TOWN OF HARVARD

BARE HILL POND WATERSHED MANAGEMENT COMMITTEE

MEETING AGENDA & MINUTES

Date:	**12/12/22**
Time:	7:30PM
Location:	Zoom
Meeting Chair:	Bruce Leicher
Meeting Purpose:	**December 12, 2022 Committee Meeting**
Attendees:	Bruce Leicher (chair), Peter Von Loesecke, Rainer Park, Joe Pettirossi, Pablo Carbonell , Ben Baron
Absent:	Morey Kraus (Alternate member), Megan Glew, Kerry Shrives,
Others Present:	Kelsey

MEETING AGENDA			
#	AGENDA ITEM	ALLOTTED TIME	PRESENTER
1	**Secretary Report**		Kerry Shrives
2	**Treasurer Report**		Peter Von Loesecke
3	**Drawdown update**		Bruce Leicher
4	**Wendy Gendron Update**		Wendy Gendron, Bruce Leicher
5	**Warren Avenue Discussion**		Bruce Leicher
6	**Meeting Dates & Activities Discussion**		

MEETING NOTES	
#	**NOTES**
1	• Bruce opened meeting at 7:30PM
2	• Agreed to defer review of meeting minutes until next meeting
3	**Secretary's Report**

The purpose of the Bare Hill Pond Watershed Management Committee is to preserve, protect, maintain and enhance the environmental, aesthetic, recreational and economic values of Bare Hill Pond, and to promote watershed management, within the Town of Harvard.

Bare Hill Pond Watershed Committee
Treasurer's Report

Month End: December 2022

Account Number	Purpose	Original Appropriation/ Carryforward	YTD Spend and Additions	Recent Month	Available Budg
01490	Appropriation account	28,000	(1,385)	(4,398)	22
27023	Project Grant	52,080	(9,593)	-	42
26612	Bare Hill Pond Gift Account	-	-	-	
52039	CPA Funded Articles	-	-		
		80,080	(10,978)	(4,398)	64

Recent Month Activity: Encumbrances

Account	Invoices Paid	Amount
01490	National Grid October	4,272.93
01490	Pablo Carbonell - SB Industrial Supply	124.83
01490		
01490		
01490		
01490		
01490		
		4,397.76

FY 2022 Projection:

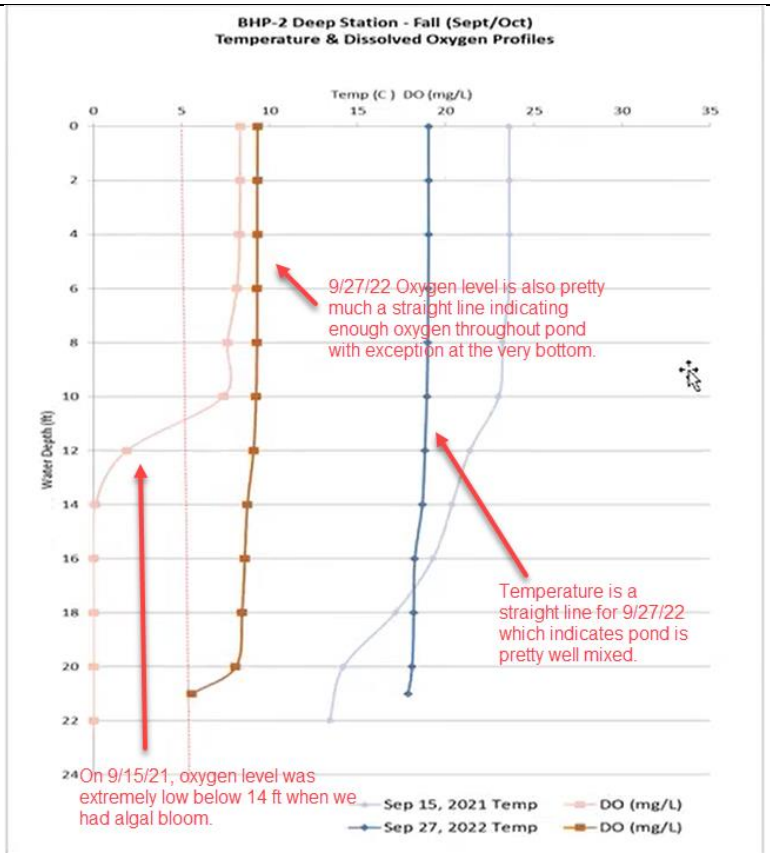
Available funds - Town	22
Project account	42
Total 2022 funds avail.	64
Projected EOY Cash position	TBA

- Received first bill for month using the pump--~ $4400
- Pablo ordered spare parts for the pump
- Bruce/Pablo replaced the water sensor for the pump priming cycle at pump house to make sure pump was starting up properly. We now have a spare water sensor at the pump house.
- Bruce did some initial maintenance on the vacuum pump before the draw down. Pablo did some additional maintenance moving the hose that drains the water to a better location (The hose had been sucking water into the oil chamber/vacuum pump occasionally)
- Submitted budget to town for approval which included an increase to cover costs of additional habitat and algal bloom monitoring and testing.

4 **DRAWDOWN UPDATE**

- DPW had contacted Bruce right before Thanksgiving regarding concern that pond level had dropped below 6.5 feet. The pump was stopped to allow the pond to refill. The pond level had never dropped that quickly prior to Thanksgiving. The pond had probably dropped to 7 ft. Pond has mostly refilled since then.

	• Two markers on the pump had fallen into the mud so we were past the 7 foot marker. Bruce reinstalled the markers… the first marker is a 4.5 ft. Pond level is just past the 6.5 feet. If the pond refills above that, the pump would be turned back on to keep it level. • Monitoring the level of the wetlands… the wetlands are staying wet . It has not declined below 68 inches. There's still water flowing from water table from the pond into the wetlands. Historically, it's been as low as 80 inches which is when it stops flowing downstream. Downstream flow is ok. If we need to keep the pump on to keep the wetlands wet, we can do so. • It's a manual process to turn off the pump based on visual inspection of the markers on the pipe for the pond level. • In 2006, pond had been drawn down to 8ft for clean-up. Historically pond was drawn down to 6ft but was increased to a 6.5ft target because it appeared to get better results. • Last year and in the two prior years, the drawdown did not get to 6.5 feet so this year appears even lower. • Pond went down a lot faster this year.
5	**WENDY GENDRON, ACQUATIC RESTORATION CONSULTING UPDATE** • Since the last Conservation Commission meeting, Wendy received August 22 phosphorous testing results and conducted another temperature/dissolved oxygen sampling in September. Based on the temperature and oxygen profiles, the pond appeared evenly *mixed* –i.e. temperature and oxygen levels were consistent at most water depths (see graph below). Due to the mixed profile, it was determined it was unnecessary to do an October sampling (we were not invoiced for the October contracted services)



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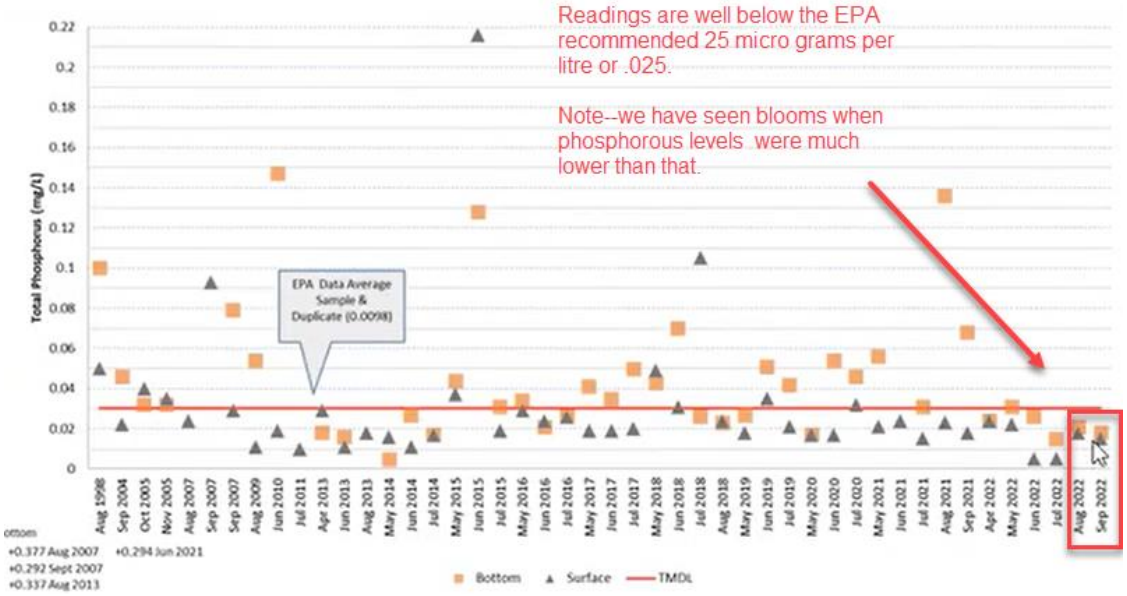
- Wendy is looking for a more *stratified* pond conditions where there's a gradient of temperature and oxygen levels in the pond to perform analysis of whether additional areas are producing phosphorous from the sediment.
- Wind conditions on the pond at end of July might have caused a 'mixing' event to create this mixed temperature/oxygen profile.



- While total phosphorous levels were low and below the EPA target levels of 25 micrograms per litre, Wendy indicated we have experienced blooms when total phosphorus levels were even lower which is why she believes phosphorous is being released from the sediment.

- *QUESTION: Are we building enough resiliency in the pond with the annual drawdowns to just continue monitoring before we need to explore/implement solutions to address algal blooms on the pond?*

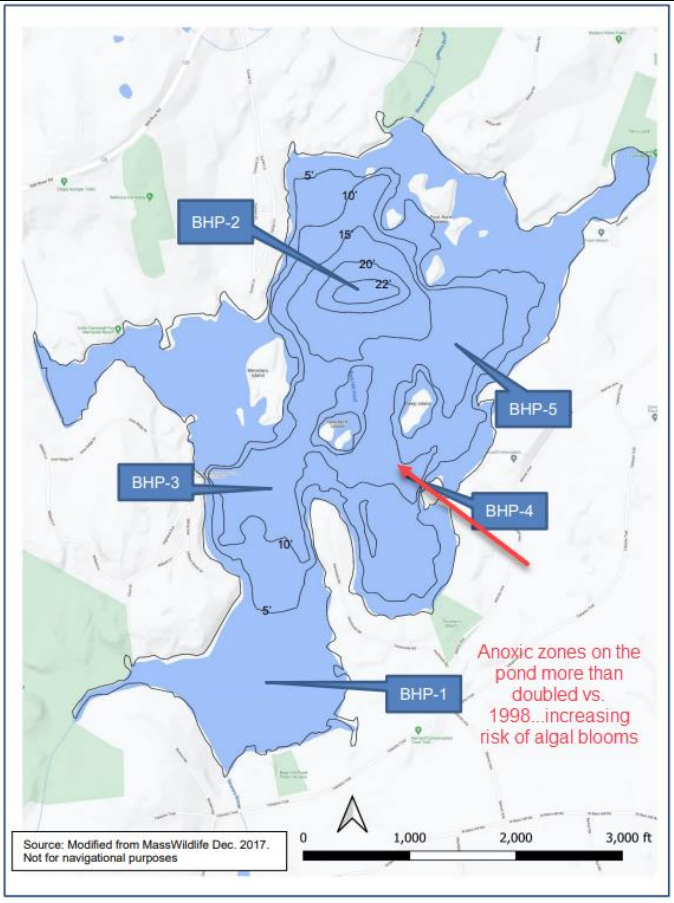
  Wendy advised that we do another year of monitoring and accumulate more data. Over the last three years, the pond has experienced varied weather conditions—heavy rain in one-year, extreme high temperatures in another and drought this year. Perhaps, the weather will be more 'normal' in the coming year.

  She observed that regardless of which technique/solution used to address the algal bloom (e.g. oxygen saturation, alum treatment) we are probably at least 2 years out from implementing. It is a process to obtain budget and the appropriate permits.

  She indicated we can try again this summer to pump out anoxic water using the pump and see if that helps.

- Anoxia technically occurs when dissolved oxygen levels is zero. However, biological chemical processes start to change when oxygen levels drop to 2mg/litre.

	• In 2021, oxygen levels were sufficient up to a depth of 10ft on the pond. Below that the, oxygen levels started to deplete or become anoxic. Near the surface, boat turbulence and plant help to restore oxygen levels. However, near the bottom of the pond, the sediment consumes the oxygen (through plant debris decomposition). Wind cannot really mix in oxygen levels at these depths and there are not as many plants to restore oxygen. Aquatic life such as fish and mussels will not be present in the anoxic layer. • So the pond becomes stagnant and stratifies essentially into two layers---an anoxic layer (no oxygen) and a layer with sufficient oxygen. • In the anoxic layer, different chemical processes start to occur. Iron which typically binds with phosphorous *starts to release* phosphorous into the water column (*phosphorous loading*) which in turns can feed algal uptake or agal blooms. This phosphorous loading and combined with warm temperatures provide ideal environment for algal blooms to emerge. • While initially growing in the anoxic layer, a *mixing* event (e.g., wind) can bring these cyanobacteria to the surface. Wendy indicated that scientists have also found that some cyanobacteria can cross this threshold without a mixing event in search of light. • In 1998, we did not see oxygen levels start to deplete until a depth of 5 meters or 16 feet. In comparison, in 2021, oxygen levels started to drop off at depth of 10ft. The areas on the pond with 10 feet depth is more than the double the area with 15 ft depth which shows the increased risk of algal blooms.



- What causes anoxia? All lakes tend to accumulate biological debris. Plants living the pond or lake eventually die and become part of the sediment. Bacteria and other organisms start to decompose this debris and, in the process, consume the oxygen. And as oxygen becomes depleted, phosphorous starts to release into the water column.
- One of the potential techniques to prevent phosphorous leaching into the pond is to add oxygen into these areas. With more oxygen, iron should hold onto the phosphorus.
- Motor boat traffic will have limited impact in terms of mixing. It generally only impacts the upper portions of the water and there can be other factors such as shape of the pond and islands which can interfere or limit the mixing.
- Bare hill Pond loses oxygen even above the thermocline (at the shallower depths) which indicates there is huge biological oxygen demand from the sediment.
- *QUESTION: Are there any innovations or progress with solutions which focus on locking up the phosphate?*

  Wendy indicated she is not aware of anything new.

Phoslock is a similar compound to alum but it is not approved in Massachusetts. It is an inactivator which combines with phosphorous and 'inactivates' it. She noted that with these solutions, you never really get rid of the phosphorous, you only make it biologically unavailable.

QUESTION: Did we do any sediment analysis when we dredged the town beach?

They did do a sediment analysis prior to disposing. The analysis indicated the sediment did NOT contain any hazardous materials but also that it had little commercial value such as using it for gardens. The dredged sediment was disposed in the town gravel pit.

- Sediment in the pond is sort of like an underwater compost pile.
- Wendy indicated that when inactivation of phosphorus generally only impacts the top 4 inches of the sediment. There is likely phosphorus at deeper levels of the sediment. It would take year to deplete or drain out. The best method would be to dredge the pond.
- By flushing out the biomass and phosphorous from the pond, the drawdowns can help build resiliency
- Wendy noted that scientists still do not fully understand the causes of algal blooms or the toxins that can be produced.
- Wendy estimated cost of alum treatment at ~$220K including permitting and transportation costs.
- The oxygen saturation technology proposal was estimated between $500-$750K. OST also indicated that the oxygen saturation should likely be combined with alum treatment so cost is likely even higher
- The alum treatment is 319 grant eligible which means the state could fund 60% of the cost and the 40% match could be met with CPC funds.
- Committee discussed what would trigger a course of action to address algal blooms on the pond and the steps involved to obtain approval. A public town hearing would be needed, and the residents would have to indicate support for any initiative. Regardless, it is likely it would 2026 at the earliest before we could implement any mitigation efforts.
- Wendy has experience working on alum treatment projects in terms of data collection, preparing estimates and notice of intent prep work.

	• Bruce indicated a historical reluctance in Town to pursue 604B grants due to the conditions the state imposes on such grants. There might be other grants available as a result of the IRA (Inflation Reduction act) which shorter grant approval timelines. • Wendy advised that we update our watershed management plan prior to obtaining any funding or grants. • It was noted that the committee should define or prepare contingency plan with defined steps in the event we needed to pursue a solution to address algal blooms.
6	Reviewed ZBA and Conservation Commission Application for 90 Warren Ave. Peter von Loesecke noted he was an abutter, recused himself and left the meeting.
7	
8	Agreed to meet on Tuesday nights on 4th week of the month.

NEW MEETING ACTION ITEMS			
#	**ACTION ITEM**	**RESPONSIBLE**	**DUE DATE**
1	Review and update watershed plan		
2			
3	Meet on Tuesday nights 4th week of Month		
4	Determine Town's Electrical Supply contract expiration	Peter Von Loesecke	
5			
6			
7			