

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

August 30, 2019

Conservation Commission
Town of Harvard
Town Hall
Harvard, MA 01451

Re: 2018-19 Drawdown Report and Fall 2019 Drawdown Plans

Dear Commissioners:

On behalf of the Bare Hill Pond Watershed Management Committee, we are pleased to submit our 2019 annual report. The accompanying professional phosphorous report and the invasive species monitoring survey was prepared by Wendy Gendron as in prior years. She completed her last data collection on August 24. We have invited Ms. Gendron, to join us for the September 5, 2019 Commission Meeting.

In summary, our observational data continues to provide us with useful information about the watershed to guide us protecting the watershed. Due to the heavy rainfall in late 2018, we did not achieve the full 6 foot draw down and instead reached a maximum of approximately 4.5 feet. In December, DPW did its best to monitor the pump and maintain the level but with the variable rain events, it was difficult to control and by late December was approximately 8" lower. The pump may have been set a bit too high during those 3 weeks and required very frequent monitoring. When I observed this, I stopped the pump, contacted DPW and asked them to discontinue use of the pump, and remove the boards to the Pond height. This would assure no change in the level without the pump needing to be monitored. This held the Pond at this level until the refill began in February 2019. As a result, we did not expect to see as great an impact on control of invasive species beyond the 4.5 foot level, although as noted in the accompanying report, there was a sufficient period for a freeze at the end of December and in January.

At the same time, greater rainfall and run off had the potential to increase phosphorous loading, however, this may have been compensated for by significantly more pumping required due to the higher water table, and this may have resulted in greater turnover in water perhaps leading to a greater level of phosphorous reduction than if we had not been pumping. Like last year the readings this year for phosphorous were a little higher in June and came down in July. That said, they were not at the endangered high levels seen before beginning this project. Water clarity was significantly better this year (up to 9.5 feet compared to 6-8 feet in the earlier years), suggesting less algal growth, although oxygen levels at the deeper zones declined somewhat in the readings, which may have caused the increase in phosphorous in the deeper zones. Wendy Gendron can discuss this at the meeting. Because we had significant pumping despite the limit to

the draw down depth, we may have helped to avoid a more dangerous phosphorous increase which could have resulted in algal blooms, a crash in oxygen and loss of fish and other species. By controlling the phosphorous we are likely avoiding these events which are experienced at other lakes and ponds without control of the phosphorous loads.

Because of the limited depth of the drawdown, and the improved water clarity, observations of residents indicated more visible growth of invasive species this year as compared to recent years. We saw a greater level of control last year following the six foot draw down. This suggests that we should continue to seek to achieve a 6 foot drawdown which appears to offer the most benefit in reducing invasive species.

Our rates of draw down and refill were somewhat different this year. The Pond height was higher by 4-6" than normal in September 2018 and there were multiple heavy rain events during the draw down in November and December. As noted above the draw down reached a maximum depth of 4.5 feet and was maintained at level by gravity because the boards could be set at this height. There were about 2+ weeks of a good freeze in January so it likely had an impact in the draw down zone. The refill was more rapid than normal and the Pond was at normal height by March 23. Attached as Exhibit A is the measurements of the draw down and refill.

In addition to the professional monitoring, we continue our volunteer monitoring program of frogs, fish, mussels and invertebrates, and downstream wetlands. Brian McClain, continues to manage the frog counts. Seven species of frogs are monitored at 3 locations around the Pond (Barba's point, end of Bowers road, Clapps Brook) on 4 separate dates (4/3/19, 5/5/19, 6/8/19, and 7/13/19) to capture each species likely breeding season when they are likely to be counted. The seven species are those native to the watershed (spring peeper, wood frog, green frog, bull frog, gray tree frog, American toad, and pickerel frog). All species except American toad were counted. The absence of American toad is not unexpected according to Brian as they were not normally counted in the past. They are present by observation in the surrounding woodlands and breed in vernal pools. Of note, 2 species that were rare in prior years, were abundant this year (wood frogs in higher numbers at Bowers Road (likely due to the earlier counting date in April) and bull frogs (again mostly at Bowers Road)). The Bowers road location continues to have the highest counts and suggest this marsh is a valuable resource.

Morey Kraus plans to conduct his annual turtle count this week and I will furnish his data upon receipt. Informally, he has observed mostly North American Painted turtles sunning on rocks and branches and snapping turtles throughout the Pond.

One fishing derby registered with the Park and Recreation Commission this year and reported excellent results to us. 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 provided a report on water chestnut control to the Committee in July. He continues to monitor invasive water chestnut plants finding very small numbers (10's of them) which he and others pull. Due to his success over the past several years, he did not seek

volunteer help for a weed pull, but just to encourage folks to pull them if they see them. The water chestnuts continue to be under control 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 target a 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.

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, and reduced power costs. Assuming that there is not excessive rainfall again, 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 – 2019 Actual Depth Target**
	2014	2012	2015-19 Drawdown 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, 2019 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, 2020 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 5.

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>
9/13	22”	67”	Pre-draw down (compared to 37” in 2016 drought year and 26” in 2017)
10/1	22”		Remove first Board on 10/1
10/4	28”	53”	
10/13	33”	51”	
10/20	41”	52”	
10/27	51”	58”	
10/31	54”	53”	Rain and pump started 10/30
11/3	53”	49”	Heavy rainfall
11/12	52”	53”	More heavy rain – increase height
11/17	54”	50”	More rain and snow
11/24	56”	53”	More rain and snow
11/30	62”	53”	Pump monitored by DPW to maintain level
12/8	64”	52	Level declined when set to be level by DPW
12/22	72”	52”	Contacted DPW to stop/slow pump which was operating too high leading to unexpected 8” drop in 2 weeks
12/29	72”	57”	Stopped pump and asked DPW to use boards
12/31	73”	70”	Boards set to maintain level
1/1	71”	68”	
1/12	65”	65”	
2/1	60”	68”	Boards put back in dam for refill
2/5	53”	68”	Thaw
2/9	48”	67”	
2/16	42”	68”	
2/23	38”	68”	Thaw snow and freeze
3/9	30”	68”	
3/23	18”	59”	Running in overflow stream (typically reaches this level in late April)

100' Shoreline Photos

Beach Site 1



Beach Site 1



100' Shoreline Photos

Beach Site 1



Beach Site 1



100' Shoreline Photos

Site 1 – Next to Thurstons Cove



Site 1 – Next to Thurstons Cove



100' Shoreline Photos

Site 2 - Penninsula



Site 2 Penninsula



100' Shoreline Photos

Site 3 - West of Clinton Shore



Site 3 West of Clinton Shore



100' Shoreline Photos

Drawdown at Bowers Frog Count site



Drawdown at Bowers Frog Count site



100' Shoreline Photos

Clapps Brook Site 4



Clapps Brook Site 4



100' Shoreline Photos

Site 8 Four Acre Island



Between Dam and GS Camp Site 7



100' Shoreline Photos

Site 10



Site 10



100' Shoreline Photos

Dam and Pipe

Dam and Pipe

100' Shoreline Photos

Winter View