Town of Barnstable

Land Acquisition and Preservation Committee

January 11, 2021

5:30 pm

https://zoom.us/i/99881252719 Meeting ID: 998-8125-2719
Phone: 888 475 4499- U.S. Toll Free Meeting ID: 998-8125-2719

Chairwoman Canedy called the meeting to order at 5:30 PM.
Chair Canedy -Roll call taken

NAME	POSITION
Canedy, Ann	Chair - present
Crowley, Elissa	Member present
Gould, Steven	Member present
Lewis, Elizabeth	Member present
Lewis, Farley	Vice Chair - present
Miller, Phyllis	Member present
Payson, Douglas	Member absent
Pratt, Tracey	Member present
Rowland, Anne	Member Present

Approval of Minutes
Chair Canedy - Recording Secretary is not present due to illness. Approval of minutes to be done next time LAPC meets. All in agreement.

New Business
Introduction of Presenter and Topic of Presentation
Chair Canedy introduced Ms. Casey Dannhauser, Special Projects Manager. Barnstable Clean Water Coalition (BCWC) on the Bioreactor Pilot Project – Improving Water Quality with Cranberry Bog Bioreactors. Ms. Dannhauser used to be a member of the Barnstable Water Advisory Committee. Ms. Dannhauser left Barnstable to pursue a degree in Oceanography, but now has returned to Barnstable.

She showed slides of ocean shoreline and noted that these are signs of unhealthy aquatic system. Nutrients have been flowing freely into our bays for decades causing atrophic conditions. The source of these nutrients is septic systems. 85% of the homes on Cape Cod process their wastewater with Title V Septic Systems. These systems do a great job in what they are designed to do. (Removing aspects of

wastewater directly harmful in the human health like E.coli.) At the time of their development nutrients weren't considered a pollutant let alone harmful directly to human health. As such, septic systems were never designed to address nutrients. As a result, for decades since the development boom on the Cape, nutrients from septic systems have been flowing directly into ground water and bays and estuaries. Three Bays Watershed where our very active project is located is highlighted in red on the slide. We chose this watershed for a couple of reasons: first) from a nutrient loading perspective, Three Bays is one of the worst Watersheds on Cape Cod. Only Waqoit Bay and Popponesset Bay need to reduce their content more to achieve natural ecosystem functions. Three Bays gets the "bronze medal" for the worst water on the Cape.

Secondly, the town does have a comprehensive plan to address this problem. Most of the Watershed of Three Bays seek treatment for over a decade with the last of the homes being reached in thirty years. Once the sewer line does come through, it'll take another decade for any nutrients already in our ground water to make its way to the estuary. The sewer line will turn off the tap but we still need to drain the bathtub.

Showing slide where the Cranberry Bog Bioreactor is where it is located. This area was not chosen by happenstance. This area acts as a collection basin essentially for nutrients and upgradient development.

Another slide was a sub water map courtesy of the MEP Report for Three Bays Estuary. Any nutrients that flow to this watershed go to our bogs. Its one thing if it stayed in the ground; it would be harder to treat. This is also massive where the water comes to the surface.

Areas of wetlands locations were determined in an aerial report in 2019 using a drone with thermal imaging attached. Showed a slide with the imagery showing 50 degree groundwater temps in the bog. This tells us that "yes" we are still seeing large quantities of groundwater coming to the surface. This is where we want to be treating the nutrients.

A Bioreactor is any manufactured system that supports a biologically active environment. Our system is just woodchips in a ditch in the cranberry bog with some sampling pores in it. Those woodchips support an eco-system of what are called denitrifying bacteria. They're naturally occurring bacteria; we don't need to introduce them. The woodchips act as sort of a food source for them which draws them in. These bacteria are incredible organisms. As an example, if I took all of the oxygen out of the room I'm standing in, I wouldn't survive. But in the absence of oxygen denitrifying bacteria breathe nitrogen instead and that's where we have the opportunity to improve water quality.

As the water moves through the Bioreactor the bacteria uses up all of the oxygen in the water. Then once the oxygen is gone, they're going to start breathing the nitrogen in the water. This reduces the nitrogen in the water coming out of the other side of the Bioreactor entering the Marstons Mills River and reaching the estuaries in a matter of hours.

A group of us made up of representatives from Barnstable Clean Water Coalition, EPA Region 1, EPS's Office of Research and Development, Mount Holyoke College, and The Nature Conservancy met weekly via Zoom to plan out our first Bioreactor with a goal being two-fold: not only do we want to achieve

denitrification but we want to do it in a way that is affordable so we can apply it not only in this cranberry bog but in other similar bogs in Barnstable and Cape Cod. In July, masked and socially distanced, we installed our first Bioreactor with wood chips straight off a wood truck. The cheapest woodchips you can get. Woodchips off a tree chipping truck are dusty with particles that clog the pores between the woodchips and slow the water down. On one hand that is a good thing. You want the water to stay in the reactor long enough for all the oxygen to be taken away. But in this case you back the water so much that instead of going through it shows the path of least resistance and went through and down another ditch instead. It backed up through a ditch and bypassed another ditch. While this theoretically does a good job at treating nitrogen not much water is actually flowing through it. To the next level up, ¾" uniformed woodchips and we did a much smaller installation so we can test out residents' time before we go and do the full installation. Water levels in photo of upstream and downstream are about equal. The water is flowing through in a matter of minutes. In order to give the bacteria enough time to consume the oxygen, a Bioreactor with just these woodchips would need hundreds of feet long, which we don't have space for.

I was out there with EPA grabbing woodchips from newer reactor and they will do a couple of bench studies with mixture of woodchips and sand to see which is the best composition to allow us to keep it affordable. But also allow us for that residence time we are talking about to achieve denitrification. EPA Lab in Oklahoma is running a lot of samples for us because they are excited for the potential applications for this work. We are also able to look for arsenic and sulfur we have potentially the chance to help different places across the country.

Questions and Answer Period

Chair Canedy: Is this still a work in progress? Ms. Dannhauser: We lose all of our oxygen in the first five feet of our initial installation and when results come in for that we expect to see denitrification but the water is just not flowing through enough for us to be satisfied. The second one is flowing too fast so it is not necessarily working. The bacterium does not have enough oxygen to get out to the other side and introduced to the atmosphere again. Ms. Dannhauser is confident that the bench tests will produce a good "number" to come up with to work efficiently.

Member Gould asked about urine diversion as urine is the problem. Ms. Dannhauser did agree that urine is the problem. It is unrelated to this project but the biggest problem with this is the social acceptance of urine diverting toilets and things like that. They are working on an alternative septic system pilot to kind of get at a solution. We do have social scientists from EPA looking at the social ability and willingness to use other technologies but at this point it is not quite there.

Member Lewis: with colder weather how does that set influence to your project? Ms. Dannhauser: With colder weather that magical time we need increases but the flow of water also slows in the winter because some of that water is going to freeze up and block some of those holes. **Member Lewis:** What is the prime time for this to be effective? Ms. Dannhauser responded that you need 7-10 hrs. in the warmer months; that increases to 10-15 in the colder months but again in the colder months the water is not moving as quickly. It's also in the summer we end up with the summer population moving back and having an increase in what we have to treat anyway.

Chair Canedy: Is this mainly applicable to bogs? Ms. Dannhauser: Essentially this is a surface permeable

reactive barrier. There are a couple of ways to work with this and one of them is using woodchips. This involves digging a huge trench and intercepting the water in a similar manner. We are using cranberry bogs because the ditches are already there and the water is coming up to the surface there. It provides a cheaper more affordable way to intercepting the water

Member Gould thanked Ms. Dannhauser for her excellent presentation.

Chair Canedy asked if other members would like to see more types of presentations like this and perhaps bring in other types of things that they suggest for presentation. We want to help the town by suggesting different ways to clean up the water. We are looking at acquisition of land for that purpose. Please let me know and I will look into it. Ms. Dannhauser: noted here she is always happy to talk about what Barnstable Cleanwater Coalition has going on. I would be happy to come back again. We are working on an alternative septic system, cluster near Hubel Pond...that's a big effort right now that I can talk about and hopefully (fingers crossed) get the ball rolling on the restoration and I can also come back and talk to you guys about that. Also I can give updates on what the team has come up with. **Member Miller**: always interested in the speller at Barnstable Harbor and what is happening with it.

Chair Canedy will book Casey again on a couple of different projects....the Urine Diversion project would be have interest as well as Oyster Speller and other alternative systems that I would be interested in. Ms. Dannhauser: very happy to talk about that and we have a lot of stuff coming down the pike. **Member Miller** asked Ms. Dannhauser if she was working with the town on the sewers. Ms. Dannhauser: the Town applied for a grant for alternative septic systems but unfortunately that grant was turned down. We are in discussion about ways we can work together.

Chair Canedy: We need to identify and obtain some parcels of land on the north side that we can locate package plants in the future. These people are going to be paying for a sewer that they will never see. **Member Miller**: The cost of doing the alternative sewer system, has that changed at all? Ms. Dannhauser: those costs are based off one system (all the way over there) another system (all the way over there)whereas in actuality if they are going to make a difference you're going to need to put a lot of them in an area but that changes the cost associated with.....if you are constructing them all at once, or sampling them all at once; that drives down the cost substantially. That's something we should be keeping tracking of as we install a cluster of 15 systems near Shubael Pond.

CONSERVATION RESTRICTIONS:

Chair Canedy: Update on Falcon Road and Wakeby Road...(both were finalized and approved by the state). The town is purchasing both parcels and the Land Trust will hold the conservation restriction on both . The Falcon Road parcel has closed. The Wakeby Parcel is coming up. **Chair Canedy** is meeting with the Town Attorney (and Member Lewis is welcome to join her) sometime after January 25th to talk about the other outstanding conservation restrictions. That is coming along and we are getting somewhere on that. Thank you to the new Town Attorneys. The town is doing a good job tracking Falcon and Wakeby so far. We still have to go back and clean up Prince Ave and Harju and Amaral.

Those are still out there.

SANTUIT:

Member Miller: We have had a good Winter through our Department of Public Works. **Member Gould** was going to go up to Santuit and take a walk. This past season due to Corona Virus, we did not have our management team do our walk but we now will find a way to do it. **Chair Canedy** requested I hold off until March. As requested, the DPW removed the concrete pad; graded; loamed and seeded by the footbridge for those who haven't been up there...the footbridge is in back of the shed (large barn). We had the barn painted red, all the translucent light panels were replaced that were damaged and the building made more secure. The pressure treated materials that have been dumped along the 2nd gate off Hollow Road. The gates are numbered. They removed dishwasher, load of bricks, and construction debris off the right side of the trail to the water. They demolished the old pump building which is technically in Mashpee but as we own this preserve together with Mashpee and the state it belongs to all of us. They completed all the trail maintenance including the fire access road. (that's the main road that goes in back of the bracket bog) and removed all the gate posts along the entrance to the fire road. This Winter we plan on filing an RDA to hopefully get permission to install a small parking area off of Santuit-Newtown Road. Conservation feels the waterway that is in there are too close. We have enlarged the parking along the road there. **Member Gould:** I was there this afternoon and I thought everything looked fabulous. There was no trash, the pump house, shed, tank (all is gone). Very little signs of human activity. There was a little bit of dirt bike activity but nothing extreme. The road seemed good all the way around today. The pond is very full and looked good but they are not allowing any water into the bogs themselves. Bogs look dry. **Member Pratt**: noticed that the water in Santuit Pond was starting to clear up a bit. The Brackett Bog has quite a bit of water in it. As a result, the pitch pines are dying. The bog that Mashpee purchased is beautiful and his hope is that they will not let it go to seed. The gate is down and it should be put back up again. **Member Miller** will mention it to D. McManus.

PATHWAYS

Member Lewis: Had an email from Lev Malakoff formerly of Cape Cod Commission (CCC). He's working on the idea of creating The Cape Cod Way which would go from Woods Hole to Provincetown. I think he'll be able to help us out when it goes through Barnstable. The Trayser Bridge Project is stalled. Mr. Malakoff hasn't heard from the project committee because he'd like to help move it along. He has a potential donor for materials and he has access to builders and tools. **Member Lewis** suggested that she and **Member Crowley** get together some time to put their heads together and come up with some ideas. **Member Crowley** was in agreement. **Member Lewis** invited anyone on committee to leading the walks, they know what to do. A time would have to be set sometime in June....so let's think about that. **Chair Canedy** noted that at that time it'll be warmer, more people will be vaccinated and perhaps feel more comfortable doing this. At this point in the meeting all members are hoping "things will look up."

Chair Canedy will get back to members on the Trayser Bridge Project as we have to get moving on that she indicated. If you give me that contact information, we can work with him on it to get David Anthony to respond. If we have potential donors for materials and tools for building, I would think that the town would jump on that.

MISCELLANEOUS COMMUNITY PRESERVATION PROJECTS

Chair Canedy and Member Lewis: As far as open space there are no community preservation projects outstanding. Hyannis Golf Course was not discussed last meeting. Braggs Hill is up in the air. Haven't heard anything on that. **Chair Canedy**: I think that's because nothing is being done about the shooting range. I think they are letting that sleeping dog lie. That is something I want to follow up on too.

Motion to adjourn made by **Member Miller** and seconded by **Chair Canedy**.
All in favor.

Respectfully Submitted

Elizabeth B. Silva
Temporary Scribe