

**Lake Champlain Basin Program
Technical Advisory Committee meeting
Held remotely over MS Teams
Wednesday, February 2, 2022, 8:45 AM – 11:30 AM
Approved TAC meeting summary**

TAC Members: Jennifer Callahan, Ryan Cunningham, Laura DiPietro, Bryan Dore, Curt Gervich, Peter Isles, Neil Kamman, Steve Kramer, Margaret Murphy, Bridget O'Brien, Mario Paula, Oliver Pierson, Andrew Schroth, Jamie Shanley, Lauren Townley, Ryan Waldron

LCBP Staff: Mae Kate Campbell, Meg Modley, Matthew Vaughan, Sarah Coleman, Katie Darr, Erin Vennie-Vollrath

Guests: Andres Torizzo, Maddie SanAngelo, Diana Bazzini, Matt Schley, Isabelle Piché, Rifat Salim, Nisha Nadkarni, Marli Rupe, Michael Murphy, Daniel Tremblay

1. Final report review: Tile drain base-flow phosphorus removal using St. George Black (Andres Torizzo and Maddie SanAngelo, Watershed Consulting Associates)

- Andres and Maddie presented. The project focused on treating soluble reactive phosphorus in baseflow effluent from tile drains using a locally sourced shale material. They found that the medium is effective.
- Laura: Thank you for the great work. I am curious about the retention time in the system. In the 2nd year of the study, with more drought conditions, do you think there was more time that the material was sitting in the St. George Black and absorbing more?
 - Andres: The Vermont Agriculture and Environmental Laboratory (VAEL) lab was an important partner in this work, thank you. I think the retention time was the same since the pump was pumping at a constant flow. I think the difference in the residence time was in that inflow sample.
- Margaret: Interesting work. Curious, you list your events, but I wonder about the seasonality, how does the seasonality of when you are able to sample impact the retention and the amount of phosphorus coming in as well?
 - Maddie: We would start in May, so the fields were not growing corn yet. During the growing season we did see differences depending on whether there was a crop or not. When there were crops growing, they were pulling up water that otherwise would have been flowing into the ditch. We never got a sample in the middle of July at the peak of the growing season.
- Matt: Note that this is a very different and useful setup than the other filter design that we are testing – the other is an inline design that measures outflow – this is specifically targeted at baseflow. You know what the flow is because you know how long the pump is on. I'm wondering if you'd be able to make some estimates of not just concentration reduction, but also load removed over time? It would be dependent on the pumping rate. In thinking about upscaling this system, what is the feasibility of having a few of these in series or one bigger one?
 - Andres: That question gets into what I was going to suggest with how this could be paired with a larger system. It could be paired with a catchment basin of some kind that would collect effluent. You'd hook the pump on to that. The first

collection area would control hydrology, hold water, and then cycle the water through the system. There could be opportunities to do this all with gravity. We weren't successful at our site, but other sites could work well in a passive way. I think we probably could do some of those calculations.

- Neil: Your basin on front end idea got me thinking. It strikes me that you could set up a solar pumping system that would allow you to get more of the high-flow volume. That thing in a hot field would become somewhat of a reactor, could convert phosphorus to soluble reactive phosphorus. I wonder whether that could have applicability in an urban stormwater application.
 - Andres: That makes a lot of sense.
- Andrew: What's the cost of leaving something like this out there and intermittently collecting samples? Is there an opportunity here to leave what you've built and test the long-term potential?
 - Andres: It is still out there. So far, the farmer has been very accommodating to this work. I would expect he would be fine if we wanted to continue.
 - Matt: The cost would mostly be personnel.
- Neil: How much would it cost to implement one of these with a gravity system or solar pump?
 - Andres: I'm hesitant to put out numbers. I can follow-up. You would need to have some automated system that would be triggered when the tile drain is flowing.
 - Matt: It could be flow activated like it is in your system.
- Neil: Maybe we can talk offline about letting this thing continue to run. If it goes for 5-years, that would be interesting.
 - Andres: We do have to figure out disposal if this was going to be the endpoint. We would talk to the farmer about cutting the system open and putting material on the field.
- Neil: Laura's initial reaction to if this is the kind of thing one might deploy in certain areas, could you see this as a practice?
 - Laura: Not going to say no, but the conditions gave you the ability to have good capturing. I know from other studies that in higher-flow conditions, it's difficult to have that performance. I would want to see more data in those conditions. We have a lot of these research studies we look at, but we don't know the longevity.
 - Matt: Thinking about this design, it's different in that when those big flows come, it lets them go by. If there's water, it can pump it whether it's surging or just a trickle. It's an upflow design, unclear if this would clog. In my mind that's an advantage of this system. You're limited in what you are able to remove because it won't capture high flows, but it keeps operating.
 - Andres: I would say that that's the case. I haven't seen any clogging issues.
 - Maddie: We have a sieve on the end of the pump that went into the ditch itself. On the outlet side, there was one time we pulled up medium material into the tubing, but nothing that clogged.
 - Andres: I think what you are saying makes sense. To have the system be totally successful, you would likely need better control of the hydrology. I'm curious to

know, if you increase the pumping rate, at what stage you'd see decreased performance. Could you use this with check dams or a filter box?

- Matt: Is the next step to try a few different design techniques, or is it to stick with this for a longer period and see how much it adsorbs?
- Laura: One thing I think we need to consider as TAC is maintenance and infrastructure care. We're missing the high flows, we're only getting some of the low flows. Compared to the idea of a treatment train and looking at if you could you get higher flows, and could you have someone maintain and run it? Merging concepts together. We need to figure out how much money it would cost, how much you reduce nutrients, and how to get these effects in the landscape.
 - Matt: I can work with Andres and Maddie to get this basic math about efficacy into the final report.
- Neil: Change figure 2 label from 'Northeast Arm' to 'St. Albans Bay'.

Motion: To approve the final report pending additional comments received within a week and to add information around loading with the information available.

By: Margaret

Second: Jenn

Vote: all in favor

2. Updates, announcements, public comments

Updates

- Matt: Recently several TAC members have moved on due to retirement, including Jim Jutras and Leigh Walrath. They've both made important contributions to the TAC over the years, and we will miss their support. Bill Ardren has accepted a new post, congratulations to him. He's been a great asset to our program over the years. I wanted to welcome Peter Isles as a new TAC member, we're happy to have him join us. We've been working to replace representation from the Québec Ministry of the Environment and Fight against Climate Change, so we are happy to have Isabelle and Daniel join us. They are working together for now, one of them will become the officially appointed TAC member.
- Andrew: Our former TAC member Breck Bowden is retiring from UVM/SeaGrant. We're in the process of hiring a new faculty member. Please spread the opportunity.
- Oliver: I'll share some updates from the Vermont Department of Environmental Conservation (DEC). Today is world wetlands day; as part of that celebration, VT is doing a big update to our wetlands inventory map. The legislature is in session and is considering several water-related bills: one would set up a decal for boat users that would fund aquatic invasive species prevention efforts, a few bills around lakes in crisis, and interesting work on environmental justices that we hope moves forward. We are also involved in a discussion on the future of the Green River Reservoir dam. The legislature has funded a study on the potential impacts of dam removal. We received an application for herbicide treatment in Lake Bomoseen to reduce the spread of watermilfoil. The application has generated interest from the angling community, which is opposed to herbicide use due to the perceived negative impacts on fisheries. We will hold public

hearings to determine how to proceed. Finally, DEC issued a request for proposals for DEC funded lake watershed actions plans. There's a neat tool available on our website around shoreland protection – a document summarizing bioengineering techniques.

- Ryan C: The New York Department of Agriculture and Markets has released two requests for proposals for NY-wide flagship programs: agricultural non-point pollution reduction and climate resilient farming. The new agricultural environmental management is out and includes funding for soil and water conservation districts to do small farm projects.
- Lauren: We are tracking the draft NY state budget, which currently includes an increase in the environmental protection fund. Great news. The draft 303b list, municipal separate storm sewer system permit, and concentrated animal feeding operation permit are out for public comment currently.
- Sarah: VTDEC recently released the 2021 VT clean water initiative performance report. There is a clean water Board meeting coming up on February 8th to review the fiscal year 2023 budget.
- Neil: The clean water report is an impressive document, I encourage you to take a look. In the Vermont state budget, we are looking at \$26 million in clean water fund money, \$7 million capital funds, and \$14.5 million in American Rescue Plan Act funds directed specifically towards the clean water program. There's some really tremendous funding available to us in the coming years. These increases could project into the future.
- Margaret: VT fishing regulations were updated on Jan 1st. We updated the online fishing regulation tool as well to make it much more user-friendly.
- Matt: Full proposals for the LCBP technical request for proposals are due in a week! TAC will review and score them between now and our March meeting.
- Meg: We've moved forward on early detection monitoring for round goby at the southern end of the Hudson canal. We will also be sampling in the Richelieu. We've added viral hemorrhagic septicemia (VHS) sampling on any organisms detected.

Review and approve summary of previous TAC meeting

Motion: To approve the meeting summary from the January 2022 meeting

By: Jenn

Second: Margaret

Vote: all in favor

Abstentions: Margaret, Curt

3. Presentation: Champlain Canal aquatic invasive species barrier feasibility study phase 1 (Diana Bazzini, USACE)

- Michael Murphy (HDR) presented, giving an overview of the project and its scope. The main purpose of this work is to develop barrier alternatives that prevent multi-taxa biological traffic in the study area while maintaining a viable navigable connection. Round goby is an imminent threat for infestation in Lake Champlain.
- The Corps is moving forward with considering alternatives 2, 4, 5. They used multi-criteria decision analysis (MCDA) to choose which alternatives to pursue. MCDA considers environmental impacts, effectiveness at eliminating aquatic invasive species,

vessel and boater accessibility, community impacts, broader system impacts, and operation and maintenance requirements.

- Alternative 2: Complete hydrologic separation with 9 measures including a back pump, physical barrier, and repairing lock seals. Initial construction cost: \$18.3 million. Greatly reduced aquatic invasive species transfer.
- Alternative 4: Small boat lift. Lock remains functional for passage of commercial or maintenance vessels only. Includes wedge wire intake screens, reversing flow, repairing lock seals. Initial construction cost: \$2.4 million. Moderately reduced aquatic invasive species transfer.
- Alternative 5: Large boat lift. Lock remains functional for passage of commercial or maintenance vessels only. Initial construction cost: \$11.4 million. Significantly reduced aquatic invasive species transfer.
- Phase 2 of project will include detailed analyses and design of 3 or the only selected alternative(s). It will also address major issues around the hydropower plant and commercial/maintenance traffic. The Phase 1 final report will be completed in March, 2022.
- Matt: For alternative 2, would the trailer and boat lift be cleaned as it moves back and forth between the two basins?
 - Meg: Yes.
- Margaret: "Upstream" is confusing because of changing flow directions.
 - Diana: Thanks, North and South is clearer and we will try to use that in that future.
- Neil: In alternative 5, would there be two barges and two tugs?
 - Diana: Yes. This would decrease the amount of inter-basin transfer. Increased cost by approx. \$2 million, but the team thought it was necessary.
- Meg: Cost estimates are relative and will shift as Phase 2 is completed.

4. Presentation: 2021 Boat Launch Steward data review (Meg Modley, LCBP)

- Meg summarized the current status of aquatic invasive species in Lake Champlain and threats from surrounding water bodies. She reviewed data from the Boat Launch Steward program from the 2018-2020 field seasons, which is summarized in the State of the Lake report. She also reviewed the history of the Boat Launch Steward program, highlights from the 2021 field season, and plans for the upcoming 2022 field season.

5. Executive session: Brief discussion regarding a request from an FY22 technical program applicant

Motion: To enter executive session

By: Margaret

Second: Jenn

Vote: all in favor