

Bare Hill Pond Watershed Management Committee
Town of Harvard
Harvard, MA 01451

August 16, 2017

Conservation Commission
Town of Harvard
Town Hall
Harvard, MA 01451

Re: 2016-17 Drawdown Report and Fall 2017 Drawdown Plans; Notice of Intent Filing

Dear Commissioners:

On behalf of the Bare Hill Pond Watershed Management Committee, we are pleased to submit our 2017 annual report. The professional phosphorous report and the final invasive species monitoring (including the new transect recommended by Wendy Gendron) will be completed this coming weekend and submitted next week. We include with this letter observational data reported by residents and our volunteers. We have invited Wendy Gendron, our wetlands biologist consultant to join us at the meeting on September 7, 2017. We are also submitting an accompanying Notice of Intent to cover the proposed draw downs that may be authorized during the next three years based on annual monitoring. Our prior Order of Conditions expired this August.

In summary, our observational data indicates from the past year provides useful information about the watershed that will assist in planning for future draw downs. In 2016 the watershed experienced a significant drought and based on advice from the state experts, and careful consideration of the Committee and the Commission, a draw down was authorized. Our refill this Spring was normal or even somewhat ahead of schedule. While snowfall was normal, there were consistent spring rains as the drought eased and the water table was restored in the watershed. Attached as Exhibit A is the measurements of the draw down and refill. The Pond was higher this year.

Our professional monitoring report will have comparison measures of invasive and native plant species, phosphorous measurements, and Secchi disk measurements among other water quality measures. Observations from residents observed a decline in water clarity this year from 2016. Recall that in 2016 water clarity was quite high, and exceeded prior years. This summer that clarity is more normal. Our hypothesis is that the water clarity is impacted by storm water flow and during the drought year, most water entering the pond was from springs and less from streams and run off which contain particulates, phosphorous and other potential pollutants.

During the summer we received observational reports that invasive species (milfoil and fanwort) were seen in greater amounts than in the prior year. The draw down did not reach its

full 6 foot depth last year due to the one week suspension of the draw down in late October. That said, there appeared to be a solid freeze in January but not for more than a few weeks. The professional data will provide more information, but based on observations, we believe it may be warranted to conduct another draw down this fall given the density of invasive species that were observed.

In the initial phosphorous measurements this Spring, levels appeared to remain comparable to last year and the final analysis of the data will be provided next week. In the Spring measurements, many of the locations remain below the endangerment level of 30 ug/l (0.030 mg/l). In 2015, some locations had measurements above that level. Ms. Gendron's report will contain year to year comparisons.

As background, a completely undeveloped watershed is normally 5-10 ug/l and it would be difficult to get much lower than 20 ug/l given the level of development in our watershed and the pre-existing bound phosphorous in the Pond bottom. The 1998 TDML measured the level at 44 ug/l and our target for the DEP/EPA grant was 30 ug/l.

Wendy Gendron conducted the expanded monitoring survey as requested. She added specified sites to the in lake survey to capture areas that were reported as concerns by residents that had not been captured in prior years. She also added adjacent wetland monitoring as requested and discussed at last year's meeting to monitor the health of the wetlands, and conducted the phosphorous readings. This data will inform the final recommendation at our meeting on September 6.

In addition to the professional monitoring, we continue our volunteer monitoring program of frogs, fish, mussels and invertebrates, and downstream wetlands. Brian McClain, did yeomans work this year assuming responsibility for frog counts. He recruited a number of new volunteers. Based on the reports, we counted all of the expected species and the numbers do not seem to indicate any significant changes. Pickerel frogs were counted in greater numbers and others somewhat less. The variation could be due to the weather differences as each species is present at different temperature levels. Morey Kraus also conducted his annual turtle count and this year he counted 34 turtles on the counting route. He observed mostly North American Painted turtles sunning on rocks and branches. He also observed some snapping turtles.

No fishing derbies registered with the Park and Recreation Commission this year so we could not rely on fishing derby reports for fish data. I reached out to Richard Hartley in the MA Department of Environmental Affairs. He conducts fish counts on MA lakes and ponds and he came to test Bare Hill Pond. He reported that he found in order of abundance: Yellow Perch, Pumpkinseed, Bluegill, Largemouth Bass, Chain Pickerel, White Perch, Brown Bullhead (a norther type of catfish), and Black Crappie. He was pleased with what he found and plans to return each year if possible so we have comparison data. Conversations with local fisherman continue to report excellent fishing. We held a mussel count at the 5 foot stage to see if they are impacted and there continue to be many mussels as well as juveniles indicating their health.

Rick Dickson continues to monitor invasive water chestnut plants finding small numbers which he and others pull. Due to his success over the past several years, he did not seek volunteer help for a weed pull. The water chestnuts continue to be under control as the density of plants is low as reflected in how difficult it is to find them throughout the Pond. He asks us all to be vigilant for any remaining water chestnut plants and to pull them when we see them.

Draw Down Plan

Our tentative recommendation, pending the receipt of Wendy Gendron's report, based on observation of an increase in invasive species, and possibly the limited impact of the draw down last winter on invasive species, we propose to do a draw down for this Fall to restore the lower phosphorous levels and to keep the invasive species from continuing to repopulate the 5-8' zone. A 6 foot draw down would achieve what we had planned for last year and has shown to be sufficient in prior years when there is sufficient cold. We believe the refill this year and the maintenance of the level in the Pond demonstrates that it is acceptable to conduct a draw down this winter. It is important that we keep the invasive species and phosphorous under control and not allow significant expansion of the invasive species.

.Our draw down plan would be the same as last year. We continue to receive outstanding support from DPW in operating the pump and assisting with maintenance. This allowed for better timing of pumping, reduced power costs, and the ability to successfully defer pumping until late October. Assuming that there is not significant rainfall in September, the current level of the Pond should allow for a gravity draw down during most of October and then running the pump when the Pond level declines to the level of water in the wetlands. The removal of boards and the running of the pump would only occur as needed to achieve the depth targets based on the following table. Depth target is the maximum drawdown as of that date.

<u>Date</u>	<u>Depth Target</u> <u>(Measured from the top surface of the dam)</u>			2017, 2016 and 2015
	2014	2012	2017, 2016 and 2015 Drawdown Depth	Actual Depth**
9/24	22"	22"	22"	0"
10/1	22"	34"	22"	0"
10/15	34"	46"	36"	14"
10/24	46"	52"	48"	26"
10/28	52"	58"	56"	34"
Nov 30 or freeze*	5.5' on pipe	6' on pipe	6' on pipe	6' on pipe

*(measured on pipe marker)

** (amount of water drawn down)

Pumping would begin only when needed to maintain the rate during October but be necessary after reaching approximately 3 feet. The rate would not exceed 2 inches per day per the Order of Conditions. We think this approach will preserve Pond levels in September and October for recreational use (including the rowing season) and still achieve the beneficial draw down effects. If we are unable to achieve the 6.0 foot draw down by November 30, 2017 or a freeze occurs, we will stop and discuss it with the Commission if we have an alternative recommendation.

As in prior years, we would initiate the refill of the Pond on or before February 1, 2017 following notice to the Commission and the abutters. Because snowmelt timing is variable, it is important to timely refilling of the Pond, our experience indicates that deferring the refill beyond February 1 is unwise to ensure the habitat is restored for amphibians, fish and reptiles.

We appreciate the time the Commission has taken, and the effort made to understand, and help manage the project. We look forward to the meeting on September 7.

Sincerely,

A handwritten signature in blue ink, appearing to read 'B. Leicher', with a stylized flourish at the end.

Bruce A. Leicher
Chair, Bare Hill Pond Watershed Management Committee

Cc: Conservation Commission Members
Bare Hill Pond Watershed Management Committee Members
Board of Selectmen

Exhibit A

Pond Draw Down and Refill Data Fall 2016 – Spring 2017

Note: 22” is average normal height of Pond (average range 16”- 28” from top surface of Dam); feet is draw down actual depth from pipe markers

<u>Date</u>	<u>Pond Level</u>	<u>Wetlands Level</u>	<u>Notes</u>
9/10	37”	68”	Pre-draw down limited rain in August; Pond 8” lower than in Sept 2015
9/17	37”	69”	No rain
9/24	37”	69”	0.5” rain
10/1	37”	68”	1.0” rain
10/8	37”	69”	No rain
10/17	38”	69”	Little rain
10/22	38”	55”	Removed boards to 40”
10/27	-	-	Stopped boards per ConsCom Request at 40”
11/3	47”	58”	
11/4	-	-	Removed Boards after meeting
11/5	52”	55”	
11/9	56”	58”	Put boards in and start pump
11/10	57”	56”	
11/11	59”	60”	
11/12	61”	55”	
11/17	70”	58”	
11/19	72”	58	
11/20	75”	59”	
11/23	84”	57”	
11/25	5 ¼ ft	57”	
11/27	5.5 ft	58”	
12/3	5 ¾ ft	62”	
Dec-Jan	5.5 – 5 ¾ ft	60-65”	
2/4	84”	60”	Start refill
2/18	73”	65”	Some snow melt – still cold
2/24	69”	65”	
3/4	62”	66”	
3/18	56”	66”	
3/25	53”	68”	A week ahead of 2015 refill
4/2	40”	65”	
4/9	24”	68”	It was 18” lower on 4/9 in 2015
4/15	20”	60”	Pond is full
4/22	19”	56”	It was 12” lower on 4/23/2016

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4/29	17"	56"	Normal Spring high above 22"
5/6"	19"	56"	
5/13	19"	57"	
5/20	18"	58"	
5/27	18"	54"	

Location

Ten 100' Segment Sites

November 16, 2003

WILDLIFE, HABITAT AND VEGETATIVE ASSESSMENT
OF BARE HILL POND, HARVARD (MA)

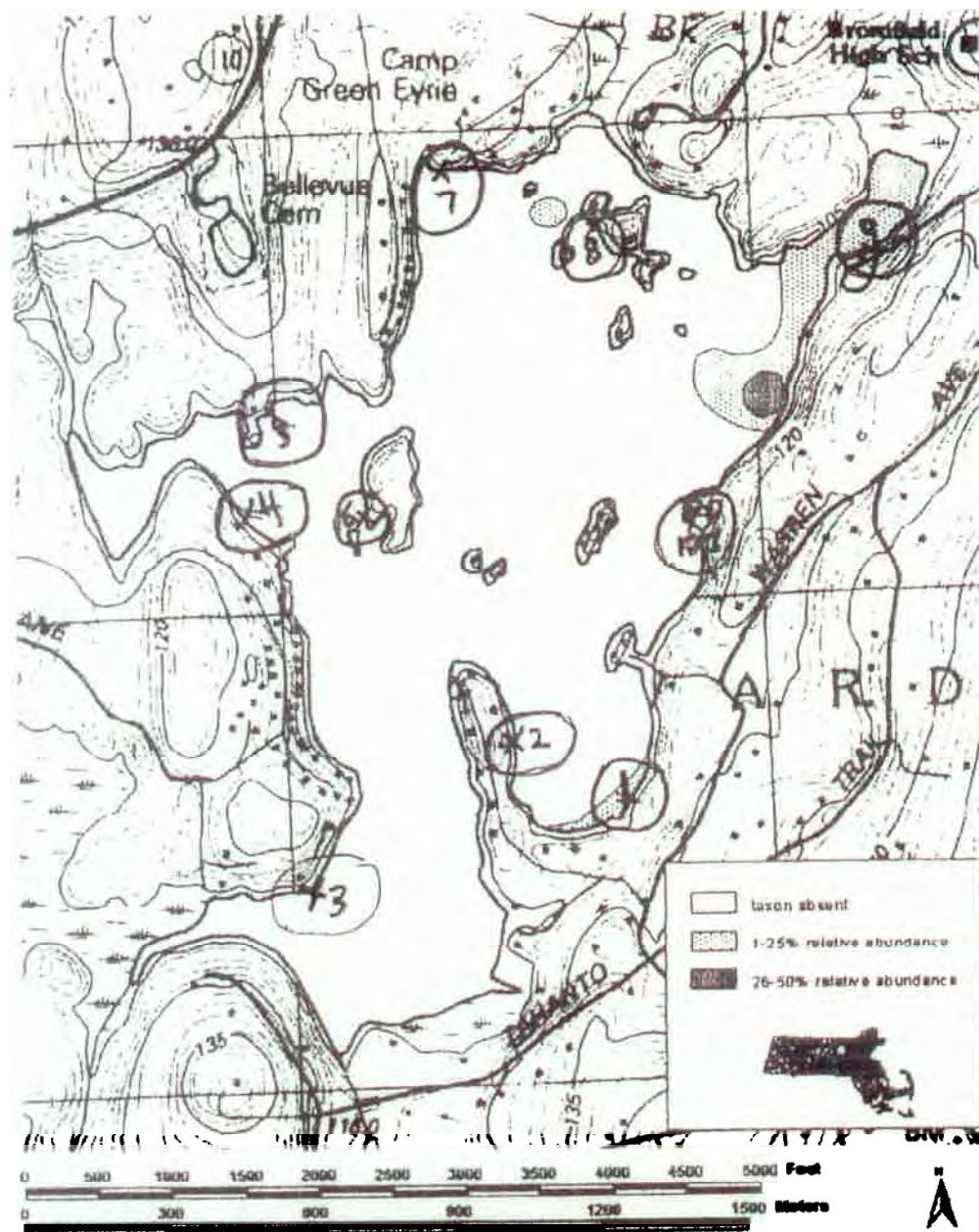


Figure 5. Distribution and relative abundance of farwort (*Cabomba caroliniana*) in Bare Hill Pond in October 2001, from data in Appendix A.



Site 10



Site 1



Site 2



Site 2



Site 2



Site 3



Site 2



Site 3



Site 3



Site 3



Site 6



Site 6



Site 4



Site 4



Site 5



Site 5



Site 7



Site 7



Site 8



Site 8



Site 8



Site 8

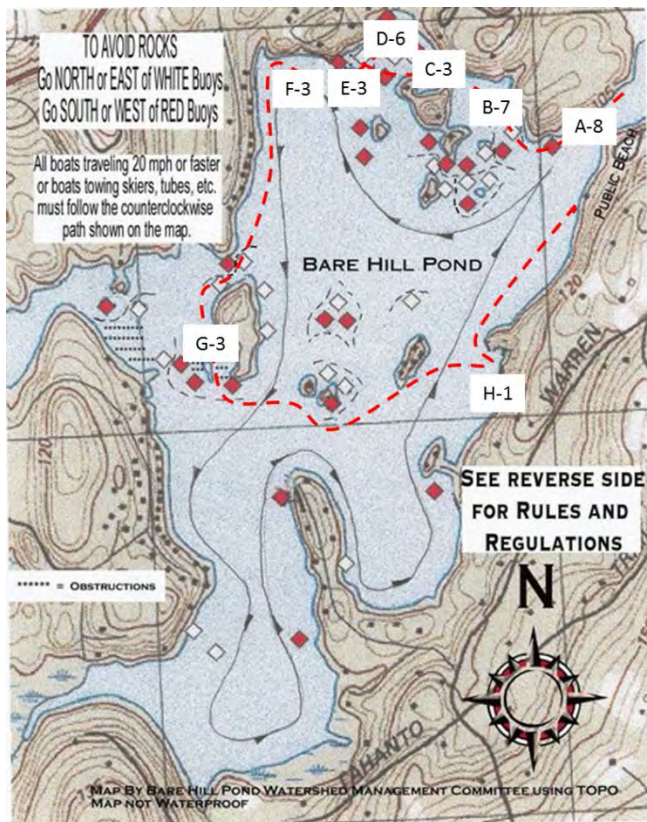


Day/Date/Time - Sat Aug 12, 2017 between 2:00-4:00 PM

Weather – mix of clouds and sun, low 80's

Method – Scout shoreline for fall-down branches, limbs, logs, etc. and rocks with low to the water profiles that allow quick escape for turtles when startled. Turtle shells may be shining in the light making them easy to see from 10-30 yards. Others may be showing orange/yellow markings that are visible to the trained eye for up to 50 yards. Approach the shoreline with possible subjects in a quiet drift and you may view and evaluate them from within 10 yards.

Track and Observations: I have had best results on the North by Northeast shoreline starting across from the town beach boat launch. I suspect this is because this shoreline sees maximum day long sun but do not know this to be the case but I have not confirmed this as a fact. I have seen turtles on the other side of the pond but have not formally counted them. Turtles I have seen by this method have been exclusively North American Painted Turtles. I have seen large Snappers from time to time. And also saw a clutch of baby Snappers along the shoreline of my property on the West by Southwest side of the pond. I proceeded counter clockwise as shown by the red dashed line on the map below. Designated on the map are the areas (A-H) I spotted and enumerated a total of 34 North American Painted turtles. Continued below...



The sighted turtles ranged in normal size distribution from palm-to-hand sized with only one individual on each end of the spectrum. Smaller subjects may not survive to late August. Seasonal counts might be recommendable in the future to better understand the maturation rate of the species in Bare Hill Pond. All of the subjects appeared healthy. Brightly orange bottoms, yellow masking, and intact scales on their shells. Representative photos are below.



Typical North American Painted turtle at Bare Hill Pond.



Clutch of N.A. Painted turtles on log. Note closeness to water line.



Two turtles sunning. Note healthy shell scaling.





Above 2 photos of a baby Snapper found walking on my shoreline were taken in May.

Additional field note:

While counting another kayaker told me she had seen an adult bald eagle that afternoon. I saw an adult bald eagle at the pond in early spring right after the thaw.

From: [Bruce Leicher](#)
To: [Bruce Leicher](#)
Subject: RE: frog counts paragraphs
Date: Tuesday, August 15, 2017 8:01:00 AM

From: Brian McClain [mailto:brian_mcclain@vrtx.com]
Sent: Monday, August 14, 2017 10:20 PM
To: Bruce Leicher <bleicher@momentapharma.com>
Subject: frog counts paragraphs

Hi Bruce

here is my take on frog counts for 2017 (Note - attached is the raw count data that I compiled for 2017 for reference):

=====
The Pond Committee has carried out monitoring of 7 frog species at 3 locations around Bare Hill Pond on 4 separate dates.

The 7 species monitored are the bull frog, green frog, wood frog, spring peeper, gray tree frog, american toad and pickerel frog.

The 3 locations are Clapp's Brook, "tennis courts" a.k.a. beginning of Barba's Point Trail, and the end of Bower's Road.

The 4 dates were 4/23/17, 5/21/17, 6/18/17 and 7/16/17.

All species - except for the wood frog - were detected during monitoring. Since volunteers had heard wood frog calls on their own before monitoring began, it is assumed that the wood frogs had finished their mating season by the time of the first count on 4/23/17. Thus the Pond Committee will commence monitoring at an earlier date in the future in order to record the presence of wood frogs.

The most numerous frogs were spring peepers which were too numerous to count at all 3 locations at the first count on 4/23/17. Pickerel frogs were also relatively numerous at this time at Clapp's Brook and Bower's Rd.

By the 5/21/17 count, pickerel frogs were no longer detected and spring peepers were almost silent as well. At this date gray tree frogs, and to a lesser extent green frogs, had started calling. Finally, at the last count on 7/16/17, only green frogs were detected.

Other items of note:

- 1) Except for the first count on 4/23/17, the "tennis court" site was noticeably silent. It has been noted that there was an oil spill at the Bromfield School which may have impacted the tennis court wetlands.
- 2) Volunteers were numerous at for the first 2 or 3 counts, but by the last count on 7/16/17 only one showed up - thus we did not have enough people to cover all 3 locations - (Clapp's Brook was not covered for this last count).

=====
OK - let me know if you have any questions,

Brian

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date	location	bull	green	wood	spring peeper	gray tree	american toad	pickerel	comment
4/23/2017	clapp's brook				chorus				36
4/23/2017	tennis courts				chorus			4	
4/23/2017	bowers rd				chorus				116
5/21/2017	clapp's brook					102		1	
5/21/2017	tennis courts								no calls
5/21/2017	bowers rd			6	15				
6/18/2017	clapp's brook		2	9					
6/18/2017	tennis courts						1		single call
6/18/2017	bowers rd			48			21		
7/16/2017	clapp's brook	xxx	xxx	xxx	xxx	xxx	xxx	xxx	not done
7/16/2017	tennis courts								no calls
7/16/2017	bowers rd			22					