

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

September 7, 2018

Conservation Commission  
Town of Harvard  
Town Hall  
Harvard, MA 01451

Re: 2017-18 Drawdown Report and Fall 2018 Drawdown Plans

Dear Commissioners:

On behalf of the Bare Hill Pond Watershed Management Committee, we are pleased to submit our 2018 annual report. The professional phosphorous report and the final invasive species monitoring prepared by Wendy Gendron are included with this report. We have invited Ms. Gendron, to join us for the September 20, 2018 Commission Meeting.

In summary, our observational data continues to provide use with useful information about the watershed that assists us in planning for future draw downs. In 2018, we saw a normal amount of rainfall in the Spring, limited rainfall in June until mid-July and then heavier rainfall in late July leading to a temporary increase in phosphorous levels. We believe this was due to the washing of runoff following the period without rain in that first big storm. This followed lower levels in the Spring and later in the season. We asked Ms. Gendron to run phosphorous levels in comparison to precipitation to see what we could learn.

Our refill this Spring was normal. Attached as Exhibit A is the measurements of the draw down and refill. With more rainfall this summer, the Pond was higher this year than the past few years.

Our professional monitoring report compares measures of invasive and native plant species, phosphorous measurements, and Secchi disk measurements among other water quality measures to prior years. Observations from residents observed favorable water clarity this year with the bottom visible in the 5-10 foot depth zone. At the time of the phosphorous increase, there were observations of some algal growth in the deeper zones which appear to have used up the phosphorous and not led to algal blooms.

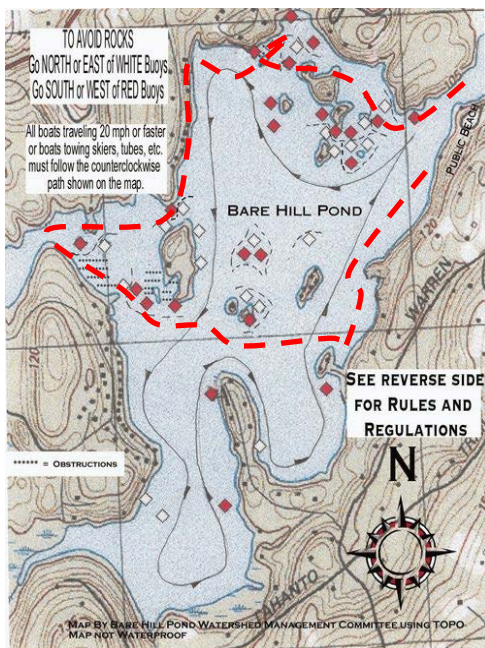
Invasive species are still present but based on the monitoring report continue to be controlled in the draw down zone. Unlike last year, we did not receive regular reports that invasive species (milfoil and fanwort) were in greater amounts than in the prior year. We were able to achieve the 6 foot draw down last winter and that may account for a more significant level of control. Based on increased phosphorous levels and continued observation of invasive

species, we believe it is warranted to conduct another draw down this fall. In the initial phosphorous measurements this Spring, levels appeared to remain comparable to last year, however, levels rose sharply in July following the first significant rainfall after the early July heatwave and absence of rain. We believe this could be the result of non-point source pollution dosing of the Pond all at once for a 3-4 week period. Had we not conducted a draw down last year, this rainfall dosing of phosphorous could have triggered an algal bloom.

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.

In addition to the professional monitoring, we continue our volunteer monitoring program of frogs, fish, mussels and invertebrates, and downstream wetlands. The 100 foot photos of the shoreline during the draw down are attached as Exhibit B.

Brian McClain, continues to manage the frog counts. He recruited a number of new volunteers. Brian reports that 7 species were monitored: bull frog, green frog, wood frog, spring peeper, gray tree frog, american toad, and pickerel frog. All species except for wood frogs and american toads were observed due to timing. Frogs are counted mostly during their week or two for mating so it is likely the american toads which move on to terrestrial sites, had been missed. Decreased calls were for american toad, gray tree frog (but they were very active in vernal pools near the Pond), and pickerel frogs during the counts. Increased calls for spring peepers and green frogs. Three locations are used: wetlands near Barba's point, wetlands at end of Bower's Road, and Clapp's Brook Wetlands. Observers had heard wood frogs earlier in the season away from the Pond.



Morey Kraus also conducted his annual turtle count and this year he counted 67 turtles, which compares to 34 turtles last year on his counting route. He reported the following:

Day/Date/Time - Sat Aug 19, 2018 between 1:00-3:00 PM

Weather – sunny, mid-70's, steady breeze out of the NE

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. Turtles I have seen by this method include primarily the North American Painted Turtle (N=64) and several box like turtles presumed to be Musk Turtles (N=3) based on photographic identification (see below last two photos). I have seen large Snappers from time to time but not on this out. 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.



One fishing derby registered with the Park and Recreation Commission this year and reported excellent results. 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.

### Draw Down Plan

Our recommendation, based on observation of an increase in phosphorous levels, and the continued need to control the invasive species is to conduct another 6 foot draw down 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 appear to be what is needed to have the impact we have been seeking. When it was interrupted two years ago, it was less effective.

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> (Measured from the top surface of the dam)			2015 – 2018 Actual Depth**
	<u>2014</u>	<u>2012</u>	<u>2015-18 Drawdown Depth</u>	
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, 2018 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, 2019 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 2017 – Spring 2018

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>
8/13	26”	62”	Pre-draw down (compare to 37” in 2016 drought year)
9/26	26”	62”	Remove first Board on 10/2
10/10	31”	70”	
10/14	35”	59”	Board removed
10/21	41”	54”	Board removed
10/28	44”	68”	Board back in due to expected storm
11/4	44”	57”	Removed boards again
11/5	47”	50”	Pump started and boards put back in
11/11	59”	58”	Pumping 50hz
11/18	69”	54”	Passed first pipe marker at 4”
11/25	5’	55”	
12/2	6’	63”	Pump monitored to maintain 6’ level
12/9	6’	63	
12/16	6’	60”	
12/30	6’	60”	Deep freeze through Jan 12
1/13	5.75’	63”	Thaw and heavy rain
1/20	5.75’	63”	Rain and re-freeze
1/27	5.0	63”	Refill starts with a thaw
2/17	56”	68”	
2/24	50”	67”	Some snow melt – still cold and more snow
3/3	40”	58”	Heavy rain and melt
3/18	24”	68”	2.5 ft snow and some melt
3/24	22”	67”	Snow and melt – flowing at dam (Full summer height)
4/7	18”	58”	Running in overflow stream
4/14	19”	60”	
4/26	17”	58”	Spring high level
5/19	21”	61”	Normal Spring height



Location

Terrestrial Segment Sites

November 16, 2003

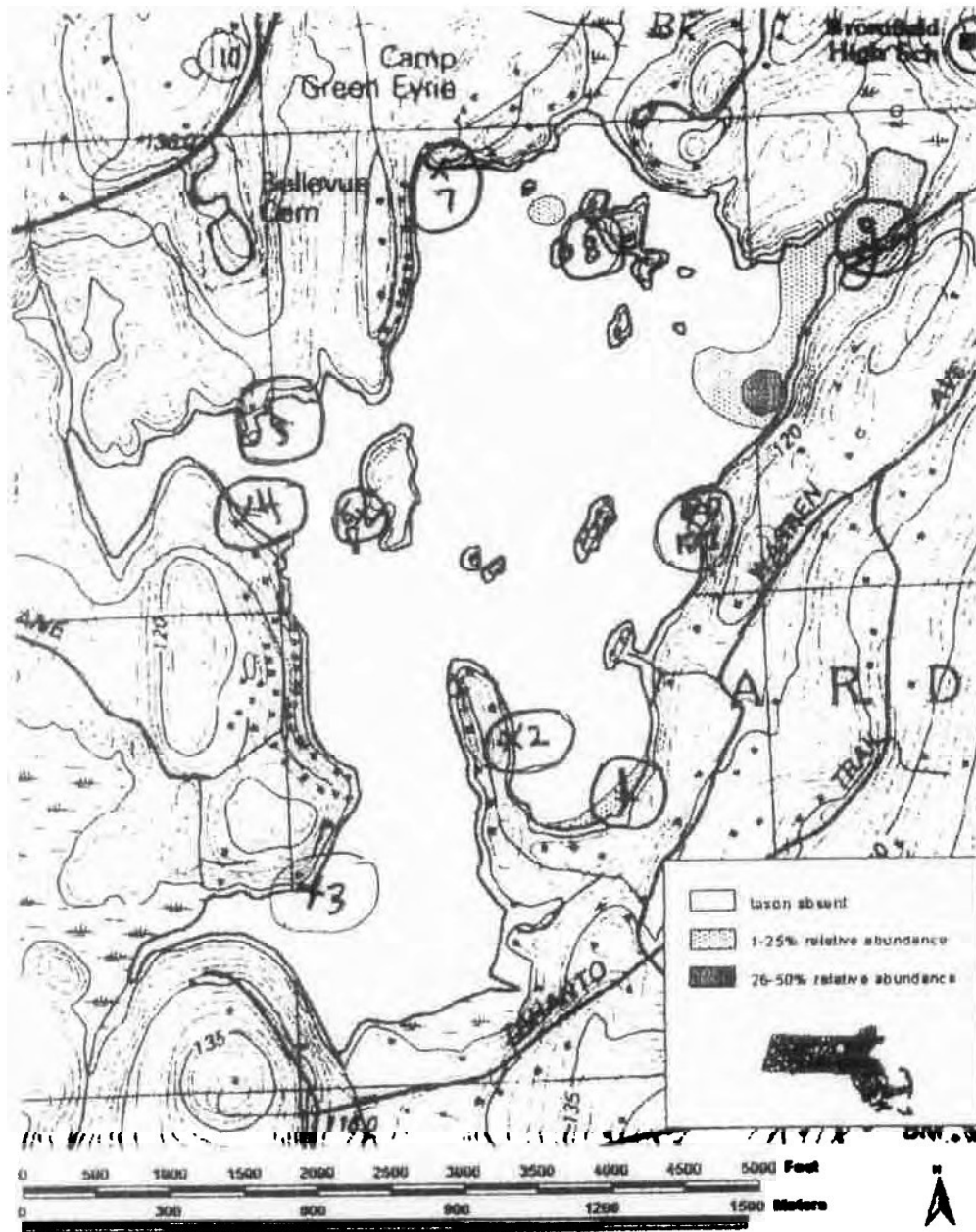
WILDLIFE, HABITAT AND VEGETATIVE ASSESSMENT  
OF BARE HILL POND, HARVARD (MA)

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

## 100' Shoreline Photos

Peninsula Road from South - Site 2



Outer Clapps Brook – Minister's Island Site 6



## 100' Shoreline Photos

Clapps Brook Shore – Site 5



Clapps Brook (Looking East) - Site 4





## 100' Shoreline Photos

Clapps Brook Site 4



Clapps Brook Site 4



## 100' Shoreline Photos

Inner Clapps Brook



Between Turner La and GS Camp Site 7



## 100' Shoreline Photos

Four Acre Island Site 8



Beach Site 1



## 100' Shoreline Photos

Beach Site 1



Beach Site 2



## 100' Shoreline Photos

Site 10



Site 10



## 100' Shoreline Photos

Dam and Pipe



Dam and Pipe



## 100' Shoreline Photos

Winter View

