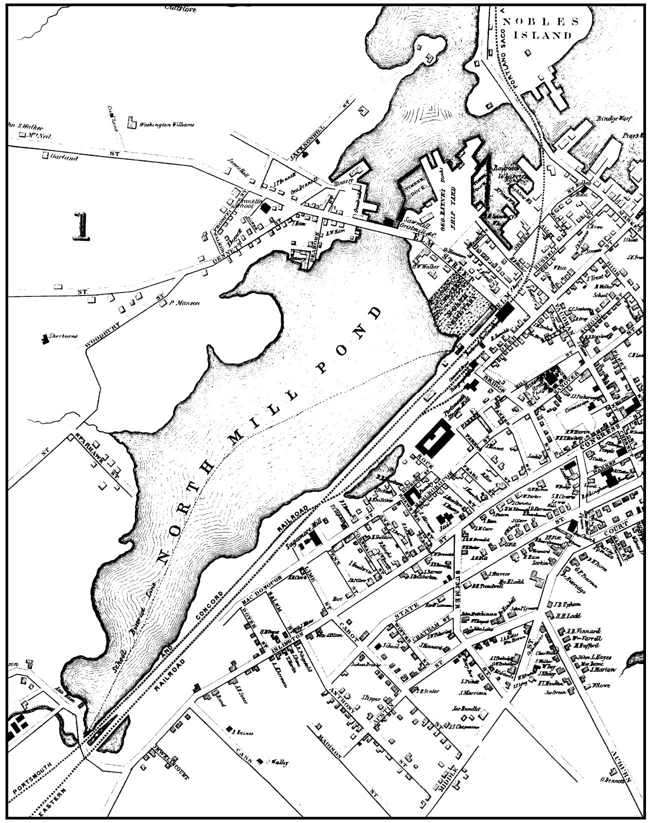
An Historical Overview

The first commercial development of North Mill Pond took place in the 1660s, when the freshwater creek at the southern end was harnessed to power a sawmill, the first in the area. The products of this mill were possibly used to build the 1664 Richard Jackson house, which still stands on Northwest Street. The mill was in operation in the 1830s, spinning woolen yarn for hosiery and eventually became the site of the Eldridge Brewing Company. This end of the Pond, known as the Islington Creek neighborhood, was the industrial center of Portsmouth in the 1860s.

At the opposite end of the pond, at the present-day Maplewood Avenue bridge, a dam was built in the mid-1700s utilizing the water's tidal flow to power grist mills. Businesses flourished at this site, in particular the large and profitable Raynes Shipyard, which built over 50 three-masted vessels (including ten clipper ships) between 1828 and 1860. It was said to be the most picturesque and beautiful of all shipyards along the Atlantic Coast.

Across the bridge, in an area known as the Christian Shore, tanneries and grist mills were built. In 1805 the shoreline was advertised as having "clay enough to make bricks for a century" and several successful pottery businesses, including the Dodge Pottery, were soon flourishing. These potteries were an important source of the bricks required (by law) for new buildings in downtown Portsmouth after the devastating fires of the early 1800s.

The western side of North Mill Pond was farmland well into the 19th century. Fifty houselots were plotted south of Dennett Street in 1812, as well as a bridge across the pond, but planner John Miller died in 1813 with the timbers waiting on the shore and few houses built. Development in this area, known as the Creek, did not speed up until much later in the century and the area remains residential today.



A view of the North Mill Pond, ca 1851.

The industrial development of the south-eastern side of the pond, an area originally known as Rock Pasture, changed the identity of Portsmouth. The arrival of the Eastern Railroad and the construction of the Portsmouth Steam Factory (and, later, the Sagamore Mill) created an industrial corridor that pulled the city's commercial focus away from the waterfront. The new industries boosted the local economy and provided work for a flow of immigrants that dramatically increased the city's population in numbers and in diversity. The Railroad remains operational today, and this side of the pond continues to be a busy commercial and industrial area.

Protecting the Natural Assets of North Mill Pond

As the land surrounding the pond was among the earliest developed in Portsmouth, it is also the area most significantly impacted from industrial and residential development. From the mills that constricted the water's flow, to the development that filled substantial areas along the shore, the pond has changed dramatically over time – as Portsmouth itself has changed. In spite of the impacts of development, the North Mill Pond is a remarkable survivor. This area still provides:

- necessary habitat for shorebirds and fish
- a stopover for migratory birds
- a nursery for shellfish and finfish
- better water quality, by filtering sediments and contaminants
- a natural buffer area, absorbing the severity of flooding from storms
- vistas of great natural beauty and wonderful birdwatching
- a direct connection to the past, with historic sites such as the North Cemetery
- a great opportunity for businesses, local government, and neighborhood associations to work together for the benefit of all.

The North Mill Pond has had a rich past, but its current condition does not reflect its important legacy. Over time, the pond has become burdened with pollution from industry, road runoff, sewage discharges, and the dumping of trash, debris, and fill material. The community that makes its home around the pond believes that it is time to recognize the importance and value of the area. With appropriate revitalization, this area could gain a new life and identity, and become an important resource for people, businesses, and wildlife.

Izak Gilbo

From: JAH <samjakemax@aol.com>
Sent: Monday, November 2, 2020 6:03 PM
To: Izak Gilbo; Peter L. Britz
Subject: 105 Barltett Street - Stormwater to North Mill Pond

Please forward this email to all members of the Conservation Commission and reply with a time and date it was sent.

Thanks

Dear Chair McMillan:

At the last ConCom meeting when this project was discussed in May or June, one of the CC members was very concerned about the temperature of stormwater that will be discharging to the North Mill Pond. Though a legitimate concern, a much bigger issue is the increase in the amount of stormwater this project will dump into NMP.

Right now more that half (55 %) the storm water goes into the "brick box" sewer which is a main sewer line that runs to the Deer Street Sewer pump station. After the project is built, 100 % of the stormwater will go into NMP. Under current conditions for the 2 year storm event, (a storm that on average will happen once every 2 years, or a 50% chance of happening any given year) 9.77 cubic feet per second (cfs) would discharge to NMP. After development, **25.61** cfs would be dumped into NMP, or a increase of 271 % !!!!!. This is unacceptable. For every new development in New Hampshire for the last 30 years, NHDES has required the post-development stormwater flows leaving the site to be less than the pre-development flows. Portsmouth requires the same standard. What ever happened to Portsmouth the "Eco-Municipality" ?

For those of you familiar with the massive ell grass die-off in Great Bay in the late 2000's, it is now generally accepted this die-off event was caused by too much stormwater in Great Bay from the massive Mother's Day flood of 2006, which reduced salinity to toxic levels for eel grass. This much additional stormwater into NMP is completely unacceptable !. See page 42 of the link below.

http://files.cityofportsmouth.com/files/planning/apps/BartlettSt_105/BartlettSt_105_TAC_050520.pdf

Jim Hewitt

Izak Gilbo

From: Juliet T.H. Walker
Sent: Wednesday, November 4, 2020 8:13 AM
To: Peter L. Britz; Izak Gilbo
Subject: Fwd: Conservation Commission 105 Bartlett Nov 4th

Begin forwarded message:

From: Planning Info <Planning@cityofportsmouth.com>
Date: November 4, 2020 at 8:10:28 AM EST
To: "Juliet T.H. Walker" <jthwalker@cityofportsmouth.com>
Subject: FW: Conservation Commission 105 Bartlett Nov 4th

From: Private General [mailto:qatoday@yahoo.com]
Sent: Wednesday, November 4, 2020 5:11 AM
To: Planning Info <Planning@cityofportsmouth.com>
Subject: Conservation Commission 105 Bartlett Nov 4th

Please provide the following information to the Conservation Commission for today's meeting. Thank you,
Elizabeth Bratter (Property Owner 159 McDonough St)

What was presented in the Drainage Report for 105 Bartlett St:

"Furthermore, since North Mill Pond is a tidal water, NHDES does not require peak runoff control requirements to be met (Env-Wq 1507.06 (d)). For this reason, a comparison of peak runoff rates for the various storm events has not been provided."

It is true they are exempt from 1507.06 (a) and (b) **however,**
I was unable to find that the report contained 1507.06 (d) a downstream point or off-site contributing area or (e) 100 yr flood impact
as well as 1504.09 (a) (2) total impervious surface by LOT and(a)(3) a discussion of how the proposed development is likely to impact downstream surface water and properties.

New Hampshire Code of Administration Rules: 1507.06 and 1504.09:
https://www.des.nh.gov/organization/commissioner/legal/rules/documents/env-wq1500.pdf (actual pages 65 and43 respectively)

Env-Wq 1507.06 Peak Runoff Control Requirements.
(a) The purpose of this section is to address increases in the frequency and magnitude of flooding caused by development.

(b) Subject to (d), below, the 10-year, 24-hour post-development peak flow rate shall not exceed the 10-year, 24-hour pre-development peak flow rate for all flows leaving the site.
(c) Subject to (d), below, the 50-year, 24-hour post-development peak flow rate shall not exceed the 50-year, 24-hour pre-development peak flow rate for all flows leaving the site.
(d) A project area that directly discharges to a stream, waterbody, estuary, or tidal water shall be exempt from (b) and (c), above, if the applicant has provided supporting off-site drainage calculations for the 10-year and 50-year, 24-hour storm **in accordance with Env-Wq 1504.09, showing that at a point immediately downstream from the project site the post-development peak flow rate from the site and the off-site contributing area does not exceed the pre-development peak flow rate at that point.**
(e) **The applicant shall provide supporting information in accordance with Env-Wq 1503.09, showing that there is no impact to properties as a result of developing within the 100-year floodplain.**

Env-Wq 1504.09 Stormwater Drainage Report; Drainage Area Plans; Hydrologic Soil Group Plans. A stormwater drainage report, associated drainage area plans, and associated hydrologic soil group plans shall include the following:
(a) A narrative with the following information:
(1) A description of the pre-development and post-development conditions affecting drainage;
(2) The total impervious area assumed per lot, as applicable;
(3) A discussion of how the proposed development is likely to impact downstream surface waters and properties;
(4) A comparison between the pre-development peak discharge rates and the post-development peak discharge rates, for the one-year, 2-year, 10-year, and 50-year, 24-hour storms;
(5) A discussion of how treatment criteria will be met in accordance with Env-Wq 1507.03; and
(6) A discussion of how groundwater recharge is met in accordance with Env-Wq 1507.04;

NOTE DID NOT INCLUDE REST OF THIS Rule nor Env-Wq 1507.04 please see website.

From: Jesse Pratt
To: Planning Info; Juliet T.H. Walker; Peter L. Britz
Subject: Conservation Commission Meeting 11-4
Date: Wednesday, November 4, 2020 10:02:52 AM

Good Morning,

I would like to echo the sentiments of many residents who expressed the need to postpone the hearing for 105 Bartlett St at this afternoons Conservation Commission meeting. As I remember from the October meeting, the request to postpone 105 Bartlett was approved and at such time Peter Britz said that this project "will have to be re-advertised because of how much time has passed." The letter from Tighe and Bond requesting to be on today's agenda was dated 10-28-2020 and the 105 Bartlett St project was added to the agenda some time after that letter. As far as I can tell, a few days before the meeting was to occur.

I have confirmed with multiple neighbors that no abutters notices have been received. I may be incorrect, but I believe that 10 days notice is required. Even if the conservation commission is exempt from the 10 day notice/submittal rule, it seems that 4 days for residents to catch up and read the documentation of changes is not sufficient time. Nor is 7 days enough time for the commission members, some of which are new and may not be familiar with this project, to fully digest the information included in the application & packet.

I feel that at this point, you are compelled to postpone reviewing 105 Bartlett St until the next meeting. Doing so will provide everyone with enough time to fully review the application/packet and understand the project and changes.

Thank you,

Jesse Pratt